VOLUME 10 Air Transportation Oversight System
CHAPTER X – SAFETY MANAGEMENT SYSTEM

Note: This draft SMS guidance material is being provided by the FAA Flight Standards SMS Program Office to support evaluation of the Safety Management System for Part 121 Air Carriers Notice of Proposed Rulemaking (NPRM) (RIN No. 2120-AJ86). This draft is not intended to provide guidance for compliance with any current existing regulation or policy. This draft chapter provides sample guidance on possible implementation of a proposed SMS rule. As such, it is written as if the NPRM has been accepted as a SMS rule and will be revised as necessary as rulemaking considerations proceed. For this reason, the FAA welcomes comment on this document.

[X]-001 OBJECTIVE

Scope and Applicability: The FAA is requiring certificate holders operating under 14 CFR part 121 to develop a system that emphasizes management of safety as the driver for an effective and efficient operation. The international system of choice is the Safety Management System (SMS). This guidance document is a tool to assist CHDO's in surveillance, oversight, validation and acceptance of a Safety Management System as implemented by a part 121 certificate holder.

Regulatory Requirements: Title 14 of the Code of Federal Regulations (14 CFR part 5), §5.1 requires a part 121 certificate holder to have a safety management system that meets the requirements of part 5 and is acceptable to the Administrator.

[X]-002 OVERVIEW OF SAFETY MANAGEMENT SYSTEMS (SMS).

WHAT IS SMS? SMS is a comprehensive, risk based, process-oriented approach to managing safety as a core business function within an organization. An SMS includes an organization-wide safety policy, formal methods of identifying hazards, assessing and mitigating risk on a continual basis, and promotion of a positive safety culture.

Four Components of a Safety Management System. SMS is organized around four basic components of safety management. The components correspond directly to the ICAO SMS Framework.

> **Policy.** All management systems must define policies, procedures, and organizational structures to accomplish their goals. This first component in an SMS provides the foundations for SMS functional elements.
>
> **Safety Risk Management (SRM).** A formal system of task analysis, hazard identification, risk analysis, risk assessment and risk control. SRM is essential in controlling safety risk.
>
> **Safety Assurance.** Once SRM controls are employed, it is necessary to ensure that the controls established continue to be effective in a changing environment. The Safety Assurance function provides for this, using system safety and quality management concepts and processes.
>
> **Safety Promotion.** Safety must be promoted as a core value with practices that support a sound safety culture. Safety Promotion provides guidance for establishing and maintaining these functions.

[X]-003 BACKGROUND. The aviation system is characterized by increasingly diverse and complex organizations as well as increasingly advanced aircraft and equipment. The changing aviation operational environment requires organizations to adapt continuously to maintain their viability and relevance.

International Harmonization. ICAO changes to key annexes in the ICAO Conventions, revamped its standards and recommended practices to reflect a systems approach to safety management. It is critical that the functions of an SMS be standardized to the point that there is a common recognition of the meaning of SMS among all concerned, both domestically and internationally. Annex 6 of the Convention on International Civil Aviation established Safety Management Systems as an international standard.

ICAO SMS Requirements and the FAA. The ICAO establishes that safety efforts are most effective when incorporated into the management of business and government

operations and oversight. This coincides with the FAA's move toward a systems approach for oversight (System Safety, ATOS, SMS, SAS). Amendment 33 to ICAO Annex 6 introduced a 12-element ICAO SMS Framework, which is reproduced below. The FAA SMS Framework in Advisory Circular (AC) 120-92NPRM, Appendix 1 (FAA SMS Framework) is aligned with the ICAO SMS Framework; however the FAA SMS Framework provides additional processes to facilitate a service provider's implementation of an SMS. Title 14 CFR, part 5, establishes the regulatory requirements for SMS and provides the structure for the SMS Framework.

Table 1 shows the ICAO SMS Framework, the international standard. Table 2 shows the relationships between the ICAO SMS Framework, AC 120-92NPRM (FAA SMS Framework) and 14 CFR part 5 (US Standard).

TABLE 1. ICAO ANNEX 6, APPENDIX 7, FRAMEWORK FOR SAFETY MANAGEMENT SYSTEMS

1. Safety policy and objectives
1.1 – Management commitment and responsibility
1.2 – Safety accountabilities
1.3 – Appointment of key safety personnel
1.4 – Coordination of emergency response planning
1.5 – SMS documentation
2. Safety risk management
2.1 – Hazard identification
2.2 – Safety risk assessment and mitigation
3. Safety assurance
3.1 – Safety performance monitoring and measurement
3.2 – The management of change
3.3 – Continuous improvement of the SMS
4. Safety promotion
4.1 – Training and education
4.2 – Safety communication

Table 2 Cross Reference Matrix
ICAO to AC 120-92NPRM to part 5 NPRM Draft

ICAO SMS Framework	**AC 120-92NPRM (App 1)**	**Part 5 - NPRM Draft**
Component 1. Safety policy and objectives	***Component 1.0 Safety Policy and Objectives***	***Subpart B – Safety Policy***
Element 1.1 Management commitment and responsibility	Element 1.1 Safety Policy	§5.21 Safety Policy.

ICAO SMS Framework	AC 120-92NPRM (App 1)	Part 5 - NPRM Draft
Element 1.2 Safety accountabilities	Element 1.2 Management Commitment and Safety Accountabilities	§5.23 Safety accountability and authority.
Element 1.3 Appointment of key safety personnel	Element 1.3 Key Safety Personnel	§5.25 Designation and responsibilities of required safety management personnel.
Element 1.4 Coordination of emergency response planning	Element 1.4 Emergency Preparedness and Response	§5.27 Coordination of emergency response planning.
Element 1.5 SMS documentation	Element 1.5 SMS Documentation and Records	Subpart F - SMS Documentation and Recordkeeping §5.95 SMS documentation. §5.97 SMS records.
Component 2. Safety risk management	**Component 2.0 Safety Risk Management** General Design Expectations	**Subpart C – Safety Risk Management** §5.51 Applicability.
Element 2.1 Hazard identification	Element 2.1 Hazard Identification and Analysis	§5.53 System analysis and hazard identification.
	Process 2.1.1 System Description and Task Analysis	§5.53 (a) & (b).
	Process 2.1.2 Identify Hazards	§5.53 (c)
Element 2.2 Risk assessment and mitigation	Element 2.2 Risk Assessment and Control	§5.55 Safety risk assessment and control.
	Process 2.2.1 Analyze Safety Risk	§5.55 (a).
	Process 2.2.2 Assess Safety Risk	§5.55 (b).
	Process 2.2.3 Control/Mitigate Safety Risk	§5.55 (c).
Component 3. Safety assurance	**Component 3.0 Safety Assurance**	**Subpart D – Safety Assurance**
Element 3.1 Safety performance monitoring and measurement	Element 3.1 Safety Performance Monitoring and Measurement	§5.71 Safety performance monitoring and measurement.
	Process 3.1.1 Continuous Monitoring	§5.71 (a) (1).
	Process 3.1.2 Internal	§5.71 (a) (2).

ICAO SMS Framework	AC 120-92NPRM (App 1)	Part 5 - NPRM Draft
	Audits by Operational Departments	
	Process 3.1.3 Internal Evaluation	§5.71 (a) (4).
	Process 3.1.4 External Auditing of the SMS	§5.71 (a) (2).
	Process 3.1.5 Investigation	§5.71 (a) (5).
	Process 3.1.6 Employee Reporting and Feedback System	§5.71 (a) (7).
	Process 3.1.7 Analysis of Data	§5.71 (b).
	Process 3.1.8 System Assessment	§5.73 Safety Performance Assessment.
Element 3.2 The management of change	Element 3.2 Management of Change	§5.51 Applicability. §5.73(a)(4)&(5) and §5.73(b) Performance Assessment
Element 3.3 Continuous improvement of the SMS	Element 3.3 Continuous Improvement	§5.75 Continuous improvement.
	Process 3.3.1 Preventive/Corrective Action	§5.75 Continuous improvement.
	Process 3.3.2 Management Review	§5.25 Designation and responsibilities of required safety management personnel.
Component 4. Safety promotion	**Component 4.0 Safety Promotion**	**Subpart E – Safety Promotion**
Element 4.1 Training and education	Element 4.1 Competencies and Training	§5.91 Competencies and Training.
	Process 4.1.1 Personnel Expectations (Competence)	§5.91 Competencies and Training.
	Process 4.1.2 Training	§5.91 Competencies and Training.
Element 4.2 Safety communication	Element 4.2 Communication and Awareness	§5.93 Safety communication.

[X]-004 SMS PRINCIPLES.

Safety Management System - Focusing on a Systems Approach. Systems can be described in terms of integrated networks of people and other resources performing activities that accomplish some mission or goal in a prescribed environment. Management of the system's activities involves planning, organizing, directing, and controlling these assets toward the organization's goals.

Processes – What do the people do? A process is a set of activities that people at the certificate holder do to achieve a desired result. Describing a process is describing what the people in the system do and how they do it (i.e. procedures) Several important characteristics of systems and the processes within systems are known as process attributes or safety attributes[1] when they are applied to safety related operational and support processes. These process attributes must have safety requirements built in to their design if they are to result in improved safety outcomes. The attributes are integral to the design of the SMS Framework and regulatory requirements. The attributes include:

1) Responsibility. Management and individual employee accountability, and therefore responsibility and authority, are fundamental to management of safety. These concepts are integrated into the SMS Framework. Specifically, Element 1.2 establishes expectations for the accountable executive (§5.25), management representative (§ 5.25, other management officials (§ 5.23) and all employees (§ 5.23) of the certificate holder.

SMS Framework Element 1.3 establishes an expectation for a person of responsibility to oversee a certificate holder's SMS development, implementation, and operation. This person does not bear the principal responsibility for safety management. The managers of the "line" operational functions, from middle management to frontline managers and supervisors, manage the operations in which risk is incurred. These managers and supervisors are, therefore, the "operators" of the SMS and jointly responsible with the accountable executive for "ownership" of the SMS.

The provisions of SMS, which require definition and documentation of aviation safety responsibilities, apply to all components, elements, and processes. Therefore, it is expected that responsibility and authority be defined and documented for each process. This is especially important with interfaced processes that cut across organizational lines.

2) Authority. Who can direct, control, or change the process, as well as who can make key decisions such as risk acceptance. In particular, the SMS Framework and regulations require designation of levels of management who have the authority to accept risk on behalf of the organization (§ 5.23(b))

[1] These six characteristics of systems, *responsibility*, *authority*, *procedures*, *controls*, *process measures*, and *interfaces*, are called safety attributes in the FAA's Air Transportation Oversight System (ATOS).

3) Procedures. International Organization for Standardization (ISO)-9001-2000 defines procedure as a specified way to carry out an activity or a process – procedures translate the "***what***" in goals and objectives into the "***how***" in practical activities (things people do). Procedures are simply documented activities to accomplish processes. The certificate holder should specify their own procedures for these items in the context of their unique operational environment, organizational structure, and management objectives. § 5.53(b)(3) requires that a certificate holder consider, among other factors, a system's processes and procedures whenever a new system is designed, an existing system is revised, or when operational procedures are developed. § 5.95 requires that SMS processes and procedures be documented.

4) Process Measures. Process measures provide feedback to responsible parties that required actions are taking place, required outputs are being produced, and expected outcomes are being achieved. A basic principle of SA is that fundamental processes be measured so that management decisions can be data-driven. The general requirements for SMS specify that outputs be measured and analyzed. For example, outputs should be subject to continuous monitoring, internal audits, and internal evaluation, which are all accomplished within the Safety Assurance component. Element 3.1 of the framework (§ 5.71) requires monitoring and measurement of the safety performance of the organization's operational processes and their SMS. Appendix 4, Table 1, AC 120-92NPRM provides a suggested set of outputs of key SMS processes to assist organizations in designing process measures.

5) Controls. Controls are elements of the system, including hardware, software, special procedures, or procedural steps, and supervisory practices designed to keep processes on track to achieve their intended results. Organizational process controls are typically defined in terms of special procedures, supervisory and management practices, and processes. Practices included in element 3.1 of the SMS framework such as continuous monitoring (§ 5.71 (1)), internal audits (§ 5.71 (a) (2) & (3), internal evaluations (§ 5.71 (a) (4))and management reviews (SMS Framework element 3.3, SMS regulation § 5.73) are controls within design requirements.

6) Interfaces. This aspect includes examining such things as lines of authority between departments, lines of communication between employees, consistency of procedures, and clearly delineating lines of responsibility between organizations, work units, and employees. Interfaces are a critical aspect of system management; recognizing the important interrelationships between processes and activities within the company as well as with contractors, vendors, customers, and other organizations with which the company does business. Interfaces are the inputs and outputs of a process. The leading objective of SMS implementation is to develop and implement, "an integrated, comprehensive SMS for the entire organization."

Systems and the Operational Environment. Analysis of processes and their associated attributes answer the questions; “what do the people do?” and “how do they do it?” The system design must also answer the questions; “what do they do it with?” and “what conditions do they work under?” The system includes the facilities, hardware, software, personnel, and organization. These can be viewed as resources for process performance.

The environment includes not only the physical environment (e.g. terrain, weather, geographic location, etc.) but also the political, cultural, demographic, and financial environment that the carrier works in. The environment will also include such things as local laws, labor agreements, resource costs, contractual agreements, and consumer issues such as the price that the operator’s customer base is willing to pay for products or services.

All of these operational and environmental factors affect how the system and its underlying processes must be designed and how they will operate. Therefore, it is essential that both the carrier’s management and the certificate management team carefully examine processes, system elements, and the operational environment to assure robust system design and performance that assures continuing operational safety.

Work Flow Process Approach to System Assessment. In a system safety environment, process attributes relate to each other as shown in the work process flow diagram (shown below in Figure 1, Work Process Flow Diagram). That is, inputs from a previous process are followed by responsibility and authority designation, procedures to be followed, outputs to the next process, controls to ensure desired output, and finally performance measures to ensure consistent results. The figure also shows the relationship of the six attributes discussed above in a generic work flow process.

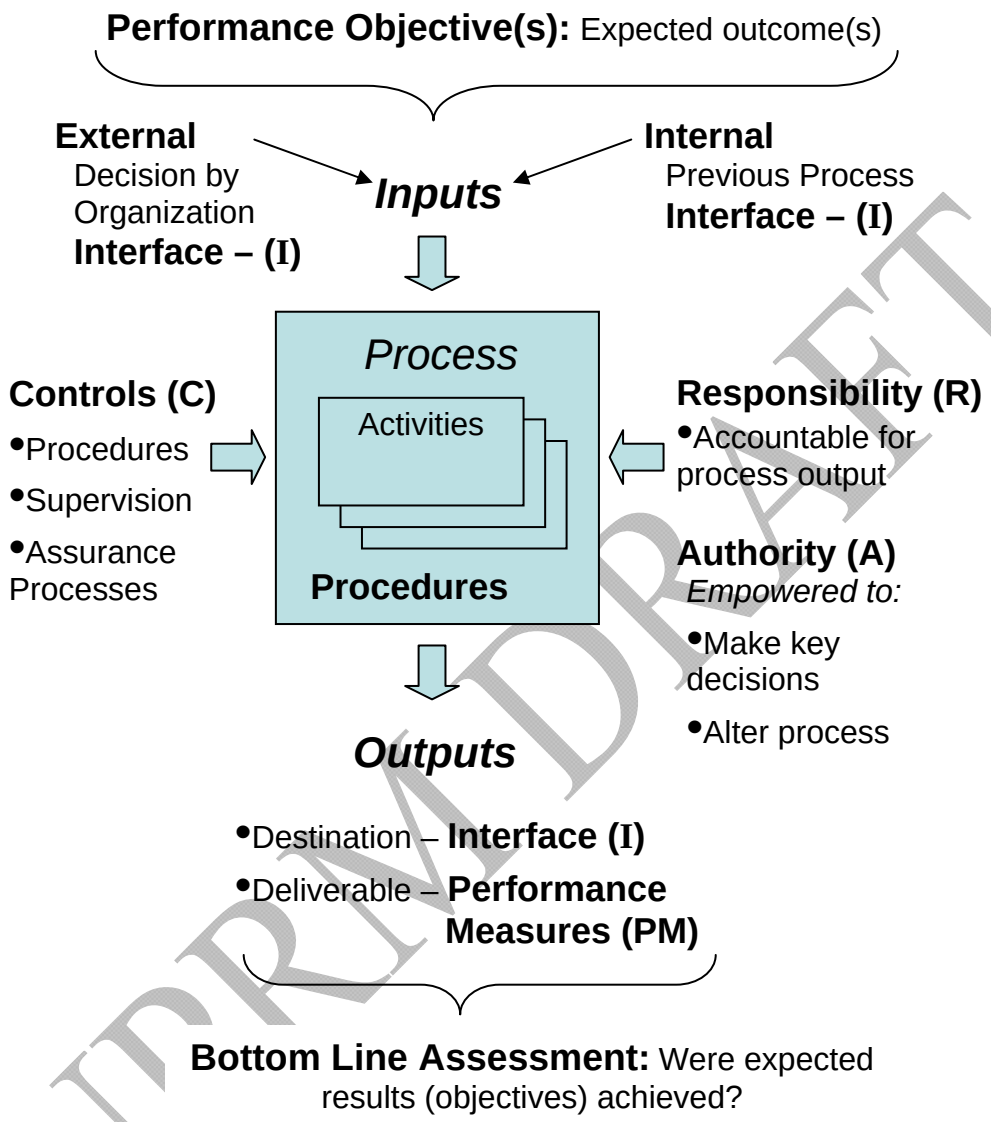

Figure 1 - Work Process Flow Diagram

[X]-005 SMS FUNCTIONS AND RELATIONSHIPS.

Safety Management System Functions: Production and Protection. The global aviation system is in reality a system of systems. Figure 2 depicts the relationship between the systems that are related to safety. The figure depicts the relationships between the technical and management functions in the organization that are related to

providing products or services and the functions that are related to controlling risk. The division between production and protection in the figure, therefore, refers to the functions and requirements that are interrelated in producing products or services and those that are involved in ensuring safety. These functions must be kept in balance if the organization is to remain financially viable while at the same time controlling safety risk.

NOTE: The depiction in this figure refers to functional roles and not organizational structures. It is not meant to infer that safety management is the sole responsibility of a safety department or safety manager. In fact, the SMS Framework stresses the role of the accountable executive all the way through to those who manage the productive 'line operational' processes in safety management.

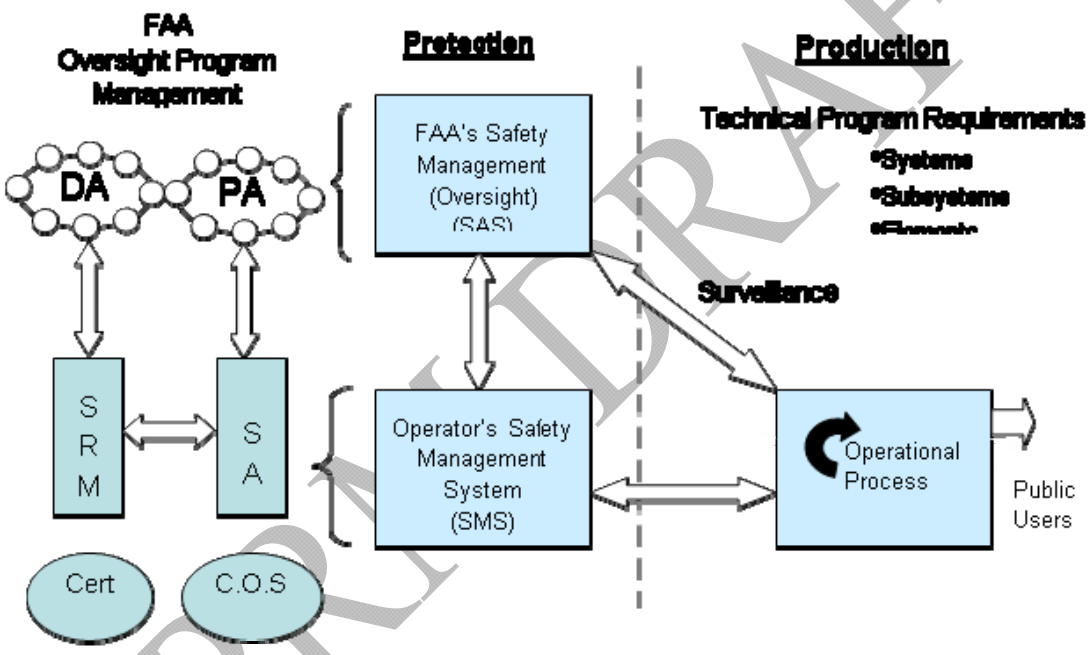

Figure 2 Protection Versus Production

Relationships between Aviation Certificate holder's SMS and Oversight. Figure 2 depicts the functional relationships between the productive processes in aviation certificate holder organizations, their safety management functions, and the functions of FAA oversight activities. On the protection side of the model depicted in Figure 2, two management systems exist: the organizations SMS and that of the oversight organization or regulator.

Oversight Systems (Figure 2)**.** The oversight management system on the protection side of the model is the Safety Assurance System (SAS), the system that will be used by the regulator to provide oversight of the aviation certificate holder's operations. Traditional oversight of organizations consists of activities such as certification, surveillance,

investigation, and enforcement of regulations. The FAA is transitioning the traditional oversight process with principle emphasis on surveillance to a systems approach that stresses the systemic nature of aviation businesses and the larger system as a whole. While traditional oversight functions will continue to exist in future safety oversight systems, the primary means of safety oversight will shift more toward system safety methods with an emphasis on the operators' ability to manage safety.

Production in Aviation Systems (Figure 2)**: Conducting Operations.** The production system which produces the product or service is the mission of the aviation certificate holder's organization. For certificate holders, these services usually involve provision of transportation services but may also include providing additional services to other companies such as maintenance and flight crew training. One of the first tasks in effective safety risk management and safety assurance is for both the operator and an oversight organization to have a thorough understanding of the configuration and structure of this system and its processes. A significant number of hazards and risk factors exist from improper design of these processes or a poor fit between the system and its operational environment. In these cases, hazards to operational safety may be poorly understood and, therefore, inadequately controlled.

Protection in Aviation Systems (Figure 2)**: Controlling Risk.** Safety risk is a byproduct of activities related to production. The aviation certificate holder's customers and employees are, therefore, the potential direct victims of the consequences of failures in the safety system. It is a primary responsibility of the certificate holder's organization to identify hazards and to control risk in the processes they manage and their operational environment. The certificate holder is primarily responsible for safety management. The certificate holder's SMS establishes a formal management system for the organization's management team to fulfill this obligation.

SMS Roles, Relationships and Responsibilities

As can be seen in Figure 2, and discussed above, there is a relationship between the productive processes of the certificate holder as well as the joint protective processes of the regulator (FAA oversight) and the certificate holder's SMS (The SA component). On the production side, the operator has a role to provide a **useful** service or product. On the protection side (operator's SMS), they have a role to provide a **safe** service or product. The FAA's oversight role is to assure that the operator lives up to its statutory safety responsibilities. A principal role of the oversight system is to establish risk controls in the form of regulations, standards, and policies. It follows that regulatory compliance is also part of the certificate holder's role in safety management. It is the objective of the SMS concept to combine system safety based oversight systems and operator's SMS's into a cooperative, professional relationship, within the context of those roles.

Following are the defined roles, responsibilities, and relationships of the certificate holder and FAA offices/personnel:

- **Certificate Holder.** AC 120-92NPRM provides guidance for a certificate holder to develop and document its SMS. The SMS may be documented in a form and manner that best serves the certificate holders need, however, any modifications of existing FAA approved/accepted programs and their associated documents must be coordinated with the appropriate FAA oversight organization. Safety policies developed by the certificate holders' accountable executive must be clearly communicated throughout the entire organization. Safety Risk Management (SRM) and Safety Assurance (SA) programs must be developed and maintained. Safety Promotion activities must take place to instill or reinforce a positive safety culture throughout the organization.

- **Oversight Organization.** The FAA office (CMO, CMT, CHDO, FSDO, etc.) that normally provides regulatory oversight of the certificate holder will continue all of its normal oversight and certificate management duties. As organizations develop their SMS, a natural relationship between the oversight organization and the certificate holder will develop. 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 the certificate holder to tailor the safety management efforts to its individual business model.

  The CMT should be fully engaged during SMS development and implementation. The CMT will participate in process meetings; gap analyses and the development of an implementation plan by the certificate holder. The CMT will verify the certificate holder's implementation plan accomplishment at each level of SMS implementation.

- **Flight Standards SMS Program Office (SMS PO).** FAA Order FS 1100.1A, Flight *Standards Service Organizational Handbook* identifies the responsibilities of the SMS PO.

- **Implementation Support Team (IST).** IST's are formed and managed by the SMS Program Office. The IST's purpose is to assist the certificate holder and its oversight organization throughout SMS development and implementation. Assistance will include SMS guidance, briefings, orientation sessions, meetings and/or seminars, as required. IST members will not be involved in oversight of the certificate holder and will not perform inspections, audits or evaluations of the certificate holder, but may review SMS documentation as part of its guidance function.

[X]-006 SMS Structure and Organization.

Functional Orientation. AC 120-92NPRM is written as a functional requirements document. It stresses *what* the organization must do rather than *how* it will be accomplished. The FAA feels that each of the functions detailed in the SMS Framework (AC 120-92NPRM) are essential for a comprehensive SMS. At the same time, the SMS Framework needs to be applicable to a wide variety of types and sizes of operators. Therefore, it is designed to allow certificate holders to integrate safety management practices into their unique business models.

SMS Configuration. Certificate holders are not expected to configure their systems in the format of the SMS Framework or to duplicate existing programs that accomplish the same function. This was a reason for using a similar scope, scale, and language to the International Organization for Standardization (ISO) standards, which are designed for broad application. The SMS Framework contained in AC 120-92NPRM, Appendix 1, attempts to strike a balance between flexibility of implementation and functional standardization of essential safety management processes.

Integration of SRM and SA. Figure 3 shows how the SRM and SA processes relate to one another. The SRM process (design) provides for initial identification of hazards and assessment of risk. Organizational risk controls are developed and, once they are determined to be capable of bringing the risk to an acceptable level, they are deployed operationally. The SA function (performance) takes over at this point to ensure that the risk controls are being practiced and they continue to achieve their intended objectives. This system also provides for assessment of the need for new controls because of changes in the operational environment.

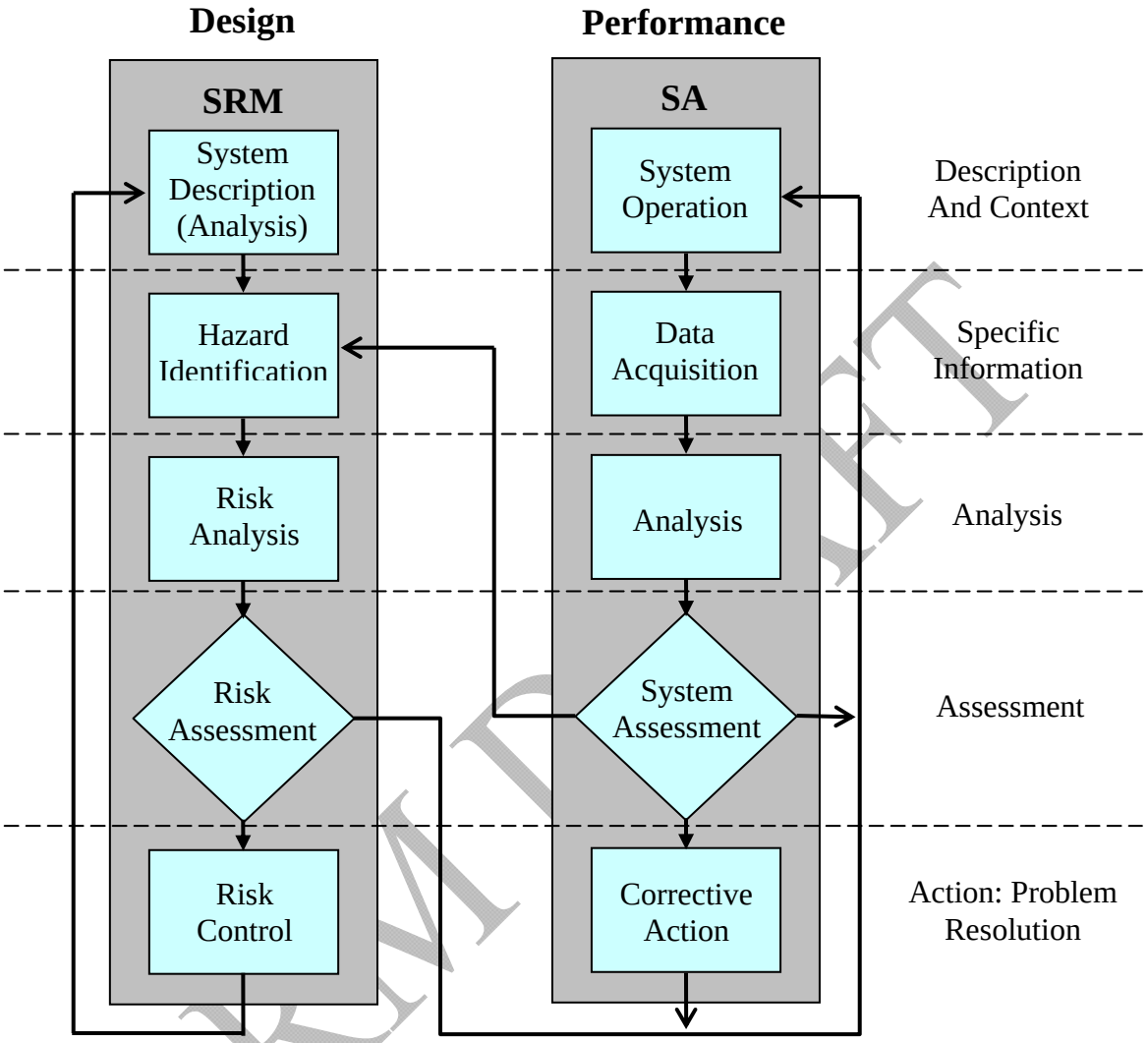

Figure 3 - SRM and SA Relationships
(An overview of each SRM and SA process is provided in Sections 2 and 3, below)

DEFINITIONS

Detailed SMS definitions are contained in AC 120-92NPRM.

REFERENCES

This guidance is in accordance with the following documents:

- Annex 6 to the Convention on International Civil Aviation, International Commercial Air Transport – Aeroplanes (with Amendment 33).
- International Civil Aviation Organization (ICAO) Document 9859, ICAO Safety Management Manual (SMM, 2nd Edition, 2009).

• FAA Order 8000.369, Safety Management System Guidance.
• FAA Order VS 8000.367, Aviation Safety (AVS) Safety Management System Requirements.

RELATED READING MATERIAL

The following references, current editions, may be of value to users of this Order:

• FAA Order 8000.369, Safety Management System Guidance.
• FAA Order VS 8000.367, Aviation Safety (AVS) Safety Management System Requirements.
• AC 120-59, Air Carrier Internal Evaluation Programs (IEP).
• AC 120-66, Aviation Safety Action Programs (ASAP).
• AC 120-79A, Developing and Implementing a Continuing Analysis and Surveillance System (CASS).
• AC 120-82, Flight Operational Quality Assurance (FOQA).

SECTION 1 Evaluating a Certificate Holder's Safety Policy: Component 1.0 - Safety Policy and Objectives

Performance Objective: The organization will develop and implement an integrated, comprehensive SMS for its entire organization and will incorporate procedures to identify and maintain compliance with current safety-related legal, regulatory, and other statutory requirements.

SRR §5.21, §5.23, §5.25, §5.71, §5.73 and §5.95

ELEMENT 1.1 SAFETY POLICY

Performance Objective
The accountable executive will define the organization's Safety Policy and convey its expectations, objectives, commitments, and accountabilities to its employees.

SRR §5.21, §5.23 and §5.25

Setting of Safety Objectives
The safety objectives must identify what the organization wants to achieve, in terms of the management of safety, and lay out the steps the organization needs to take to achieve those objectives. The standards of safety performance allow organizational behavior to be measured in relation to safety performance and therefore in relation to the management of safety. Both safety objectives and the standards of safety performance must be linked to the safety performance indicators, safety performance targets and action plans of the SMS.

Acceptable Versus Unacceptable behavior: Management should define, in the safety policy, the line between acceptable behavior, (often unintended errors), and unacceptable behaviors, (such as negligence, recklessness, violations or sabotage), and provide fair protection to reporters. A safety or "just culture" may not preclude the "criminalization of error", which is legally, ethically and morally within the rights of any organization. Potential litigation may be expected following an accident or serious incident even if no negligence or ill-intent existed. A potential issue could therefore exist if voluntary hazard reports are treated in the same way as those concerning accident and serious incident investigations. The intent of protecting hazard reports should not challenge the legitimacy of a judicial investigation or demand undue immunity. The following examples are derived from FAA Order 8900.1, Volume 14, Section 8, Enforcement Decision Process.

Examples of acceptable behavior:
1. A mechanic improperly performs maintenance because he or she misreads an instruction in the maintenance manual has acted inadvertently.

2. An air carrier who operates an aircraft with an improperly deferred component because of genuine miscommunication with maintenance control has acted inadvertently (e.g., the maintenance controller misheard the discrepancy reported).
3. A pilot misses a checklist item because of an air traffic control communication.

Examples of unacceptable behavior:

1. A mechanic failing to consult the maintenance manual and then conducts an incomplete or improper inspection or improperly performs maintenance.
2. An air carrier who operates an aircraft with an improperly deferred component because the maintenance controller failed to follow documented procedures or ignored them (e.g., the maintenance controller disregarded the discrepancy reported).
3. A pilot fails to use a required checklist.
4. A Commercial rated pilot taking off at a busy controlled airport without having received takeoff clearance.
5. A maintenance controller instructs a line mechanic to defer a discrepancy using a specific minimum equipment list item number with knowledge that the system or component deferred is not inoperative.
6. Known and substantiated lack of qualification, or questionable qualification. For example:
    a) Positive drug and alcohol test results.
    b) Failing to successfully complete a reexamination.
    c) Failing to possess the skills and competency required for the certificate held.
    d) Refusing to permit and/or submit to an inspection, reexamination, or a drug or alcohol test.
    e) Intentionally falsifying a record or application.
    f) Cheating on a written examination.
7. Criminal activity, such as narcotics convictions, substance abuse, controlled substances or alcohol abuse.
8. Operating without having been issued a required certificate, rating, or other required and valid authorization, such as a §61.58 pilot in command proficiency check.

Safety Policy: Is it a document or a statement? The Safety Policy is a documented statement from management conveying their expectations, objectives, commitments, and accountabilities to its employees.

a) The Safety Policy is management's commitment to:
    (1) Clearly define the organization's safety objectives (§5.21 (a) (1)),
    (2) Fulfill the organization's safety objectives (§5.21 (a) (2)),
    (3) Provide the resources to implement SMS (§5.21 (a) (3)),

(4) Define requirements for employee reporting of safety hazards or issues (§5.21 (a) (4)),
(5) Define unacceptable behavior and conditions for disciplinary action (§5.21 (a) (5)),
(6) Establish an emergency response plan that provides for the safe transition from normal to emergency operations as per §5.27) (§5.21 (a) (6)),

b) The Safety Policy must:
(1) Must be in accordance with all applicable regulatory requirements and reflect the organizations commitment to safety (§5.21 (b),(2) The safety policy statement must be signed by the accountable executive (§5.21 (c),
(3) Be documented and communicated, with visible endorsement, throughout the organization (§5.21 (d)),
(4) Be regularly reviewed by the accountable executive for relevance and appropriateness to the organization (§5.21 (e)),
(5) Define accountability for safety performance for management and employees with respect to: (§5.23 (a))
(a) Hazard identification and safety risk assessment.
(b) Assuring the effectiveness of safety risk controls.
(c) Promoting safety as required in subpart E of part 5.
(d) Advising the accountable executive on the performance of the SMS and on any need for improvement.

(c) The safety policy statement must be signed by the accountable executive (§5.25 (b) (2)).

An example of a Safety Policy Statement:

Air Safety, Inc.

Safety Policy

Safety, security and compliance are the corner stones of Air Safety's operations. These are imperatives -- at all times and at all levels.

Air Safety is committed to providing a safe environment for customers, employees and vendors by meeting or exceeding applicable flight, ground, occupational and environmental safety standards.

As the accountable executive, my commitment to Air Safety employees and the flying public is to establish and ensure we accomplish our corporate safety objectives, provide the necessary resources for the implementation and maintenance of our Safety Management System, ensuring the widest dissemination of safety related information and continuously reviewing our safety policy, safety objectives and safety performance to ensure they remain relevant and appropriate to our operations.

Management at all levels is accountable for developing, implementing, and maintaining SMS processes within their area of responsibility, including, but not limited to:

- Hazard identification and safety risk assessment.
- Assuring the effectiveness of safety risk controls.
- Promoting safety as required in subpart E of this part.
- Advising myself and senior management on the performance of the Safety Management System and on any need for improvement.

Management is also accountable for ensuring that employees understand and comply with safety, security and compliance standards and are trained and equipped to recognize and control hazards in the daily work environment.

Air Safety employs a systemic approach to manage safety risks and continually improve the level of safety. All employees play a key role in this process by identifying hazards and mitigating risks as part of everyday activities. In a shared responsibility, each employee must act safely and report incidents and occurrences that reduce or have the potential to reduce the level of safety. Timely reporting of such information through the established non-punitive safety reporting programs is essential and encouraged.

All employees share the responsibility for maintaining the safety, security and compliance standards established by the company and regulatory agencies, and for adhering to all laws established by the countries in which we conduct operations. Employees are accountable for knowing their role in attaining the company's safety objectives, what to do in the event of an emergency, understanding what constitutes unacceptable behavior and how to identify and report safety hazards or issues.

An uncompromising commitment to safety, security and compliance is the responsibility of each and every employee.

_____
Chief Operating Officer

_____
President

_____
Chief Executive Officer
Accountable Executive

EXAMPLE SAFETY POLICY STATEMENT

How does Safety Policy and Quality Policy relate in an SMS? The SMS uses quality management principles, but will be managed based on an objective assessment of safety risk, rather than customer satisfaction with services, products or other commercial goals. However, management of process quality, with emphasis on those characteristics that affect safety, is an important aspect of safety management. Operators should integrate their safety and quality management systems as much as feasible. Safety objectives should be predominant where conflicts are identified.

It is the responsibility of all safety related employees to identify and report hazards to management (§5.21 (4)) and for risk evaluation to make necessary corrections to improve procedures in order to meet corporate objectives.

Safety Policy - How often must this be reviewed? The SMS Policy should be regularly (as determined by the certificate holder) reviewed, by the accountable executive, to ensure it remains relevant and appropriate to the certificate holder (§5.21(e)).

What are the triggers for reviewing out of cycle? Triggers should be put in place for reviewing the Safety Policy when needed, not just when scheduled during normal review cycles. These triggers could include but are not limited to:

(a) Change in facilities or equipment.
(b) Accident or incident
(c) Financial problems
(d) Rapid growth

ELEMENT 1.2 MANAGEMENT COMMITMENT AND SAFETY ACCOUNTABILITIES

Performance Objective
The organization will define, document, and communicate the safety roles, responsibilities, and authorities throughout its organization.

SRR §5.21, §5.23 and §5.25

Importance of Management Involvement: The SMS specifies that management is primarily responsible for SMS, must be personally and materially involved in safety activities and must clearly delineate safety responsibilities throughout the organization. While it is true that management must take overall responsibility for safe operations, it is also true that all members of the organization must know their responsibilities to identify and report hazards in their work environment, as well as notifying other workers of the identified hazard.

Management Personnel Requirements and Responsibilities. §119.65 Management Personnel Required for Operations Conducted Under part 121…, specifies that a part 121 certificate holder must have (§119.65 (a)), "sufficient qualified management and

technical personnel to ensure the highest degree of safety in its operations." §135.69 has similar requirements for § 135 operators. Five specific management positions (three for part 135) are specified in the respective sections of the CFRs. §119.65 (d) (3) goes on to state that these management personnel will, "Discharge their duties to meet applicable legal requirements and to maintain safe operations." Further, the paragraph indicates that the individuals in the specified five positions and "anyone in a position to exercise control over operations conducted under the operating certificate," must meet these requirements.

Responsibilities of the Accountable Executive

Pursuant to §5.23 (a), organizations will be required to appoint an accountable executive. The accountable executive is an individual identified by the certificate holder as the one who directs and controls an organization at the highest level and has full responsibility for the organization's compliance with regulatory standards. This person is the final authority over operations authorized to be conducted; controls both the financial and human resources required for the operations to be conducted; and retains ultimate responsibility for the safety performance of operations conducted under the operator's certificate.

The accountable executive must ensure that the SMS is properly implemented and performing in all areas of the certificate holder's organization. He/she is responsible for the development and signs the certificate holder's safety policy and communicates the safety policy throughout the certificate holder's organizations. He/she must regularly review the certificate holder's safety policy to ensure it remains relevant and appropriate to the certificate holder and direct actions necessary to address substandard safety performance areas (§5.25 (b)).

Determining the Accountable Executive

The organization must identify the correct person to be the accountable executive, and ensure that this individual understands and accepts the roles and responsibilities associated with the position. This is not intended to be a position title without accountability.

To assist the organization with the selection of their accountable executive, Figures 4 and 4A provide flow charts and series of questions to be used in the selection process. Figure 4 identifies several organizational structures that will lead to a corresponding accountable executive. Once this person is determined, the questions in Figure 4A will verify the selected person is the correct choice. All questions in Figure 4A must receive a 'yes' answer for the candidate to be acceptable. Should any of the questions result in a 'no' answer, the selection process must start again with a new candidate. The organizational structures included in Figure 4 are intended to cover the majority of situations that will be encountered. Should there be an organizational structure that does not result in the clear selection of an accountable executive; an appropriate candidate will be selected in consultation with the FAA.

The certificate holder must submit a letter to the FAA naming the accountable executive, his/her position within the company and his/her duties. The FAA will evaluate the submission and respond to the certificate holder. The accountable executive's information will be entered into the Enhanced Vital Information Database (eVID).

Figures 4 and 4A, below, assist the certificate holder and oversight organization in determining the Accountable Executive.

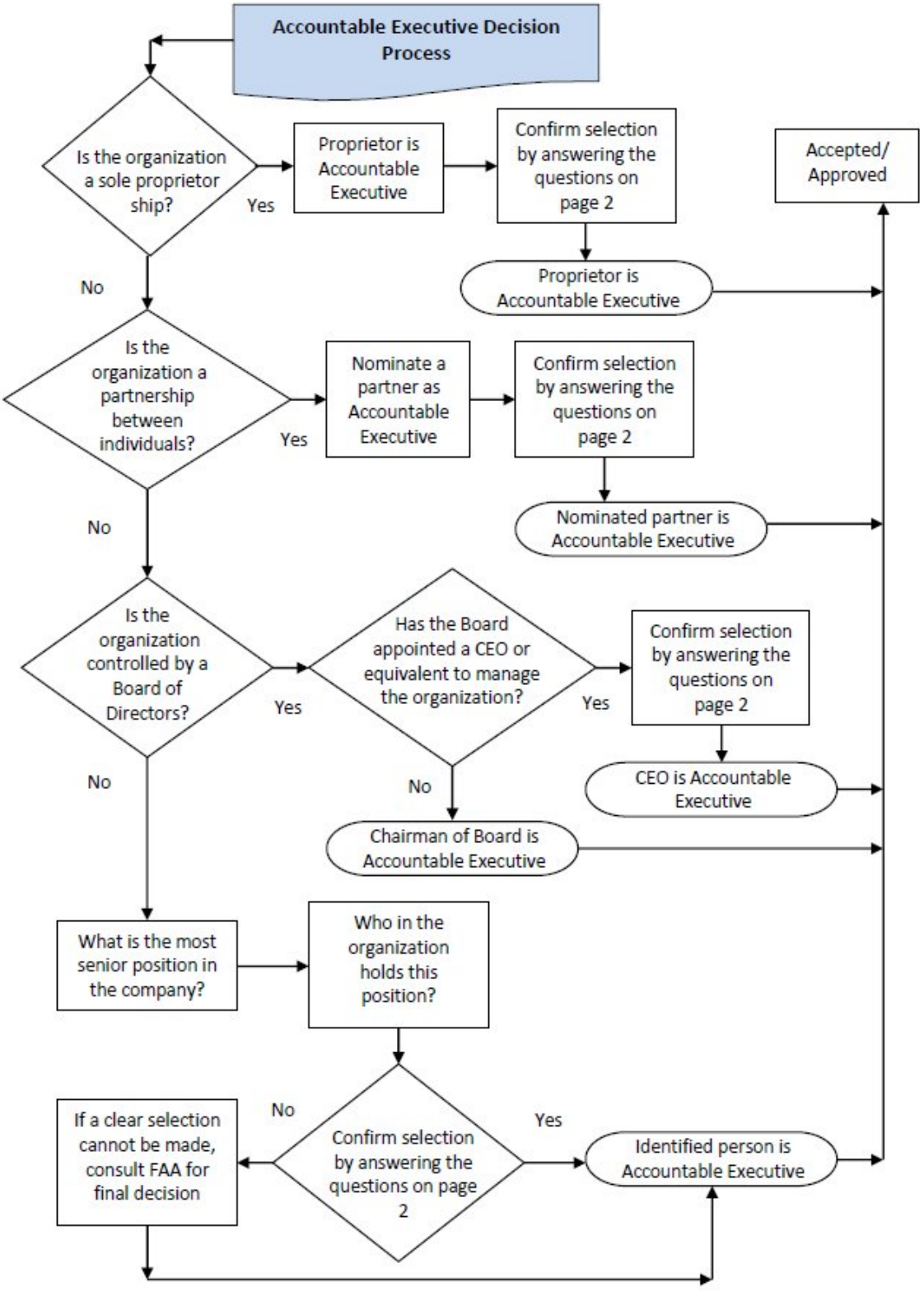

Figure 4 - Accountable Executive Decision Tree - Page 1
(see discussion above for use)

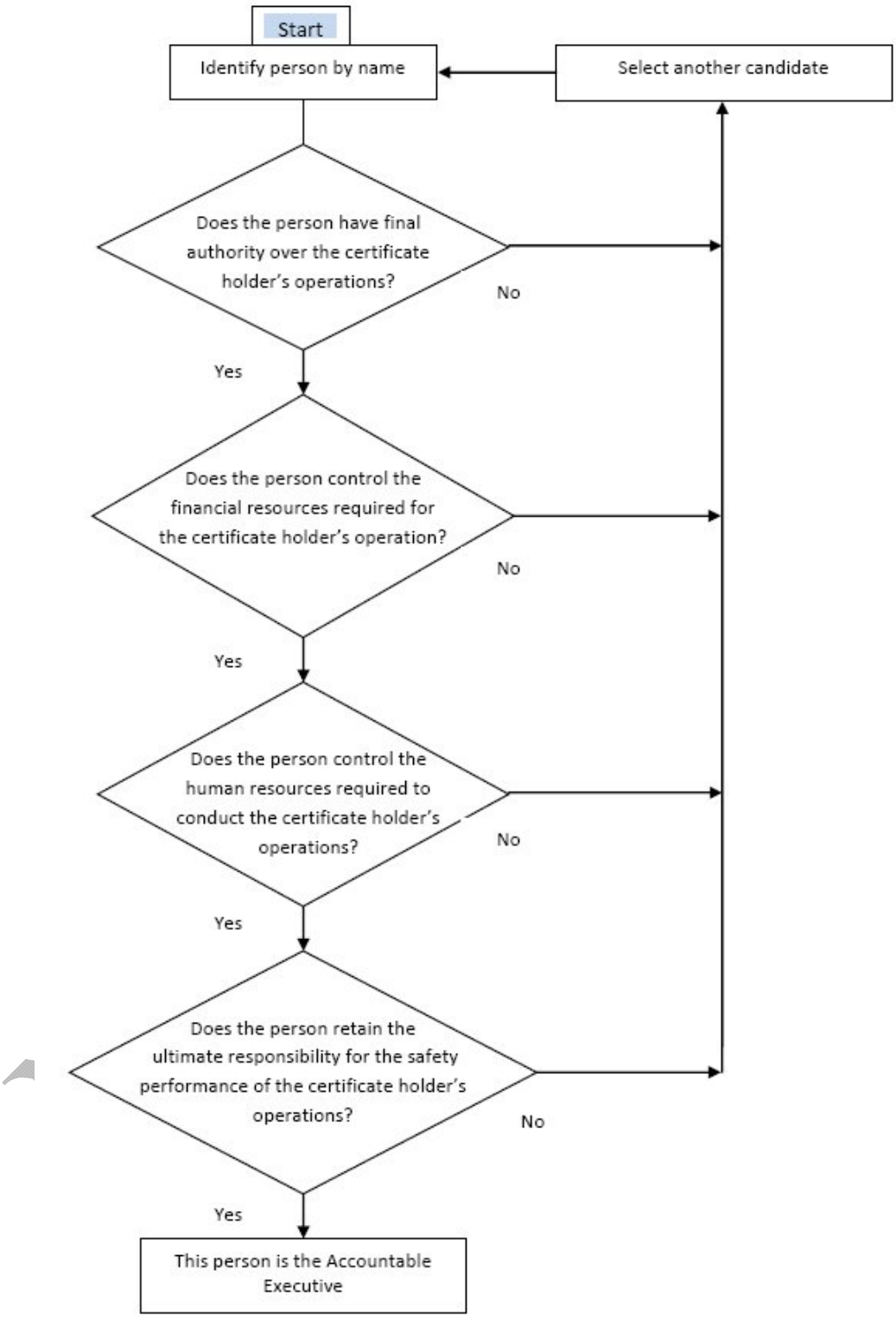

Figure 4A - Accountable Executive Decision Tree - Page 2
(See discussion above for use)

ELEMENT 1.3 KEY SAFETY PERSONNEL

Performance Objective
The organization will appoint a management representative to manage, monitor and coordinate the SMS processes throughout its organization.

SRR §5.23, §5.25 and §119.65

One of the positions specified in §119.65 for part 121 operations is a Director of Safety. The SMS rule provides for a management representative with specific duties. While the rule does not require that this management representative be the person filling the Director of Safety position required by §119.65, it does not prohibit it.

The Inspector must ensure that the management representative:

1) Establishes, implements and maintains processes needed for the SMS,
2) Facilitates hazard identification, safety risk analysis and monitors the effectiveness of safety risk controls,
3) Reports to the accountable executive on the performance of SMS and the need for improvement,
4) Ensures the promotion of safety awareness throughout the organization.

Safety management personnel include:

Part 119 management personnel:

- Director of Operations
- Director of Maintenance
- Chief Inspector
- Chief Pilot
- Director of Safety
- As approved by the Administrator

All other personnel with safety related positions (operational control)

The certificate holder's SMS documentation should define the specific expectations and responsibilities for each of these managers safety performance per §5.23. They should also define expectations and responsibilities for other managers, supervisory personnel, and individual employees who are entrusted with responsibilities for §119.65 defined "control over operations."

The SMS will provide managers with a structured system with which to meet safety objectives. This is particularly true with respect to risk assessment. "Assessment" implies a decision process and should, therefore, be accomplished by managers with the authority to make major operational decisions. Therefore, the certificate holder should apply these standards, at a minimum, to the individuals filling the positions specified in §119.65, and those in a "position to exercise control over operations conducted under the operating certificate".

ELEMENT 1.4 EMERGENCY PREPAREDNESS AND RESPONSE

Performance Objective
The organization will develop an Emergency Response/Preparedness Plan that it will follow in the event of an accident or incident or operational emergency to mitigate the effects of these events. This plan must describe how the organization will transition from normal operations to emergency operations and return back to normal operations after the emergency.

SRR §5.27

Who prepares the Emergency Response/Preparedness Plan? The accountable executive and management representative must develop, as part of the safety policy of the certificate holder, an emergency response plan that addresses at least the following:

(a) Delegation of emergency authority throughout the certificate holder's organization;

(b) Assignment of emergency responsibilities during the coordinated emergency activities; and

(c) Coordination of the certificate holder's emergency response plans with the emergency response plans of other organizations it must interface with during the provision of its services.

How is Emergency Response/Preparedness different between operations, maintenance and manufacturing?
The SMS process for Emergency Response/Preparedness would not differ for operations, maintenance or manufacturing even though each operation has differences within their own respective areas. All three must consider emergency response for accidents or incidents occurring at their facilities, including offices, maintenance hangers, shops, and the maintenance line. Operations must also include aircraft events during enroute flight segments or accidents not at an airport.

Since no operation, maintenance or manufacturing facility are the same there is no one size fits all when it comes to an emergency response program. All aviation certificate holders must use the SRM process to identify their operational processes, identify potential hazards, and build an emergency response/preparedness plan that encompasses their entire organization.

ELEMENT 1.5 SMS DOCUMENTATION AND RECORDS

Performance Objective
The organization will have documented safety policies, objectives, procedures, a document/record management process, and a safety management plan that meet organizational safety expectations and objectives.

SRR §5.25, §5.95 and §5.97

What does this look like? The SMS system documentation conveys management expectations and work instructions to employees. This would include, policies, procedures, processes, and requirements used to carry out the system. Documentation may be in the form of a stand-alone manual or integrated into the existing documentation systems. Documentation and records may be in digital or paper format but must be available to all affected employees or oversight authorities upon request.

How long are these records kept?
Outputs from the safety risk management processes must be retained for as long as the control remains relevant to the operation. (§5.97(a))

Outputs from the safety assurance processes, i.e., monitoring, measuring, analysis, assessment, preventative/corrective actions, management review, etc., must be retained for a minimum of 5 years. (§5.97(b))

Training records shall be retained for a period of 24 months for all training conducted under §5.91 for each individual. (§5.97(c))

Records for any other communications conducted under §5.93 shall be retained for a period of not less than 24 consecutive calendar months. (§5.97(d))

SECTION 2 Evaluating a Certificate Holder's Safety Risk Management: Component 2.0 SRM

The organization will develop processes to understand the critical characteristics of its systems and operational environment and apply this knowledge to identify hazards, analyze and assess risk and design risk controls.

The SRM process is used to examine the operational functions of the company and their operational environment to identify hazards, analyze associated risk, assess the risk and control the risk. The intent of the SRM process is to focus on the areas of greatest risk from a safety perspective, taking into account complexity, operational scope, etc.

The SRM flow diagram (Figure 5, on the following page) includes the FAA SMS Framework element/process numbers and other notes to help the reader visualize the FAA SMS Framework in terms of a process flow (with interfaces, i.e., inputs and outputs), and understand the component/element/process expectations.

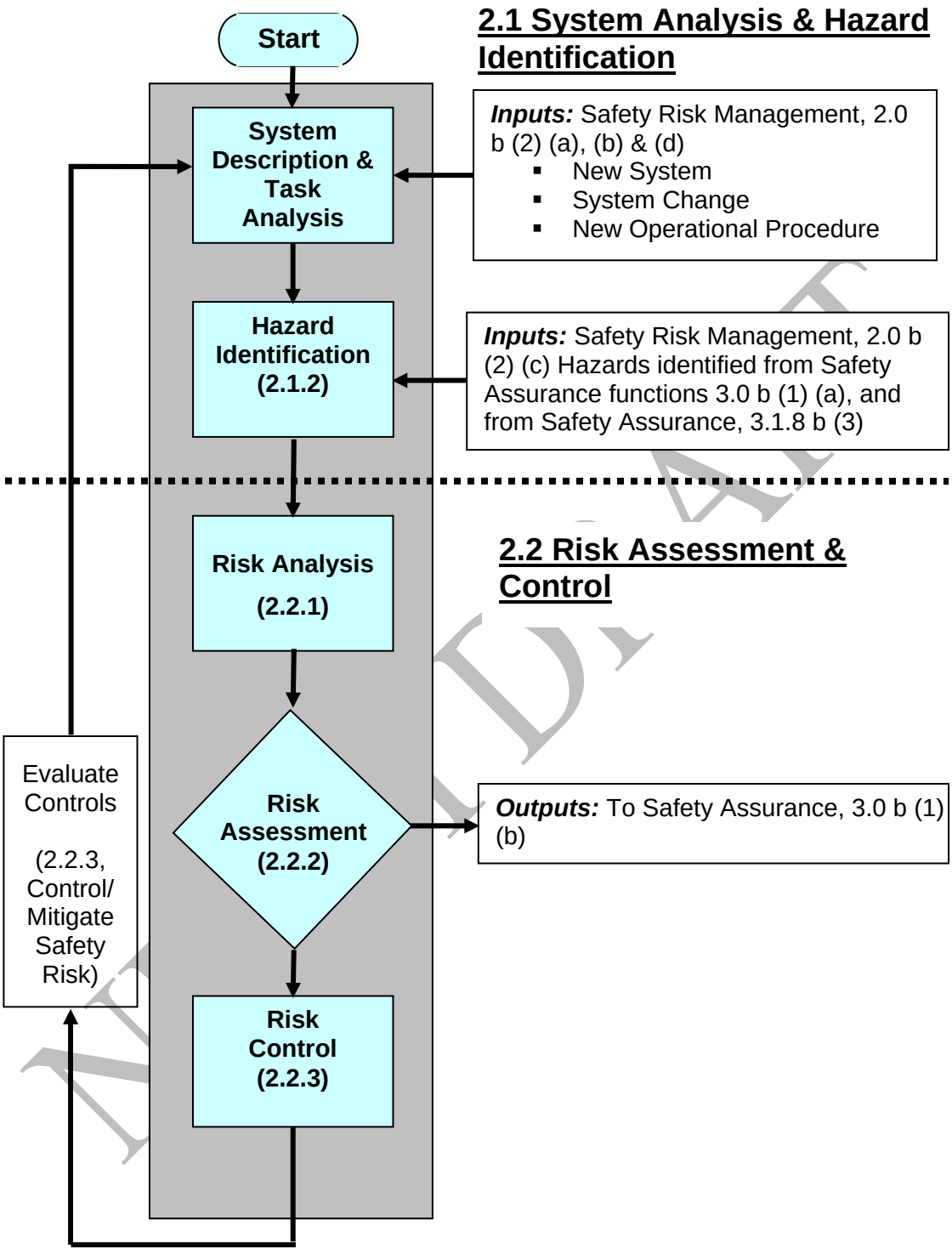

Figure 5 - SRM Flow Diagram (Numbers refer to AC 120-92NPRM, Appendix 1, SMS Framework element/process numbers)

COMPONENT 2.0 SAFETY RISK MANAGEMENT

ELEMENT 2.1 SYSTEM ANALYSIS AND HAZARD IDENTIFICATION.

Performance Objective
The organization will develop and maintain a process that ensures that hazards in operations are identified. Hazards will be identified from the analysis of critical design and performance factors, processes, and activities in sufficient detail to determine associated level of risk and risk acceptability.

SRR §5.23, §5.51, §5.53, §5.55 and §5.73

Management Responsibilities in SRM. §5.23(a) (2) (i) of the SMS rule defines specific responsibilities for management personnel within the scope of their areas of responsibility (e.g. Director of Operations, Chief Pilot(s), Director of Maintenance, Chief Inspector). Managers are specifically responsible for hazard identification, risk assessment and assurance of the effectiveness of risk controls. §5.23(b) of the rule also requires the organization to designate management officials with the authority to accept risk. The carrier's SMS documentation must clearly lay out these responsibilities and identify who in the company has been designated to meet them. Management officials must be informed and knowledgeable of their responsibilities and the procedures associated with accomplishing them. Note that the primary responsibility for hazard identification and risk assessment rests with operational managers. The management representative is responsible for assistance in these tasks and associated risk analysis (ref: §5.25(c) (1)).

When does the operator need to conduct SRM?
A certificate holder, or certificate applicant, must conduct safety risk management to a system when any of the following conditions apply:

- Implementation of new systems,
- Revision of existing systems,
- Development of operational procedures,
- Identification of hazards or ineffective risk controls found through the safety assurance processes in subpart D of Title 14 CFR, part 5, i.e., if ineffective controls, new hazards, or potential hazards are identified.

The certificate holder must also conduct safety risk management when change occurs. These changes may have been imposed by either managerial inputs, FAA imposed or changes to the environment. Changes could involve but are not limited to:

- Change in facilities or equipment,
- An accident or incident,
- Financial problems,

- Rapid growth,
- FAA placing restrictions on the operation or requiring new processes.

Escalations: Escalations with and without a reliability program will be processed somewhat differently in an SMS.

- **Without** a reliability program, proposed escalations would need to be presented to the Principal Maintenance Inspector (PMI). Under an SMS, they would also have to accompany their request with the appropriate risk assessment evidence.
- **With** a reliability program the carrier may adjust maintenance intervals based on their reliability analysis, but they would still have to perform the SRM process before implementing the change. This would not alter their authority to escalate but they would have to be able to produce a record of the risk assessment upon request of the CMT.

How does SMS Safety Risk Management (SRM) process and the ATOS Risk Management Process (RMP) relate? The key distinction between SRM and RMP is in the purpose of the two systems. SMS is a "**management**" system and ATOS is an "**oversight**" system.

SRM: A formal process within the certificate holders SMS that describes the system, identifies the hazards, assesses the risk, analyzes the risk, and controls the risk. This is a carrier responsibility that is monitored and overseen by both the carrier and the FAA. FAA oversight of the carriers SRM may be monitored and tracked with an ATOS RMP.

RMP: A process within ATOS that is used to record and analyze hazards and provides the CMT with a basis for communicating concerns that the certificate holder either eliminates the hazards or controls the associated risk at acceptable levels. This process also allows the FAA to manage resources in accordance with risk-based priorities. The RMP is an FAA tool to help CMT's meet their oversight responsibilities.

PROCESS 2.1.1 SYSTEM DESCRIPTION AND TASK ANALYSIS

Performance Objective
The organization will describe and analyze its systems, operations, and operational environment to gain an understanding of critical design and performance factors, processes, and activities to identify hazards.

SRR §5.53

SRM begins with system design. This is true whether the system in question is a physical system, such as an aircraft, or an organizational system such as an operator, maintenance, or training establishment. These systems consist of the organizational structures,

processes, and procedures, as well as the people, equipment, and facilities used to accomplish the organization's mission.

The system or task descriptions should completely explain the interactions among the hardware, software, people, and environment that make up the system in sufficient detail to identify hazards and perform risk analyses. Hazards frequently occur when there is an interface. For example, a crew member inputting a flight plans in an FMS. The crew member may accidently enter the wrong information because of the design of the keypad.

At a minimum, the system description and task analysis must include the following (ref: §5.53(b)) :

- Function and purpose of the system (within the scope of the proposed development, revision, or change),
- The system's operating environment,
- An outline of the system's processes and procedures, and
- The:
    - Personnel,
    - Equipment, and
    - Facilities necessary for the operation of the system.

While systems should be documented, no particular format is required. System documentation would normally include the operator's manual system, checklists, organizational charts, and personnel position descriptions. A suggested functional breakdown of operational and support processes for air operators includes:

- Flight operations;
- Dispatch/flight following;
- Maintenance and inspection;
- Cabin safety;
- Ground handling and servicing
- Cargo handling; and
- Training.

Specific Regulatory Requirements (SRR): SRR's make up one element of an air carrier's environment. The SRR's are those specific regulations that apply to an operator. These regulations form the base line of protection for the company. A company must use the regulations as a starting point for their system description and then tailor their systems to satisfy their own unique operational requirements.

PROCESS 2.1.2 IDENTIFY HAZARDS

Performance Objective

The organization will identify and document the hazards in its operations that are likely to cause death, serious physical harm, or damage to equipment or property in sufficient detail to determine associated level of risk and risk acceptability.

SRR §5.23 (a) (2) (i), §5.25 (c) (1) and §5.53

Hazards in the system and its operating environment must be identified, documented, and controlled. It also requires that the analysis process used to define hazards consider all components of the system, based on the system description detailed above. Hazard identification should consider to the processes, system elements, and operational environment.

Hazard descriptions should clearly identify the conditions that are hazardous, the potential errors or failures associated with the hazard and the potential consequences (i.e. events – accidents, incidents, etc.) resulting from those errors or failures. The key question to ask during analysis of the system and its operation is what if? Remember that hazards are conditions, not the errors, failures, or consequences that result. Conditions can be addressed through management action and should thus be the targets of the analysis.

As with system descriptions and task analysis, judgment is required to determine the adequate level of detail. While identification of every conceivable hazard would be unlikely, certificate holders are expected to exercise due diligence in identifying significant and reasonably foreseeable hazards related to their operations.

Common Hazards which can be influenced by an organization:

- Design factors, including equipment and task design.
- Procedures and operating practices, including documentation and checklists.
- Communications, including means, terminology and language
- Organizational factors, such as company policies for recruitment, training, remuneration and allocation of resources.
- Work environment factors, such as ambient noise and vibration, temperature, lighting and protective equipment and clothing.
- Regulatory factors, including the applicability and enforceability of regulations; certification of equipment, personnel and procedures; and the adequacy of oversight.
- Defenses including detection and warning systems, and the extent to which the equipment is resilient against errors and failures.
- Personnel conditions, including medical conditions and physical limitations.

ELEMENT 2.2 RISK ASSESSMENT AND CONTROL

PROCESS 2.2.1 ANALYZE SAFETY RISK

Performance Objective
The organization will determine and analyze the severity and likelihood of potential events associated with identified hazards and will identify risk factors associated with unacceptable levels of severity or likelihood.

SRR §5.25 (c) (1) and §5.55 (a)

The risk analysis component of the SMS uses a conventional breakdown of risk by its two components: likelihood of occurrence of an injurious mishap and the severity of the mishap related to an identified hazard, should it occur. An analysis is required to assess potential for harm or damage for each possible adverse consequence. Consider all possible adverse consequences that could result from the hazard. Consider the level of exposure to the hazard. One hazard can have multiple consequences, each with different probability or severity levels.

Likelihood: Estimating Probability (What are the chances of it happening?):
By looking at experience of past operations or similar situations, the operator can gain insight into how likely (probable) they will also have problems. Asking:

- Is there a history of occurrences associated with this hazard?
- What other equipment of components of the same type might have similar defects?
- What other indications (past accident/incident reports, employee reports, reliability data, ASRS) do we have of the same or similar hazards?, etc.
- Are there multiple reports or other data pointing to the hazard and its potential effects?

– are questions an operator can use to draw on their own experience to evaluate a hazard.

An additional consideration is “what is the exposure to the hazard?” How many operating personnel are following, or subject to the procedures? What percentage of the time is the equipment or procedure in use? Are there organizational, managerial or regulatory implications that might reflect larger threats?
Probability is the product of past experience used to predict potential future outcomes.

Severity: Estimating Severity (If it happens, how bad will it be?) for example:

- How many lives are at risk?
- What is the extent of property or financial damage?
- What is the extent of environmental impact?
- What are the political implications and/or media interests?

It is important to remember that risk is not a tangible object – it is constructed by combining the two effects – likelihood and severity. Also remember that one hazard can have multiple consequences; each may have different likelihood or severity levels.

A useful tool for assisting in the determination of hazard risk and managing the resulting priorities is a "Risk Matrix". A risk matrix is a means of looking at the combined effects of likelihood and severity determined during risk analysis. Operators are not required to utilize a matrix, but they must be able to determine if a risk is acceptable or not.

AC 120-92NPRM, Appendix 3 shows models, examples, and discussion of safety risk matrices. Operators should develop a matrix that best represents their operational environment. Separate matrices with different risk acceptance criteria may also be developed for long-term versus short-term operations.

A generic matrix, Figure 6, shows three areas of acceptability. Risk matrices may be color coded; unacceptable (red), acceptable (green), and acceptable with mitigation (yellow).The color codes help determine the acceptability or "tolerability" of risk.

Figure 6 - Safety Risk Management Example

Unacceptable Risk: – This is a decision based on judgment, but guided by a structured process. The risk matrix, shown above, is a means of looking at the combined effects of likelihood and severity. Is the risk acceptable? If so, the system can be put into operation. If risk is unacceptable, management or other decision making body must develop appropriate controls and allocate resources to implement the control/s.

The FAA does not require the operator to determine specific levels of severity or likelihood, additionally, it leaves the construction of the matrix, if used, up to the organization.

PROCESS 2.2.2 ASSESS SAFETY RISK

Performance Objective
The organization will assess risk associated with each identified hazard and define risk acceptance procedures and levels of management that can make safety risk acceptance decisions.

SRR §5.23 (a) (2) (i), §5.23 (b) and §5.55 (b)

Risk assessment is the process where management or other decision making body applies analytical judgments to safety information and determines the acceptability of analyzed risk. Risk assessment results in a decision and is, therefore, a management function. §5.23(a) (2) (i) makes risk assessment a management responsibility and a responsibility of the organization to define those responsibilities for their management personnel. §5.23 (b) requires the organization to designate levels of management who have the authority to accept risk. In many organizations, this is done thorough:

- A hierarchy that ensures adequate consultation is conducted among managers and employees,
- Ensuring decisions regarding high, but potentially acceptable risk situations are made at an appropriate management level, and
- Managers being aware of the resources, supervision, and other controls that will be necessary to make risk controls effective.

Facts, Inferences and Judgment: When gathering data on a system the organization must be careful to insure data is relevant and factual. From factual data that is gathered, one can make inferences based on these facts and a judgment can be made. Facts are objective, describing something without opinions or adjectives. A workplace condition should be factual. Judgments are part of the decision making process. For example, we have the following scenario:

Facts:

- Duty day is 14 hours
- Flight schedule is 8 hours
- Flights have 10 legs, 10 IFR approaches
- Flights are legal (within regulation)

From these facts we can make the following inferences:

- Crew fatigue will probably result.
- Likelihood of crew errors will increase.

Then a decision is made based on the facts and inference.

Judgment (Risk Assessment):

- Unacceptable risk

PROCESS 2.2.3 CONTROL/MITIGATE SAFETY RISK

Performance Objective
The organization will design and implement a risk control for each identified hazard for which there is an unacceptable risk, to reduce risk to acceptable levels. The potential for residual risk and substitute risk will be analyzed before implementing any risk controls.

SRR §5.55

Controlling Risk. After hazards and risk are fully understood though the preceding steps, risk controls must be designed and implemented. These may be additional or changed procedures, new supervisory controls, addition of organizational hardware, or software aids, changes to training, additional, or modified equipment, changes to staffing arrangements, or any of a number of other system changes.

Hierarchy of Controls. The process of selecting or designing controls should be approached in a structured manner. System safety technology and practice has provided a hierarchy or preferred order of control actions that range from most to least effective. Depending on the hazard under scrutiny and its complexity there may be more than one action or strategy that may be applied. Further, the controls may be applied at different times depending on the immediacy of the required action and the complexity of developing more effective controls. For example, it may be appropriate to post warnings while a more effective mitigation of the safety risk is developed. The hierarchy of controls is:

(a) Design the hazard out – modify the system (this includes hardware/software systems involving physical hazards as well as organizational systems).
(b) Physical guards or barriers – reduce exposure to the hazard or reduce the severity of consequences.
(c) Warnings, advisories, or signals of the hazard.
(d) Procedural changes to avoid the hazard or reduce likelihood or severity of associated risk
(e) Raise awareness training to avoid the hazard or reduce the likelihood of an associated risk.

Residual and Substitute Risk. Residual risk is the risk remaining after mitigation has been completed. Often this is a multi-step process, continuing until risk has been mitigated down to an acceptable level. It is seldom possible to entirely eliminate risk, even when highly effective controls are used. After controls are designed, but before the system is placed back on line, an assessment must be made of whether the controls are likely to be effective and/or if they introduce new hazards to the system. The latter condition is referred to as substitute risk, a situation where the solution may be worse than the original risk. The loop seen in Figure 5 that returns back to the top of the diagram depicts the use of the system

analysis, hazard identification, risk analysis, and risk assessment processes to determine if the modified system is acceptable.

System Operation. When the controls are acceptable, the system is placed into operation. The next process, Safety Assurance, uses auditing, analysis, and review systems that are familiar from similar quality management systems. These processes are used to monitor the risk controls to ensure they continue to be implemented as designed and continue to be effective in a changing operational environment. Managers are also responsible for assurance that risk controls are effective (ref: §5.25 (c) (2)). Therefore, the design of any good risk control should include plans and provisions for monitoring, measuring, and, where necessary, improving the performance and effectiveness of risk controls.

SECTION 3 Evaluating a Certificate Holder's Safety Assurance: Component 3 Safety Assurance

Performance Objective
The organization will monitor, measure, and evaluate the performance of their systems to identify new hazards, measure the effectiveness of risk controls and ensure compliance with regulatory requirements.

SRR §5.23 (a) (2) (ii), §5.71 and §5.73

Safety Assurance might be defined as activities designed to gain confidence that risk controls established during SRM continue to be effective. The SA function applies the activities of quality assurance and internal evaluation to ensure that risk controls, once designed, continue to conform to their expectations and that they continue to be effective in maintaining risk within acceptable levels. These assurance and evaluation functions also provide a basis for continual improvement.

The SA flow diagram (Figure 7, on the following page) includes the FAA SMS Framework element/process numbers and other notes to help the reader visualize the FAA SMS Framework in terms of a process flow (with interfaces, i.e., inputs and outputs), and understand the component/element/process expectations.

Management Responsibility in Safety Assurance. §5.23 (a) (2) (ii) of the SMS rule requires managers to take steps to assure the effectiveness of risk controls within the scope of their areas of responsibility. Activities involved in meeting this responsibility include continuous monitoring, internal audit, system analysis and assessment, management of change, and corrective action.

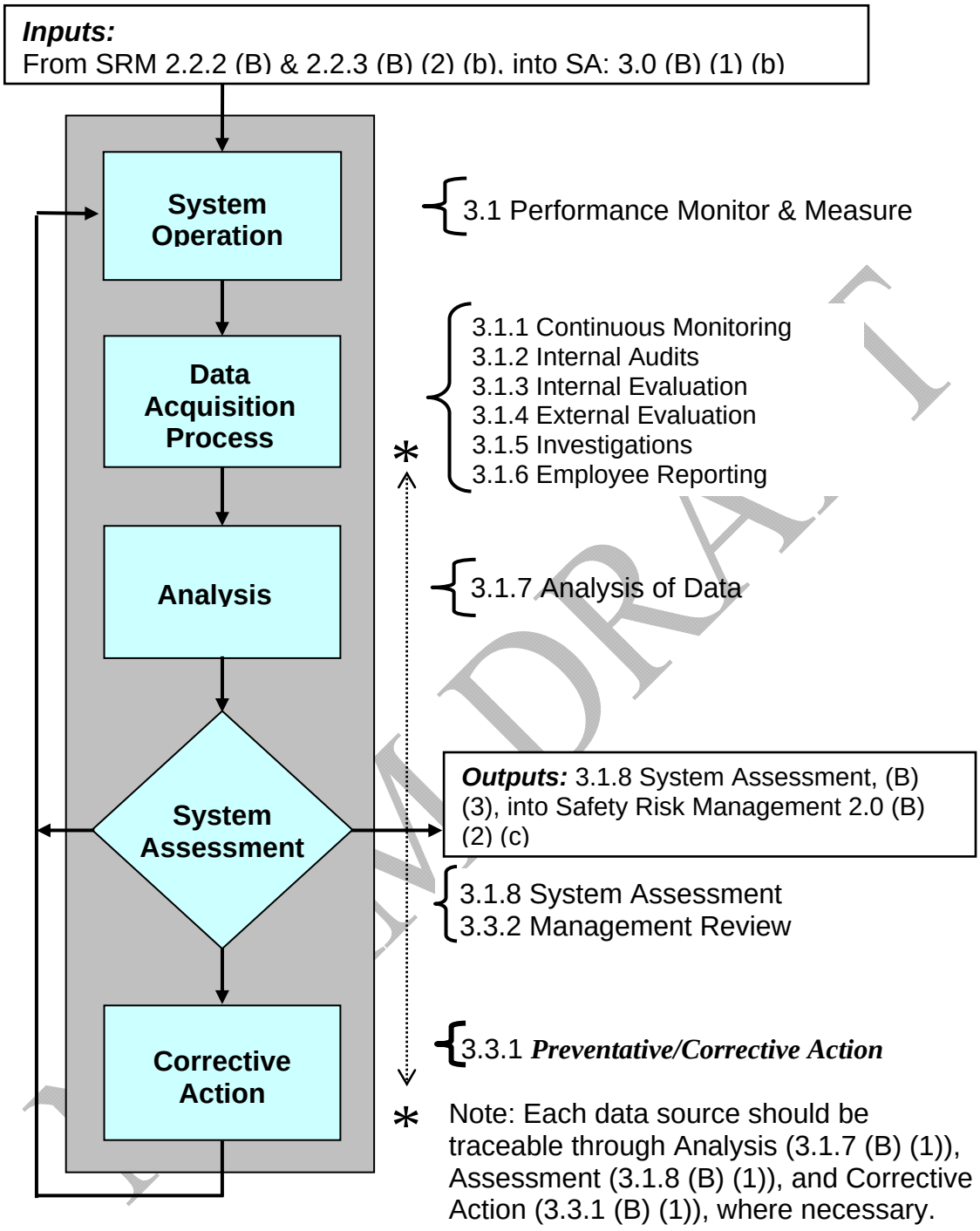

Figure 7 - SA Flow Diagram (Numbers refer to AC 120-92NPRM, Appendix 1, SMS Framework element/process numbers)

System Operation - Performance Monitoring and Measurement:
Establishment of satisfactory risk controls through the SRM process allows a process or system to be put into, or continue operation.

The SA process starts with a System Description which adds structure and helps map organizational responsibilities, functions and interfaces. The SA process is designed to continuously prove, through monitoring and measuring system and process performance, that the risk controls are performing as designed and that the operational systems and processes themselves are meeting their intended objectives.

ELEMENT 3.1 SAFETY PERFORMANCE MONITORING AND MEASUREMENT

PROCESS 3.1.1 CONTINUOUS MONITORING

Performance Objective
The organization will monitor operational data, including products and services received from contractors, to identify hazards, measure the effectiveness of safety risk controls, and assess system performance.

SRR §5.23 (a) (2) (ii) and §5.71

Information for SA comes from a variety of sources, including continuous process monitoring of day-to-day activities and inputs from employees through employee reporting systems. While each of these information sources exists to some degree in every organization, the SMS formalizes requirements for each. Line managers are the technical experts in any organization and thus the most knowledgeable about the specific processes involved. Line managers of the operational departments should exercise their responsibility for monitoring these processes and periodically assessing the status of routine operations and risk controls. Specifications for these and other related SA processes are left at a functional level, allowing individual organizations to tailor them to the scope and scale appropriate for their size and type of organization.

PROCESS 3.1.2 INTERNAL AUDITS BY OPERATIONAL DEPARTMENTS

Performance Objective
The organization will perform regularly scheduled internal audits of its operational processes, including those performed by contractors, to verify safety performance and evaluate the effectiveness of safety risk controls.

SRR §5.23 (a) (2) (ii), §5.71, §5.73 and §121.373

Management has the ultimate responsibility and authority for the SMS; however, line managers of operational departments have the daily responsibility for quality control and for ensuring that the processes in their areas of responsibility function as designed. Thus, the primary responsibility for safety management rests with those who own the technical processes. It is here where hazards are most directly encountered, where deficiencies in processes contribute to risk, and where direct supervisory control and resource allocation can mitigate the risk to acceptable levels. Line managers exercise their responsibility through internal auditing of their process. The SMS specifies a responsibility for internal auditing of the operator's productive processes. As with other requirements, the SMS's auditing requirements are left at a functional level, allowing for a broad range of complexity, commensurate with the complexity of the organization.

PROCESS 3.1.3 INTERNAL EVALUATION

Performance Objective
The organization will conduct internal evaluations of the SMS and operational processes at planned intervals to determine that the SMS conforms to its objectives and expectations.

SRR §5.21, §5.25 (c) (4), §5.71 and §5.73

This function involves evaluation of the technical processes of the operator and the SMS-specific functions. Audits conducted for the purpose of this requirement must be conducted by people or organizations that are functionally independent of the technical process being evaluated. For example, a flight training department may be evaluated by a safety specialist, quality assurance department or another organization, as directed by management, but may not be evaluated by personnel who are under the control of the flight training department. The internal evaluation function also requires evaluation of the safety management functions, policymaking, SRM, SA, and safety promotion. These evaluations provide management officials with objective evidence with which to evaluate the SMS itself.

> **NOTE:** The provisions of the SMS are not intended to duplicate the functions of a Continuing Analysis and Surveillance System (CASS) or Internal Evaluation Program (IEP). In fact, these systems and programs should be an integrated part of a comprehensive SMS (see Section 5, below). Additionally, §5.25 does not explicitly make internal evaluation the responsibility of the management representative or Director Of Safety, but the requirement in the cited subpart is best served by the internal evaluation function. Moreover, this is consistent with the definition of the internal evaluation function in the CASS and IEP Advisory Circulars.

PROCESS 3.1.4 EXTERNAL AUDITING OF THE SMS

Performance Objective
The organization will include the results of assessments performed by oversight organizations (FAA), and other organizations (IOSA, IS-BAO, etc) in its analysis of data.

SRR §5.71

External audits of the SMS may be conducted by the regulator (FAA), code-share partners, customer organizations, or other third parties selected by the operator. These audits not only provide a strong interface with the Safety Oversight System but also a secondary assurance system. It is not the intent of an SMS to require the arrangement or purchase of external audits; however, if external audits are conducted of the organization, the data collected should be used by the organization in their data acquisition process.

PROCESS 3.1.5 INVESTIGATION

Performance Objective
The organization will establish procedures to collect data and investigate incidents, accidents, and instances of potential regulatory non-compliance to identify potential new hazards or risk control failures.

SRR §5.71

Investigation of safety occurrences should have the objective of identifying systemic safety deficiencies (poor system design, failed controls, failed preventative/corrective actions, etc.) rather than assigning blame. It is not as important to identify who was at fault as it is to learn why it happened. System resilience can be much more effectively reinforced by removing systemic deficiencies than by removing individuals, who may only be caught in the human activity of making mistakes.

PROCESS 3.1.6 EMPLOYEE REPORTING AND FEEDBACK SYSTEM

Performance Objective
The organization will establish and maintain a confidential Employee Safety Reporting and Feedback System. Data obtained from this system will be monitored to identify emerging hazards and to assess performance of risk controls in the operational systems.

SRR §5.71

SMS specifies that the aviation certificate holder must provide for a means of employee communication that allows for timely submission of reports on safety deficiencies without fear of reprisal. Without “fear of reprisal” does not mean employees are free

from consequences for their **intentional** actions, see "Acceptable Vs. Unacceptable behavior" discussion, above.

The main objective of an employee safety reporting and feedback system is to establish and maintain an environment in which employees can report hazards, issues and concerns, as well as occurrences, incidents, etc., and propose safety solutions and improvements. Employees must be encouraged by management to use the employee reporting system. Data from the safety reporting and feedback system should be monitored to identify emerging hazards. Additionally, data collected in the safety reporting and feedback system should be included in all SMS analysis functions. Many certificated operators already have invested in ASAP. As discussed below in Section 5, this program is an example of a program that could be integrated into the SMS (providing it encompasses the entire organization, or ASAP can continue to cover specific employee groups so long as another reporting system is available for non-ASAP represented employees).

Effective safety reporting relies upon voluntary error and hazard reporting by people. These people are mainly operational personnel who coexist with or encounter hazards. However because a hazard may also be more obvious to a person who is unfamiliar or unconnected with an operation (and the circumstances in which it is undertaken) there should not be any restriction on who may report and on what. Reporting should not be discouraged in any way.

A good employee safety reporting system should have the following elements that will encourage a positive safety culture:

- The reports need to be confidential and/or anonymous.
- The reporting system needs to provide feedback to the employee.
- The company must take visible action on the report.

There are several ways to kill an employee reporting system: If an employee is penalized for reporting, a rapid death of the reporting system will occur because the program immediately loses its credibility. If nothing is done with the data (the report), employees will lose faith in the process and stop submitting reports; this will cause the slow death of the reporting system.

Operator employees should be encouraged to report actual or potential discrepancies and deficiencies involving the safety of the certificate holders operation. In other words, if a person believes that it is a hazard, non-conformity, etc., they should file a report. A few examples:

- A baggage handler may notice someone driving dangerously on the ramp. Even though the handler informs their supervisor, they should still make a report through the employee reporting system.
- A flight crew may have reviewed the MEL prior to the flight and noted an item that required that they use less than the normal flap setting. On final approach they use the normal flap setting and realize that they used the wrong flap setting

after landing. This is an example of an inadvertent deviation and should be reported.

- Another flight crew identifies a problem with a taxiway at an airport and notifies the ground controller. They should also report it to their company management through the employee reporting system so the company can take action by changing procedures at the airport with the taxiway problem.

All reports should be analyzed to determine what happened (was it a design flaw or a performance issue) and how did it happen (did a control fail). From there, corrections, control modifications or new processes can be developed.

PROCESS 3.1.7 ANALYSIS OF DATA

Performance Objective
The organization will analyze the data gathered in the Data Acquisition Processes, to assess the risk controls' 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.

SRR §5.71

Safety information analysis — what is it?

Analysis is the human activity that is used to make inferences based on data – to make sense of it. The intent of data analysis is to look for patterns, not events. Data should be considered across data sources such as employee reports, investigations, deviations, audits, etc. The main objective of any safety data collection and analysis system is to make events, hazards, safety trends, and their contributing factors visible, understandable, and supported by useable data so that effective corrective action can be taken. Caution: do not collect data that cannot be used, just because it is easy to collect.

Data is analyzed for the purpose of assuring the effectiveness of the SMS and of the risk controls that are in place for the operational processes in the organization. There needs to be a path from data collection to the outputs of Safety Assurance activities which feed into other components of the SMS, thus it is important for analysis to be valid.

For example: When Safety Assurance activities identify hazards, SRM should be conducted. When trends in Safety Assurance performance activities are identified through audits, they should be shared across the industry through programs such as the Aviation Safety Information Analysis and Sharing (ASIAS) program. When compliance issues are identified, they should be reviewed for their impact on policy, both internally and externally

Analyses results are used by the certificate holder for many things:

• Compared to criteria or objectives, such as regulations, international standards and company policies,
• Compared to norms, such as industry standards and company norms,
• Patterns from multiple data points, such as employee reports, audits and investigations,
• Trends over time,

Data is only meaningful to Management if the information is distilled into a meaningful form and conclusions are drawn to form bottom-line decisions.

To put the system back on track, the cause must be determined. This concept is generally known as "Root Cause Analysis". Simply put, Root Cause Analysis determines the initiating cause of a chain of events which lead to an undesirable outcome or event of interest. The goal here is to address a problem or non-conformance, in order to get to the "root cause" of the problem. It is used so we can correct or eliminate the cause, and prevent the problem from recurring.

Safety analysis is based on factual information originating from several sources. Safety analysis often requires multiple cycles and it may be quantitative or qualitative. The absence of quantitative baseline data may force a reliance on more qualitative methods of analysis.

WBAT (Web-Based Application Tool):
WBAT (maintained by Universal Technical Resource Services, Inc. (UTRS)) is an option for those with certificate holders without extensive IT or automation support. WBAT provides aviation service providers with a secure, fully customizable system that promotes safety and accountability across five employee groups. UTRS developed WBAT with funding from the FAA, and will deliver free on-site training and electronic support to Certificate Holders. For more information go to http://www.utrs.com/aviation_safety.html

Safety Performance Measurement - What is it?
In any system, it is necessary to define a set of measurable performance outcomes, in order to determine whether the system is truly operating in accordance with design expectations. Thus, measurable performance outcomes permit the actual performance of activities critical to safety to be assessed against existing organizational controls, so that safety risks can be maintained and necessary corrective action taken.

Examples of safety performance measurement include the number of foreign object debris (FOD) events per number of ramp operations, or the number of ground vehicle events on taxiways per the number of airport operations. Safety performance measurement is a non-stop activity, involving continuous monitoring and measurement, by the organization, of operational activities necessary to deliver products or services.

An additional safety performance example is:

An aircraft operator has identified approach and landing phases of flight as a major safety concern to be addressed by its SMS. It has further narrowed the concern to unstable approaches at those airports served by nonprecision approaches. The operator defines the following safety performance indicator: 10 unstable approaches per 1 000 landing operations at airports served by non-precision approaches. Subsequently, the aircraft operator defines the following safety performance target: Within the next three years, reduce by fifty per cent the number of unstable approaches at airports served by non-precision approaches. The action plan to achieve the safety performance target would be as follows: Coordination with appropriate agencies for the development of constant descent angle (CDA) GPS approaches at airports served by non-precision approaches.

A range of different safety performance indicators and safety performance targets will provide a better insight into safety performance, in other words, the safety performance of an SMS will always be expressed by multiple safety performance indicators and targets, never by a single one.

PROCESS 3.1.8 SYSTEM ASSESSMENT

Performance Objective
The organization will perform an assessment of the safety performance and effectiveness of risk controls, conformance to SMS expectations as stated herein, and the objectives of the safety policy.

SRR §5.23 (a) (2) (ii), §5.73 and §5.97

Audits and other information gathering activities are useful to management only if the information is provided in a meaningful form and conclusions are drawn to form a bottom-line assessment. A primary purpose of the SA process is to assess the continued effectiveness of risk controls put into place by the SRM process. Where significant deviations to existing controls are discovered, the SMS requires a structured, documented process for preventive and corrective action to place the controls back on track.

System Assessment - What is it?
System assessment is where decisions are made about assuring safety. System Assessment applies a manager's human value judgments to the situation considering available information and the decision-maker's past experience within the scope of their area of responsibility. This is where the final determination of acceptability of performance and effectiveness of risk controls is made. For example: "Is the situation acceptable?" or "Are goals and objectives being met?"

When is corrective action needed? This is a situation where the risk has been defined and a control or controls are in place and appear to be effective, however the control/s are not being followed by the employees.

Preventative/Corrective action vs. new risk control? New risk control is needed when data analysis shows that risk has not been mitigated as intended when the control is complied with, i.e., the employees are performing the controls properly, but the control/s themselves are not sufficient. This situation sends you back to the SRM processes in order to modify or implement new risk controls.

ELEMENT 3.2 MANAGEMENT OF CHANGE

Performance Objective
The organization's management will develop and maintain a process to identify changes within the organization or its operational environment which may affect established processes and services. This process will be used to describe the arrangements to assure safety performance before implementing changes.

SRR §5.23 (a) (2) (ii), §5.75, 5.73 (a) (4) & (5) and §5.73 (b)

The Management Of Change process should identify changes within the organization which may affect established processes, procedures, products, and services. Before implementing changes, this process should describe the arrangements to ensure safety performance. This process should consider the criticality of the system and activities, the stability of the system, the operational environment and past performance of the system. Management of change (SMS Framework 3.2) is the application of SMS processes on new processes, products and procedures.

ELEMENT 3.3 CONTINUOUS IMPROVEMENT

Performance Objective
The organization will develop and maintain a process to identify the causes of sub-standard safety performance, determine the implications of substandard safety performance, and eliminate or mitigate such causes.

SRR §5.23 (a) (2) (ii) and §5.75

The organization must continuously improve 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, and management reviews.

As part of the SA function (and management of change, element 3.2, function), the analysis and assessment functions must alert the organization to new hazards found and significant changes in the operating environment, possibly indicating a need for a system change to maintain effective risk controls. Typically this assessment occurs with the Safety Department, Safety Committee, Safety Roundtable, Safety board or other decision making group. When this assessment decision occurs, the results become the input to start the SRM process, as depicted in Figure 5. The SMS requires an analysis and assessment process and a path to the SRM process for the development of new safety controls as environments change and new hazards are identified. It further requires that the organization provide training and information about risk controls and lessons learned. The closed loop nature of SMS monitoring, measuring, analyzing, assessing, correcting/controlling and validating provides the nucleus of continuous improvement.

PROCESS 3.3.1 PREVENTATIVE/CORRECTIVE ACTION

Performance Objective
The organization will take corrective and preventive action to eliminate the causes, or potential causes of nonconformance identified during analysis, to prevent recurrence.

SRR §5.23 (a) (2) (ii), §5.25, §5.73, §5.75 and §5.97

The SA process should include procedures that ensure that corrective actions are developed, documented, and tracked in response to findings of audits and evaluations, and to verify their timely and effective implementation. Organizational responsibility for the development and implementation of corrective actions should reside with the operational departments cited in audit and evaluation findings. If new hazards are discovered, the SRM process should be employed to determine if new risk controls should be developed.

PROCESS 3.3.2 MANAGEMENT REVIEW

Performance Objective
The accountable executive will conduct regular reviews of the SMS to assess the performance and effectiveness of the organization’s operational processes and the need for improvements.

SRR §5.25 and §5.73 (a)

The accountable executive will conduct regular reviews of the SMS, including outputs of SRM, SA, and lessons learned. The Accountable Executive reviews should include assessing the performance and effectiveness of an organization’s operational processes and the need for improvements.

The organization may also conduct management reviews at lower functional levels (i.e. flight operations, maintenance, ground operations, etc.). This could occur, based on the organization of the company, at the individual part 119 director level or at the division level, department level, or section level. These reviews could help managers to meet their responsibility for assurance of the effectiveness of risk controls under §5.23(a) (2)(ii).

SECTION 4 Evaluating a Certificate Holder's Safety Promotion: Component 4 - Safety Promotion

COMPONENT 4.0 SAFETY PROMOTION

Performance Objective
The management representative will promote the growth of a positive safety culture and communicate it throughout the organization.

SRR §5.21, §5.23 and §5.25

Management has the responsibility to promote the growth of a positive safety culture. The effectiveness of an SMS program is in direct proportion to the commitment and dedication put forth by management. Management must provide adequate employee education and training to promote safety awareness and regularly communicate safety policy, goals, objectives, standards, and performance throughout the organization. Additionally, management must provide a safety information system that provides an accessible, efficient means to retrieve safety information.

Safety Culture. A safety effort cannot succeed by mandate only or strict implementation of policy. Organizational cultures, set by management, establishes the tone that enhances the performance and efficiency of the entire SMS. The culture fills in the blank spaces in the organization's policies, procedures, and processes and provides a sense of purpose to safety efforts. The organization must do what it can to cultivate the willingness of its members to contribute to the organization's safety efforts and feel confident that, while they will be held accountable for their actions, the organization will treat them fairly.

Before an organization can have a positive safety culture, the employees need to be informed of their duties and responsibilities. Each employee from the accountable executive/CEO/President down to the line employee has a role in insuring that the organization has a positive safety culture. There are at least seven actions necessary for an organization to have a positive safety culture. They are:

1. Publicize senior management's commitment to safety to all employees.
2. Ensure senior management visibly demonstrates their commitment to SMS.
3. Communicate safety responsibilities for the organization's personnel.
4. Communicate safety policy, goals, objectives, standards, and performance expectations to all employees clearly and regularly.
5. Senior management must allocate resources to create a solid SMS structure and provide the resources to ensure its operation.
6. Ensure that the employee safety reporting and feedback system provides confidentiality.

7. Create and use a safety information system that is accessible and has information that is easy to retrieve.

The organization has to communicate their SMS objectives and procedures to all employees, and the SMS should be visible in all aspects of the organization's operations supporting the delivery of services. The accountable executive or designated management representative should communicate the performance of the organization's SMS program through bulletins and briefings. The designated management representative should also ensure that lessons learned from investigations and case histories or experiences, both internally and from other organizations, are distributed widely. Communication should flow between the accountable executive/designated management representative and employees throughout the organization. Safety performance will be more efficient if employees are actively encouraged to identify and report hazards. Safety communication, therefore, aims to:

1. Ensure that all employees are fully aware of the SMS,
2. Convey safety-critical information,
3. Explain why particular actions are taken,
4. Explain why safety procedures are introduced or changed, and
5. Convey "nice-to-know" information.

Examples of organizational communication include but are not limited to:

1. Safety management systems manual,
2. Safety processes and procedures,
3. Safety newsletters, notices and bulletins, and
4. Websites or email.

ELEMENT 4.1 COMPETENCIES AND TRAINING

PROCESS 4.1.1 PERSONNEL EXPECTATIONS (COMPETENCE)

Performance Objective
The organization will ensure that personnel are trained and competent to perform the SMS duties. The scope of safety training will be commensurate with the individual's involvement in the SMS.

SRR §5.91

PROCESS 4.1.2 TRAINING

Performance Objective
The organization will develop, document, deliver and regularly evaluate training necessary to meet competency requirements outlined in their safety policy.

SRR §5.91

There are process requirements in the Safety Promotion component of an SMS to ensure employees, throughout the organization, are trained and competent on their safety-related job functions. Additionally, it is important for all employees to know how to report safety concerns and know that it is their responsibility to do so.

Training. Safety training within an organization must ensure that employees are trained and competent to perform their safety management duties. The certificate holder's policies and procedures should specify initial and recurrent safety training standards for employees, relative to their positions safety criticality, managers and supervisors, senior managers and the accountable executive. The amount of safety training should be appropriate to the individual's responsibility and involvement in the SMS. The policies and procedures should also specify safety training responsibilities, including contents, frequency, validation and management of safety training records.

Safety training should follow a building-block approach. Safety training for employees should address safety responsibilities, including following all operating and safety procedures, and recognizing and reporting hazards. The training objectives should include the organization's safety policy and SMS fundamentals and overview. The contents should include the definition of hazards, consequences and risks, the safety risk management process, including roles and responsibilities, safety reporting and the organization's safety reporting system(s).

Safety training for managers and supervisors should address safety responsibilities, including promoting the SMS and engaging operational personnel in hazard reporting. In addition to the training objectives established for employees, training objectives for managers and supervisors should include a detailed knowledge of the safety process, hazard identification and safety risk assessment and mitigation, and change management. In addition to the contents specified for employees, the training contents for supervisors and managers should include safety data analysis.

Safety training for senior managers should include safety responsibilities including compliance with national and organizational safety requirements, allocation of resources, ensuring effective inter-departmental safety communication and active promotion of the SMS. In addition to the objectives of the two previous employee groups, safety training for senior managers should include safety assurance and safety promotion, safety roles and responsibilities, and establishing acceptable levels of safety.

Lastly, safety training should include special safety training for the accountable executive. This training should provide the accountable executive with a general awareness of the organization's SMS, including SMS roles and responsibilities, safety policy and objectives, safety risk management and safety assurance.

ELEMENT 4.2 COMMUNICATION AND AWARENESS

Performance Objective
The management representative will communicate the output of its SMS to its employees, and will provide its oversight organization access to SMS outputs in accordance with established agreements and disclosure programs.

SRR §5.93

Management will communicate the outputs of its SMS to its employees, and should provide its oversight organization access to SMS outputs in accordance with established agreements (MOU, LOA, etc.) and disclosure programs (VDRP, ASAP, etc.). The processes specified in the Safety Policy, SRM, SA, and Safety Promotion components of the SMS provide the structure for the organizations processes. However, the organization must also set in place processes that allow for open communication among employees and the organization's management. The certificate holder must make every effort to communicate its goals and objectives, as well as the current status of the organization's activities and significant events. Likewise, the organization must supply a means of upward communication in an environment of collaboration, trust, and respect.

SECTION 5 Integration of Existing Programs into SMS

1. PURPOSE OF THIS SECTION. The FAA strongly encourages the use of required and voluntary programs in the process of safety management, particularly the use of the Continuing Analysis and Surveillance System (CASS), Internal Evaluation Program (IEP) and the Aviation Safety Action Program (ASAP). These programs, and others, have strong relationships to the SMS functions of Safety Assurance and Safety Promotion. Aviation certificate holders are encouraged to consider expanding these programs across their entire organization to develop a comprehensive systems approach to safety management. The discussion and table below is provided to assist in the integration of existing programs into an SMS.

Table 3, below, shows a correlation between the SMS Framework, the requirements of CASS, IEP, ASAP, LOSA and FOQA. The table illustrates potential overlaps between the SMS Framework and the requirements of CASS and other programs, i.e., where a component of either CASS or a voluntary program may satisfy SMS requirements. When an operator utilizes a CASS or one of these programs, the design expectations of SMS should be evaluated to ensure the performance objectives and design expectations are being fulfilled.

2. Integration of Required Programs - CASS

Continuing Analysis and Surveillance System (CASS) is a quality assurance system that monitors and analyzes the performance and effectiveness of the Air Carrier's Continuous Airworthiness Maintenance Program (CAMP). CASS accomplishes this through surveillance, hazards identification, analysis, corrective action, and corrective action follow up.

Until present, the only method an air operator could use to evaluate the effectiveness of their CASS system was the Independent Evaluation Program (IEP), which is not regulatory (except it is required by DoD for a Defense Department contract). Now with SMS, there is a regulatory requirement. SMS should be used to evaluate the CASS or ensure that the IEP is fulfilling its control responsibility.

During the implementing of SMS; CASS should be included in the SMS process. SMS is not a substitute for CASS but a quality management tool ensuring that all the required processes within a robust CASS have been completed. Conversely, CASS may satisfy many SMS requirements for maintenance operations within the organization. CASS should not be a stand-alone system, but rather a subsystem within SMS, and can either be built into the organizations SMS or maintained separately and assessed by the SMS. Either way it is accomplished, it is imperative to understand that CASS should supply data to the SMS. SMS may even support CASS through the use of Safety Risk Management (SRM) and Safety Assurance (SA) processes applied to CASS needs.

SMS should be instrumental in the evaluation of CASS by asking questions necessary to determine if the operator's CASS is effective and efficient, and if there are opportunities for improvement. This is accomplished by ensuring that an Analysis of Data (AOD) is performed on identified hazards as a result of CASS audits and the Independent Evaluation Program (IEP), if implemented. The SMS should ensure that the AOD accomplishes trend analysis, looking for trend patterns, and taking corrective action at the highest level to ensure hazards and risks are removed or mitigated to the lowest possible level. SMS should not only manage the corrective action, but also who was part of the decision making process, and the factors that determined the corrective action.

Enhancing the CASS decision making process, the certificate holder's SMS should utilize the Safety Assurance (SA) process for performance management; and the Safety Risk Management (SRM) process, for design management. During SA system assessment, performance is evaluated to determine if the hazard is a result of insufficient policy or procedures which would affect control (design), or if adequate policies and procedures are in place, and not being followed (performance). If the hazard is identified to be a performance issue, the SA process can be used for preventative or corrective action. However, if the evaluation leads to a design problem then the SRM process must be followed to evaluate current policies and procedures and revise as necessary to provide adequate control.

During a design change, company policies and or procedures are revised to ensure the operational process is clear and concise, so that the desired outcomes are achieved. During this process it is essential to ensure that upper level management with authority to accept and approve policy changes are part of the decision making process.

The SA and SRM work flow processes also enables a feedback loop not addressed in the CASS System. The feedback loop ensures that any changes in performance (SA) or design (SRM) as a result of a corrective action or control does not countermand or interfere with another process, or introduce other latent or active hazards.

SMS must evaluate the CASS to ensure all critical CASS elements are being performed, controlled and outcomes are acceptable, in accordance with FAA Order 8900.1 Volume 3, Chapter 44, "Assess Continuing Analysis and Surveillance System for Parts 121 and 135," and the latest version of AC 120-79, "Developing and Implementing an Air Carrier CASS".

3. Integration of Voluntary Programs

a. Voluntary Programs and the SMS. The FAA strongly encourages the use of voluntary programs in the process of safety management, particularly the use of the Internal Evaluation Program (IEP) and the Aviation Safety Action Program (ASAP). Both of these programs have strong relationships to the SMS functions of SA and Safety

Promotion. Certificate holders are encouraged to consider expanding these programs across their entire organization to develop a comprehensive systems approach to safety management.

Most part 121 certificate holders and their employee groups participate in several of the FAA's voluntary safety programs, and the operator should utilize these programs to satisfy a number of SMS requirements.

In addition to its many regulatory programs, the FAA also supports a portfolio of voluntary safety programs, which encourage certificate holders to exceed the minimum safety standards commonly associated with the regulatory programs. The Flight Standards Service currently supports four reporting programs (the Aviation Safety Reporting System-ASRS, the Aviation Safety Action Program-ASAP, the Flight Operations Quality Assurance program-FOQA and the Voluntary Disclosure Reporting Program-VDRP), two auditing programs (the Internal Evaluation Program-IEP and the Line Operational Safety Audit program-LOSA) and one training program (the Advanced Qualification Program-AQP). These seven partnership programs all involve the collection and analysis of safety data resulting in corrective actions to address safety shortfalls.

Certificate holders are encouraged to be creative in utilizing these voluntary programs to meet the specifications of the SMS rule. All of these programs collect data on the performance of the safety system, so most can be used to help satisfy some of the SMS safety assurance requirement.

b. Voluntary Safety Programs (VSP) and the Freedom of Information Act (FOIA).

Under part 193, the FAA may issue an order designating such information as protected from disclosure under FOIA. But the FAA must first issue such an order, and it cannot do so until it has published the proposed Designation in the Federal Register and solicited public comment. The final order of designation, if issued, must address any public objections in its final order. Data or information that does not qualify as "voluntarily submitted safety related data" can only be protected under FOIA if it qualifies under one or more of the exemptions from FOIA. There are 9 FOIA exemptions under part 193, the most relevant exemption for VSP's and SMS is:

> Exemption 4: Trade secrets or commercial or financial information that is privileged or confidential and submitted to the agency by any person;

(1) Taken program by program:

AQP training data - Exemption 4 may apply.
ASAP reports are protected by FAR part 193 and FAA Order 8000.82.
FOQA data is protected under FAR part 193 and FAA Order 8000.1.
VDRP report data is protected under FAR part 193 and FAA Order 8000.89.

ASRS is protected by FAR §91.25, and FAA confidentiality agreements with NASA.
IEP - this audit data is not currently submitted to the FAA, and may be protected under Exemption 4.
LOSA - this audit data is not currently submitted to the FAA, and may be protected under Exemption 4.

(2) Any VSP is protected by part 193, when an FAA order specifically designates it as protected. Data or information that does not qualify as "voluntarily submitted safety related data" can only be protected under FOIA if it qualifies under one or more of the exemptions from FOIA.

c. Correlation summary between SMS and the voluntary, regulatory, and quasi-required programs.

- CASS is required by §121.373. It overlaps on some of the SMS SA functions (§5.71)

- ASAP and FOQA are programs that can be approved by FAA but are not required. These programs can be used to satisfy some SMS requirements (§5.71).

- LOSA is the subject of AC120-90, Line Operations Safety Audits. A LOSA program is not formally approved or accepted by FAA. A LOSA program could be used to satisfy part of the internal audit requirements of SMS (§5.71).

- IEP is the subject of AC 120-59A, Air Carrier Internal Evaluation Program and AC 145-5, Repair Station Internal Evaluation Programs. An IEP is not approved or accepted by the FAA (no approval or acceptance process). If an operator desires to have a DoD contract they will be required by the DoD to have an IEP. An IEP will satisfy the internal evaluation requirement of §5.71

The data basis for the voluntary programs meets part of the requirements for an SMS. Below is a summary discussion of the various programs and where they do/do not meet the requirements and how the data meets the SMS standards. Further discussion of each program begins on page 60.

(1) ASAP requires analysis and corrective action. It does not, however, require analysis of patterns or trends across reports that would identify systemic problems. We tend to fix the employee but not the system. Technically, this type of trend analysis is not required by AC 120-66B but is highly recommended if the system accomplished the objective of assurance or the performance and effectiveness of risk controls. Of course, the coverage of ASAPs depends on how many employee groups are covered by ASAP programs. Employee groups not covered by an ASAP would need to have some other

type of confidential employee reporting system. Also, an operator would need to maintain a "backup" program to remain in compliance if their collective bargaining agreement (CBA) allowed for the union to opt out of the program.

(2) FOQA requires data collection and analysis but stops short of requiring corrective action. Thus, this requirement would be dependent on the configuration of the specific operator's program - a subject of the gap analysis.

(3) IEP. Since an Internal Evaluation Program is not covered by a regulation or formal voluntary program approval process, an IEP would be totally dependent on the configuration - again, a subject for gap analysis. A program that includes all of the processes of AC 120-59A should cover internal evaluation and associated analysis, assessment, and corrective action processes, to be verified by the gap analysis.

(4) LOSA. Line Orientated Safety Audit has the least connection with established processes. A LOSA could be part of the flight operations' internal audit process. A Gap analysis would be required to insure that it meet the SMS standard.

Below is an extensive baseline correlation between SMS and the voluntary, existing regulatory and quasi-required programs.

Note: Table 3 may be used as guidance in mapping the processes in the certificate holder's CASS to the processes required in a robust SMS. The table is only a quick reference guide. For definitive analysis, the operator should complete a detailed gap analysis (SMS Implementation Guide, Appendix 6) to identify gaps, or missing processes between the certificate holder's CASS and SMS.

It is understood that CASS is not expected to perform Analysis of Data in areas outside of maintenance / inspection and that CASS may not perform complete analysis of data throughout the Safety Assurance Component. During implementation of SMS and when performing the detailed gap analysis (explained in Section 6, below) on SMS Framework processes 3.1.1, 3.1.4, 3.1.5, and 3.1.6, it is important to ensure that the processes within CASS meet the design expectations of SMS.

CASS should also have clear guidance ensuring that any new hazards identified during the System Assessment Process (3.1.8) should go through the SRM process.

When the detailed gap analysis finds gaps within the certificate holder's CASS, the CASS program must be revised, or the missing processes should be part of the certificate holder's SMS.

Safety Management Requirements Baseline Correlation Matrix

SMS	CASS*	IEP	ASAP	LOSA	FOQA
1. Safety policy and objectives					
1.1 - Safety Policy					
1.2 Management Commitment and Safety accountabilities					
1.3 Key Safety Personnel					
1.4 Emergency Preparedness and Response					
1.5 SMS Documentation and Records					
2. Safety risk management					
2.1 Hazard Identification and Analysis					
2.1.1 System Description and Task Analysis					
2.1.2 Identify Hazards					
2.2 Safety Risk Assessment and Control					
2.2.1 Analyze Safety Risk					
2.2.2 Assess Safety Risk					
2.2.3 Control/Mitigate Safety Risk					
3. Safety assurance					
3.1 Safety Performance Monitoring and Measurement					
3.1.1 Continuous Monitoring**	X***	X			
3.1.2 Internal Audits by Operational Departments**	X			X	X
3.1.3 Internal Evaluation**		X			
3.1.4 External Auditing of the SMS**	X				
3.1.5 Investigation**	X		X		
3.1.6 Employee Reporting and Feedback System**			X		
3.1.7 Analysis of Data**	X***	X	X	X	X
3.1.8 System Assessment**	X	X			
3.2 Management of change**		X			
3.3 Continuous Improvement	X				
3.3.1 Preventive/Corrective Action**	X	X	X		
3.3.2 Management review**		X			
4. Safety promotion					
4.1 Competencies and Training					
4.1.1 Personnel Expectations (Competence)					
4.1.2 Training					
4.2 Communication and Awareness					

*Maintenance and Inspection Programs (Systems/Processes) only
** Possible Overlap
*** Limited

Table 3 - Safety Management Requirements Baseline Correlation Matrix

4. Voluntary Safety Programs:

a. Aviation Safety Action Program (ASAP) The goal of the Aviation Safety Action Program is to encourage voluntary reporting of safety issues and events that come to the attention of employees of participating certificate holders. ASAP program development, implementation, approval, and operation is covered in AC 120-66.

To encourage an employee to voluntarily report safety issues even though they may involve an alleged violation of Title 14 of the Code of Federal Regulations (14 CFR), enforcement-related incentives have been designed into the program. An ASAP is based on a safety partnership that will include the Federal Aviation Administration (FAA) and

the certificate holder, and may include any third party such as the employee's labor organization.

ASAP programs include processes for intake of data from employees, analysis of the data, and development of corrective actions. Each ASAP has an Event Review Committees (ERC) to conduct these activities. The ERC has members from the carrier's management, the FAA certificate management organization (e.g. CMO, FSDO, etc.) and, where applicable, the employee group's union. Typically, a separate ERC is organized for each employee group, partly due to different unions representing each group. The ASAP considers each ASAP report for acceptance or denial (according to predetermined criteria) and subsequently analyzes, then, with the reporter's participation, recommends action.

The ASAP program can be used to satisfy the requirement for a confidential reporting system, but only in part. It was designed for pilots, flight attendants, dispatchers and maintenance personnel, and not for the entire certificate holder's workforce. The certificate holder may elect a less complex and expensive solution for its' remaining employees, more along the lines of a suggestion box or anonymous on-line reporting software, whose contents are reviewed by upper management on a regular basis and acted upon as required.

The SMS regulation includes a requirement for a confidential employee reporting system, as well as analysis, system performance assessment, and corrective action processes to support them. ASAP would be considered an acceptable means of compliance with this provision for the employee groups covered by the ASAP. It should be noted that the FAA does not intend to mandate ASAP, the SMS rule does contain provisions for an equivalent function that provides a means of communicating employee safety concerns and establishes requirements for action on these reports. At the same time, the rule and its associated guidance for implementation will allow operators who do have ASAP programs to integrate them into the SMS without duplication.

FAA Order 8000.82 designates information received by the agency from an Aviation Safety Action Program (ASAP) as protected from public disclosure in accordance with the provisions of part 193.

b. Aviation Safety Reporting System (ASRS) The FAA Aviation Safety Reporting System (ASRS) utilizes the National Aeronautics and Space Administration (NASA) as a third party to receive aviation safety reports. ASRS does not provide an explicit requirement for corrective actions nor does it provide sufficient detailed data with which to adequately analyze specific systems or processes. Although ASRS issues "Alerts" to the FAA, to manufacturers, and other organizations such as airport operators on safety issues identified through analysis of submitted ASRS reports, there is insufficient information for a certificate holder to take preventative or corrective action.

Therefore, ASRS is of limited use to an SMS. Additional information on ASRS can be obtained in AC 00-46D.

c. Flight Operational Quality Assurance (FOQA) FOQA is a voluntary program for the routine collection and analysis of digital flight data generated during aircraft operations. FOQA programs provide more information about, and greater insight into, the total flight operations environment. FOQA data is unique because it can provide objective information that is not available through other methods. A FOQA program can identify operational situations in which there is increased risk, allowing the operator to take early corrective action before that risk results in an incident or accident. FOQA, if present, must interface and be coordinated with the operator's other safety programs and their SMS. The FOQA program is another tool in the operator's SMS which monitors operational data, provides system assessment and prepares preventive/corrective actions. As with the other voluntary reporting programs the FAA does not intend for certificate holders to develop a program to satisfy SMS requirements. However if a voluntary program is already present, safety information gained through the program should be used to interface with the SMS Safety Assurance process. FOQA program development, implementation, approval, and operation is covered in AC 120-82.

d. Voluntary Disclosure Reporting Program (VDRP) VDRP provides incentives for a certificate holder to voluntarily identify, report, and correct instances of regulatory noncompliance. The program allows the FAA to oversee and participate in the root-case analysis of the events leading to the violations. The FAA reviews, approves, and oversees corrective actions and conducts follow-up surveillance. The agency accepts the voluntary disclosure, foregoes legal enforcement action, and protects the public release of qualifying disclosures and corrective actions when specific criteria are met.

While VDRP data is not normally the source of safety information, the data gathered during investigation of the event, subsequent development of a comprehensive fix and schedule of implementation should be integrated into the data analysis, assessment and validation processes of the carrier's SMS Safety Assurance processes. Additional information on the VDRP can be obtained in AC 00-58A.

e. Internal Evaluation Program (IEP) The FAA presently encourages (and the DoD requires) an IEP to increase awareness of company management and all employees of their responsibility to adhere to best safety practices, and to also engage in continuous compliance with all regulatory requirements. An Internal Evaluation Program is a fundamental process of the Safety Assurance component of SMS. Each IEP will clearly identify who is responsible for the quality of the IEP, and delineate who is responsible for accomplishing the program.

IEP's should be a continuous process that includes the inspections, audits, and evaluations to assess the adequacy of managerial controls and processes in critical safety systems and to continuously improve those systems based upon results of regular

evaluation. These are the same objectives as the SMS Safety Assurance process. It is encouraged that the IEP will be integrated directly into the Certificate Holder's SMS.

f. Line Operations Safety Audit (LOSA) LOSA is a formal process that requires expert and highly trained observers to ride the jumpseat during regularly scheduled flights to collect safety-related data on environmental conditions, operational complexity, and flight crew performance. Confidential data collection and non-jeopardy assurance for pilots are fundamental to the process.

LOSA is distinct from - but complementary to - other proactive safety programs such as electronic data acquisition systems (e.g., FOQA), and voluntary reporting systems (e.g., ASAP). However, these programs have two major conceptual differences.

1. FOQA and ASAP rely on outcomes to generate data. For FOQA, it is flight parameters, TCAS data, etc; for ASAP, it is adverse events that crews report. By contrast, LOSA samples all activities in normal operations.
2. ASAP reports provide insight into why events occur as seen from the crew's perspective. By contrast, LOSA provides a "neutral, third-party perspective" in that LOSA observer's record contextual and flight crew data.

While the Federal Aviation Administration (FAA) encourages airlines to voluntarily conduct LOSA programs in the interest of safety improvement, LOSA does not entail any requirement for FAA approval, acceptance, or monitoring. While an airline may elect to share the results of a LOSA with the FAA, there is currently no requirement to do so. LOSA results, however, if present, should be included in the data acquisition process of the SMS Safety Assurance component.

g. Advanced Qualification Program (AQP) The AQP is a systematic methodology for developing the content of training programs for air carrier crewmembers and dispatchers. It replaces programmed hours with proficiency-based training and evaluation derived from a detailed job task analysis that includes crew resource management (CRM). AQP incorporates data-driven quality control processes for validating and maintaining the effectiveness of curriculum content. AQP provides an alternate method of qualifying and certifying, if required, pilots, flight engineers, flight attendants, aircraft dispatchers, instructors, evaluators, and other operations personnel subject to the training and evaluation requirements of part 121.

Like ASAP, the AQP program can be used to satisfy the requirement for SMS continuous monitoring, but only in part. It was designed for specific employee groups but not for the entire certificate holder's workforce. The certificate holder may elect use or develop an AQP program or not based upon their unique operational complexities. As an added benefit, AQP may be used to augment not only the SA process, but the SRM process as well since AQP includes system analysis as a component part.

SECTION 6 SMS Implementation

1. General

There are two scenarios for implementing Safety Management Systems. The first is for a new certification and the second is for an established air carrier. In both cases the implementation plan will be submitted to the FAA CHDO for approval (with assistance from the SMS Program Office). The organization will have a full up and running SMS when it completes the SMS Proactive Level (Level 3). At this time the operators SMS will meet the standards in title 14 CFR, part 5 and AC 120-92NPRM.

a. New Applicant: The new certificate applicant must plan and design their company organization using the SRM process, as they are building the company and as they write their manuals. This means that the applicant must have their SRM processes designed, planned and put into operation evaluating every part of the company, as they are building it. Initially, the SRM process will probably be run by the company designers and planners.

For example, the organizers, designers and planners, initially very few individuals, might determine that they need a business plan to show perspective financiers what the new company will look like. Then they might identify the need for an operations section, a maintenance section, a flight section, etc. For each section, for example the operations section, the planners would design what the section we needs to do, i.e., process A, process B, process C, etc. Applying the SRM process, they would ask "In process A, what are the hazards, would the hazards be a risk to our operation, is the risk acceptable and if not, how can we design out the risk or design in a control to mitigate the risk?" Once they have documented the process, they have applied SRM to the design of their operations section. Later, they may have staff managers and others to take over the SRM process, but initially the organizers, designers and planners will use SRM to design the company.

b. Established Certificate Holder: An established carrier will already have systems in place and they may have parts of a Safety Management System in their current system. In this case the company will need to analyze their current systems and compare them to the SMS Framework in AC 120-92NPRM, Appendix 1. This process is called a Gap Analysis, the "gaps" being those elements in the Framework that are not already being performed. They will develop an implementation plan, based on their Gap Analysis. The certificate holder will be required within 6 months of the effective date of the final rule, to show how they intend to implement an SMS within 3years by submitting their implementation plan to the CHDO.

In either case, there are four levels in developing the company's Safety Management System. These levels are (1) The Planning level, (2) the Reactive level, (3) the Proactive level and (4) the Continuous Improvement level. The company may chose any sequence

of events across their operational processes, divisions, departments or other organizational elements to achieve final implementation as long as they are able to meet the [date – 3 years from issuance of final SMS rule] deadline for implementation. For example, a carrier may choose to work though the levels with all operational departments, divisions, or functions simultaneously. Alternatively, the carrier may elect to fully implement SMS processes one division at a time. Whatever sequence is chosen, it must be detailed in the organization's implementation plan. Carriers and CHDOs should, however, remember that the objective is to develop an integrated, comprehensive SMS for the entire organization.

2. Phased Implementation - Four Levels

Note: Orientation and Commitment, "0", in Figure 8 below, is an information process and not considered an actual "level"; it is a time for the operator to gather information on SMS.

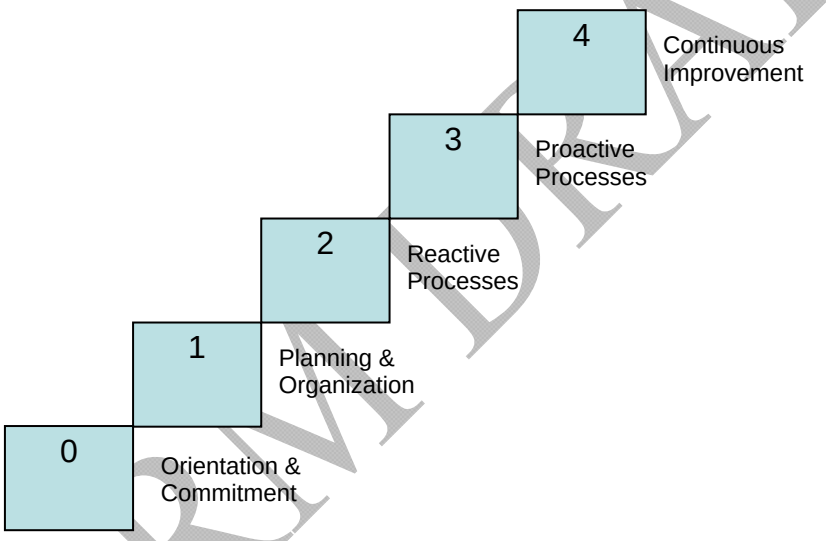

Figure 8 - Levels of SMS Implementation

a. Level One: Planning and Organization. For both implementation scenario's, Level 1 begins when a Certificate holder's Accountable Executive commits to providing the resources necessary for full implementation of SMS throughout the organization. The two principal activities that make up level one are the Gap Analysis and the Implementation plan. (Both activities are discussed in detail in the AC 120-NPRM, Appendix 8). The Gap Analysis is the analysis of the program versus the SMS Standards. The Implementation Plan is simply a "road map" describing how the Aviation Certificate holder intends to close the existing gaps by meeting the objectives and expectations in the SMS Framework.

(1) Gap Analysis: The first step in developing an SMS is for the organization to analyze its existing programs, systems, and activities with respect to the SMS functional expectations found in the SMS Framework. This analysis is a process and is called a "gap

analysis," the "gaps" being those elements in the SMS Framework that are not already being performed by the applicant or certificate holder.

(2) Implementation Plan: Once the gap analysis has been performed, an Implementation Plan is prepared. The Implementation Plan is simply a "road map" describing how the applicant or certificate holder intends to close the existing gaps by meeting the objectives and expectations in the SMS Framework.

b. Level Two: Reactive Processes. At this level, the certificate holder develops and implements a basic Safety Risk Management process. Information acquisition, processing, and analysis functions are implemented and a tracking system for risk control and corrective actions are established. This allows the organization to address problems as they occur and develop appropriate remedial action. For this reason, this level is termed "reactive."

c. Level Three: Proactive Processes. (A fully functional SMS) Component 2.0 of the SMS Framework (AC 120-92NPRM, Appendix 1) expects Safety Risk Management (SRM) to be applied to initial design of systems, processes, organizations, and products, development of operational procedures, and planned changes to operational processes. The risk management process developed at level two is used to analyze, document, and track these activities. Because the organization is now using the processes to look ahead, this level is termed "proactive." In this phase, 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 have been verified. The complete Safety Assurance process, including continuous monitoring and the remaining features of the other SRM and SA 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.

3. SMS Implementation for Initial Certification

At the initial stages of a company's development the initial designers need to use the Safety Risk Management Process to build the company. The initial designers of the company define the company's goals and general plan (AKA Business Plan); this then becomes the basic system description for SRM. The initial designers then use the SRM process to identify potential hazards, analyze and assess risk and incorporate risk controls into both their business and SMS Implementation Plans. As they continue to design the business, they assess and control potential risk as they organize and develop the company. As the company is built, the Implementation Plan is built into the Certification Plan; therefore, operational systems subsystems, company organization, lines of authority, contract arrangements, etc. are analyzed by both their business plan and their implementation plan.

The first step in the application process is to insure that the applicant is prepared and knowledgeable of what a safety management system involves. As part of Pre-Application activities the applicant will complete a Level 1 orientation including the Preliminary Gap Analysis process. If the applicant has started to develop its systems, this will be a check on how those systems compare to the SMS Framework. The applicant must submit, as part of the formal application package, their Detailed Gap Analysis, Implementation Plan and meet the expectations of a Level 1 exit (AC 120-92NPRM, Appendix 1).

4. SMS Approval for Initial Certification

The CHDO, in coordination with the Flight Standards SMS Program Office will approve the implementation plan using the Level 1 Exit Criteria Worksheet found at the end of Appendix 1, AC 120-92NPRM. The Certification Team will validate the implementation/certification plan using the Certification Process Document (CPD). When the company manuals are submitted to the Certification team, the applicant must show evidence that they developed their systems using their Safety Risk Management process.

The certification team will evaluate the applicant's Safety Management System to ensure an SMS that conforms to the standards in AC 120-92NPRM. The company will not progress beyond the Certification Process Document Gate 2 unless their Safety Management System meets the expectations that are defined in AC 120-92NPRM, and that the Detailed Gap Analysis is updated with a minimum assessment level of "Documented" in the Detailed Gap Analysis. The certification team will use the Level 2 Exit Criteria Worksheet found at the end of Appendix 1, SMS Implementation Guide.

As the applicant progresses to Certification Process Document (CPD) Phase 3 – Performance Assessment, they will start to implement the remainder of their Safety Management System. The Detailed Gap Analysis will be updated to reflect the current status of the SMS. The applicant will assess their operating systems using their newly

implemented Safety Performance Monitoring and Measurement processes and the results will be submitted to the certification team). The company will ensure that all concerns found during the assessment have been properly addressed using their SMS process. The certification team will test the SMS to determine that the company's SMS meets the objectives of AC 120-92NPRM.

Once the FAA has established that the applicant SMS meets the requirements for Level 3 Exit, as outlined in SMS Implementation Guide, their safety management procedures will be accepted by the FAA. After an operator is certified, they will have their SMS Processes in place and their performance and effectiveness will have been verified.

5. SMS Implementation for Certificate Holder's Transitioning to SMS.

The second scenario is for an established certificate holder to implement a Safety Management System. The certificate holder should expect to complete the process in 36 months. The operator will progress through the four levels that are described above. After completing Level 3, the Proactive Processes, the carrier will have a complete Safety Management System.

The first step in developing an SMS is for the certificate holder to analyze its existing programs, systems, and activities with respect to the SMS functional expectations found in the SMS Framework (AC 120-92NPRM, Appendix 1). This analysis is called a "gap analysis," The operator will complete both the Gap Analysis processes described in SMS Implementation Guide, Appendix 5 and 6 and summarized below:

- The "Preliminary Gap Analysis" process is performed onsite with the assistance of the Implementation Support Team (IST), the certificate holder's management and the FAA CMT. The preliminary gap analysis represents a "snapshot", a high level subjective analysis of where the certificate holder stands at that time with respect to the SMS Framework.

- (b) The "Detailed Gap Analysis" process is an in-depth process and is performed by the certificate holder (with the involvement of the company's FAA CMT). It is a comprehensive and thorough assessment of each program, process and control of the organization as compared to the standards and objectives of the SMS Framework. Depending upon the size and complexity of the organization, the detailed gap analysis may take 4 to 6 months to complete. The detailed gap analysis is a "living" process and will be continuously updated as SMS implementation progresses.

a. Implementation Plan. Once the detailed gap analysis has been performed, an implementation plan is prepared. The implementation plan is simply a "road map" describing how the certificate holder intends to close the existing gaps by meeting the standards and objectives of the SMS Framework.

(1) While only three actual development activities are expected during level one, the certificate holder organizes resources, assigns responsibilities, sets schedules and defines objectives necessary to address all gaps identified.

(2) It should be noted that at each level of implementation, accountable executive's approval of the implementation plan must include allocation of necessary resources IAW SMS Framework Element 1.2 b (2) and §5.21 (a) (3).

b. Implementation Level Two: Reactive Process. At level two, the certificate holder develops and implements a basic SRM process. Information acquisition, processing, and analysis functions are implemented and a tracking system for risk control and corrective actions are established. At this level, the certificate holder corrects known deficiencies in safety management practices and operational processes; develops an awareness of hazards and responds with appropriate systematic application of preventative or corrective actions. For this reason, this level is termed "reactive." This will include complying with the requirements in SMS Implementation Guide, Appendix 2.

c. Implementation Level Three: Proactive Processes, (Fully-Functioning SMS). Component 2.0 b (2) (a), of the SMS Framework expects the certificate holder to apply its SRM process to initial design of systems, processes, organizations, and products; development of operational procedures and planned changes to operational processes. The certificate holder is now using the SMS to look ahead, thus this level is termed "proactive". However, even though these proactive processes have been implemented, their performance has not yet been proven. This level will include complying with the requirements in SMS Implementation Guide, Appendix 3.

d. Implementation Level Four: Continuous Improvement. The final level of SMS maturity is the continuous improvement level. SMS processes have been in place and their performance and effectiveness have been verified. The complete SA process, including continuous monitoring and the remaining features of the other SRM and SA processes are functioning. Level 4 will continue for the life of the organization.

6. SMS Approval for Transitioning Certificate holders

a. Scope. It is recognized that complete implementation of an SMS at a larger and more complex organization may take as long as 3 years to ensure that all aspects of the system is in place across all departments of the organization. The intent is to allow certificate holders to implement an SMS in phases, in a standardized manner and to allow validation and acceptance at each level of implementation.

b. Letter of Acceptance. Upon successful completion of each level, the certificate holder will receive a "Letter of Acceptance" which will document their completion of the levels in the development of their SMS. The Letter of Acceptance will be signed by the CMT Management Team, and will be issued to the certificate holder.

c. Levels of Participation. There are four levels in implementing a Safety Management System. Each certificate holder may develop their SMS in a modular fashion across their departments or across all their departments at the same time, however, the attainment of the implementation levels shown below are based on a comprehensive system covering the entire organization.

(1) SMS Level One: This level will be validated when a certificate holder demonstrates that they have successfully conducted a thorough preliminary and detailed gap analysis, implemented the processes corresponding to level 1 of the SMS Implementation Guide, Appendix 1, developed a comprehensive implementation plan. Refer to the Advisory Circular Level 1 exit check list for guidelines.

(2) SMS Level Two: This level will be validated when a certificate holder demonstrates that they have successfully implemented the processes corresponding to level 2 of the SMS Implementation Guide, Appendix 2. Objective evidence will be required that SRM processes and procedures have been applied to at least one existing hazard and that the mitigation process has been initiated.

(3) SMS Level Three: This level will be validated when a certificate holder demonstrates that they have successfully implemented the processes corresponding with level 3 of the SMS Implementation Guide, Appendix 3, and that the performance of these processes has been demonstrated in a performance review conducted by the CMT. This includes all training for the SMS staff and employee personnel of the organization. At this level, the certificate holder is considered to have a fully instituted SMS, however the performance and effectiveness of the SMS processes have not been validated for continued system effectiveness.

(4) SMS Level Four: The final level of SMS maturity is the continuous improvement level. Complete SMS processes have been in place and their performance and effectiveness has been verified. There is no validation of level 4 as the certificate holder is expected to attain and maintain level 4 for the life of the organization.

d. Validation: The CHDO, in coordination with the Flight Standards SMS Program Office will conduct validation activities to assure that the certificate holder's SMS is being developed in accordance with the approved implementation plan and that it meets the requirements of 14 CFR part 5. The CHDO will coordinate intermediate validation events at least upon completion each of levels one though four , when all organizational elements are deemed to be at that level. Additional intermediate validation events may be planned as necessary or desired by the CHDO or may be requested by the carrier. The purpose of these intermediate events is to assure that the certificate holder is making adequate progress toward full implementation and that they are receiving feedback to assist them from the CHDO and the SMS Program Office.