International Industry Standard

IMPLEMENTING A SAFETY MANAGEMENT SYSTEM IN DESIGN, MANUFACTURING AND MAINTENANCE ORGANIZATIONS

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Record of Revisions

Issue	Date	Reasons for Revisions
A	September 17th, 2018	Initial issue
B	March 31st, 2022	The intent of this update is to: - Incorporate lessons learned from voluntary implementation with Aviation Authorities, - Incorporate clarification and updates to ensure alignment with ongoing rulemaking as a means of compliance, - Facilitate increased scalability depending on the organization and service attributes, - Establish global applicability for maintenance organizations, - Strengthen compliance verification and safety activities to guard against potential hazards of undue pressure on certifying staff from the business interests of the company, - Align with EASA Part 21 rulemaking where some gaps were identified in the previous issue A
C	November 18th, 2025	The intent of this update is to: - Address the comments still pending from the ballot of previous issue B - Incorporate Appendix 7 “SMS Implementation Strategies” in previous issue B into the main body of the Standard - Incorporate experience with the development of the US SMS regulations and guidance material for Design and Manufacturing organizations and consider updated FAA Part 5 mandating SMS to TC & PC holders, - Further strengthen global applicability for maintenance organizations, - Strengthen safety culture principles and provide guidance for its enablers & disablers, - Strengthen the need to ensure independence of the staff making decisions affecting safety/airworthiness - Add a new Section 5. “Positive Safety Culture” - Add a new appendix 3 “Examples of Safety Assurance” - Add a new appendix 4 “Examples of Safety Promotion - Add a new appendix 7 “Examples of Positive Safety Culture Enabling Behaviours”

		- Extend the scope of appendix 8 to ANAC, EASA and TCCA and consider the specificities of latest amendment of FAA Part 5 - Add references to FAA part 5 and EASA part 21 within appendix 9

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1. INTRODUCTION

1.1. Preamble

This Standard is intended to enable the aviation industry to implement a Safety Management System (SMS) consistent with Annex 19 [Second Edition-Amendment 1] to the Convention on International Civil Aviation, as adopted by the International Civil Aviation Organization's (ICAO). It can be used to support demonstration of compliance with applicable SMS requirements from Aviation Authorities or for voluntary SMS implementation.

ICAO Annex 19 establishes Standards and Recommended Practices (SARPs) applicable to safety management functions related to, or in direct support of, the safe operation of aircraft.

Annex 19 prescribes that each State must require several organizations under its authority to implement an SMS (e.g., organizations responsible for the type design or manufacture of aircraft, engines or propellers in accordance with Annex 8, approved maintenance organizations providing services to operators of airplanes or helicopters engaged in international commercial air transport, in accordance with Annex 6, Part I or Part III, Section II, respectively).

The industry anticipates that each Local Aviation Authority will continue to promulgate SMS regulations applicable to organizations identified by ICAO Annex 19 and that the industry organizations will be required to respond consistent with their State's requirements.

This Standard has been developed to consider the broadest scope of potential SMS implementation in design, manufacturing and maintenance organizations.

SMS is being introduced for the purpose of continuous improvement in Aviation Safety.

When the term "Safety" is used in this document, it is defined as the state in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level.

The main objective of an SMS is to manage safety related to, or in direct support of the safe operation of aircraft through the effective management of safety risks. It is a system designed to maintain or improve safety by identifying hazards, collecting and analyzing data and managing safety risks. An SMS seeks to proactively assess and control risks before they result in aviation accidents and incidents.

SMS is an approach to manage safety within the entire organizational management structure(s); remain alert or agile to any kind of potential safety concerns or changes; stay resilient when the organizational environment is under stress; and assure that management of safety remains at the heart of the business.

Also, it is important to recognize that (unlike other service providers required by Annex 19 to have an SMS) Design, Manufacturing and Maintenance organizations' contribution to aviation safety is through the product delivered into operation. The contribution to aviation safety of such organizations is essentially defined by their output at the point where it is provided for operation. Design, manufacturing

and maintenance organizations can identify what a safe contribution is - either a design shown to meet a defined safety/certification standard, a fully conforming product, or a set of requested maintenance activities properly completed.

While the organizations may have existing mature systems & disciplines already aiming to achieve these safe contributions, the SMS is the means to consider why that might not be achieved, or how to achieve a higher level of safety, by seeking and managing the weaknesses in the organization's systems and so limiting the opportunity for the expected contribution to safety not to be achieved.

SMS can be a complex topic with many aspects to consider, but the defining characteristic of an SMS is that it is a decision-making system, based on the collection and analysis of information that encompasses both reactive and proactive measures. It also aims to maintain or improve the safety performance of organizations by establishing and fostering a Positive Safety Culture. A Positive Safety Culture should be present at all levels and be reflected in an active and visible management commitment as well as by individuals' awareness of their role and influence on safety.

An SMS should not be implemented through an additional management system requirement, superimposed onto the existing rules, but should be fully consistent with other organization management systems. It is important to note that this Standard addresses only the requirements of an SMS and does not provide guidance or means of compliance for the other organization management system requirements, or other duties already required of the holder of certificates or approvals. The SMS may contribute to the discharge of these duties but does not act as the sole means of compliance. As an example, duties for reporting of certain occurrences to the Aviation Authorities from holders of certain approvals or certificates exist today. The SMS does not re-define the criteria for the selection of such reports or the means to convey them to the Aviation Authorities, but may, through its collection of information and reports, provide additional sources of information from which the organization may identify items required to be reported to the Aviation Authorities.

Note: The table within Appendix 9 shows the correlation between ICAO Annex 19 Appendix 2, FAA 14 CFR part 5, EASA Part 21, EASA Part 145 and SM-0001 and link to IAQG 9100:2016 & IAQG 9110:2016.

The structure of an SMS has been formalized in ICAO Annex 19 around four components:

1. Safety Policy and Objectives.
2. Safety Risk Management.
3. Safety Assurance.
4. Safety Promotion.

The ICAO Safety Management Manual (SMM, Doc 9859) also mentions SMS as a system that is commensurate with the organization's regulatory obligations and safety goals. This Standard recognizes the variability of organizations implementing SMS requirements in providing additional guidance for organizations having disparate attributes including, but not limited to their size and complexity, the types of products or services being provided, as well as external factors such as operating environments and regulatory requirements. The guidance stresses the interest of keeping the system as simple as possible for its effective and efficient operation.

This Standard is intended to support SMS implementation by Design, Manufacturing and Maintenance organizations, and is expected to be usable as Guidance Material (GM) and as an Acceptable Means of Compliance (AMC) to the corresponding Annex 19 transposition into aviation safety regulations. For example, in 2015, in the USA, the Federal Aviation Administration (FAA) published 14 CFR Part 5 which included SMS requirements applicable only to air carriers conducting operations in accordance with part 121. This rule was updated in 2024, to include SMS requirements applicable to part 135 operators, § 91.147 air tour operators, and certain holders of a Type Certificate and Production Certificate issued under Part 21. In Europe, the European Union Aviation Safety Agency (EASA) has published the SMS requirements for Design, Manufacturing and Maintenance organizations in Part 21 and Part 145. In Brazil, National Civil Aviation Agency – Brazil (ANAC) began, in 2025, the rulemaking process to update RBAC 21, including SMS requirements for Design and Manufacturing organizations. Also, FAA, and Transport Canada (TCCA) are continuing to operate a voluntary SMS program for Design and Manufacturing organizations.

This Standard can be used as a means for demonstrating SMS compliance with FAA 14 CFR Part 5 and EU Part 21 also in the frame of voluntary SMS programs under the conditions as specified within the Appendix 8 “Compliance with Authorities’ SMS regulation”.

The Aerospace Industries Association of America (AIA) has issued a National Aerospace Standard (NAS) “Safety Management System Practices for Design and Manufacturing”: NAS 9927.

The NAS Standard has been considered as an input for the development of this SM-0001 Standard.

SMS requirements may also be applied to military regulations (just as airworthiness certification requirements are used in a military context). The present standard may then be considered as guidance material.

ICAO Annex 19 includes a requirement for a voluntary incident reporting system and accords the protections outlined in its Appendix 3, Principles for the Protection for Safety data, Safety Information and Related Sources, to the safety data captured by and safety information derived from these voluntary reporting systems and related sources. These principles are in line with the concept of "Just Culture" which are important to encourage individuals to report safety-related information. However, it should not absolve individuals of their normal responsibilities. In a European context, "Just Culture" is also required by EU No 376/2014. This Standard considers “Just Culture” principles from both Annex 19 and EU No 376/2014 perspective.

This Standard has been developed with the expectation that when safety management systems implemented in a manner consistent with SM-0001 will be accepted by the implementing organization’s National Aviation Authority, it should be mutually recognized by other National Aviation Authorities. However, it is understood that some Aviation Authorities may apply additional requirements over and above those contained in ICAO Annex 19. Any additional requirements contained in national regulations should be subject to a dedicated annex to this Standard.

This Standard has been developed by a group of representatives of aviation Design, Manufacturing, and Maintenance organizations.

1.2. Acceptance status by Aviation Authorities

SM-0001 acceptance status by Aviation Authorities is documented in the supplement ref. SM-0001.01 available on the websites of the sponsoring associations.

2. SCOPE OF THE STANDARD

2.1. Purpose

This standard provides:

- Means of compliance for each of the SMS Framework elements.
- Detailed guidance to implement SMS requirements.
- Guidelines to enable the sharing of safety related information and continuing airworthiness through interfaces between organizations having safety management obligations, such as: design, manufacturing, maintenance and training organizations, as well as operators and relevant Aviation Authorities.

It also considers corporate structure and processes to cover some or all elements common across domains, such as: accountability, safety policy, hazard identification and safety risk management principles, safety data collection and assessment, and safety awareness and training. Corporate SMS is not compulsory but could facilitate consistent SMS implementation, in companies holding multiple approvals and/or certificates.

This standard is intended to provide a means of compliance with SMS requirements enforced by ICAO Member States and based upon ICAO Annex 19 Appendix 2 (e.g., 14 CFR Part 5 in the USA, Part 21 and Part 145 in Europe), primarily using both Section 6 and any relevant unique national authority requirements found in Appendix 8.

It is intended to provide a means, but not the only means, of compliance with civil aviation regulations but could be used for compliance with other regulations (e.g., military regulations) when acceptable to the relevant Aviation Authorities.

The appendices to this standard provide supplemental/additional guidance and examples for several topics addressed in the core sections. In particular, the appendix on SMS maturity assessment has been extensively revised through Issue B and now includes material to support self-assessment by both the organization and by a National Aviation Authority.

2.2. Intended application

This standard addresses the implementation of the SMS elements within organizations undertaking design, manufacturing or maintenance responsibilities and activities or both as:

- Approved organizations (holding an organization approval, e.g., DAO, DOA, ODA, POA, AMO/MOA)
- Other organizations (holding a certificate for design or manufacturing or both, e.g., TC, PC, PMA holder), including those from the supply chain (i.e., critical system and component suppliers).

This standard can be implemented on a voluntary basis by organizations that are not required by regulation to implement an SMS.

The extent to which SMS is applied to an organization depends on the organization's approval scope or the applicable organizational system description when organization approval is not required.

Although this standard addresses implementation of the SMS elements within organizations responsible for aircraft, parts and appliance design, manufacturing or maintenance, it may also be used as a baseline to implement an SMS, when acceptable to the relevant Aviation Authority by other organizations included under the ICAO Annex 19 applicability: approved training organizations exposed to safety risks related to aircraft operations, certified operators authorized to conduct international commercial air transport, air traffic services providers, certified aerodromes and international general aviation operators. It should be noted that principles of SMS are consistent over the service providers, but business-specific terminology may be different. Thus, consideration should be given to the specifics of the organization's services.

Note: All the supporting reference documentation listed in section 3 has been considered while drafting this standard.

2.3. How to Use this Document

Within Section 6, the content is organized to first provide a perspective on how to interpret the ICAO Annex 19 language for Design, Manufacturing, and Maintenance organizations. Next, a concise desired outcome is presented to help the reader visualize the end state objectives of the activities that are described in the last segment, the means of compliance. Appendices 1 – 4 provide practical industry examples for consideration in achieving the Section 6 means of compliance.

The standard provides ample supplemental information in the remaining sections and appendices that may prove useful for an organization at different times in its SMS journey. For example, guidance for interfaces is found in Section 7, guidance for initial SMS implementation can be found in Section 8 and a method to assess SMS maturity progress is provided in Appendix 5. Safety culture is described in Section 5 and examples for enablers and disablers are highlighted in Appendix 7.

3. SUPPORTING REFERENCE DOCUMENTATION

The following documents have been considered during the development and update of this standard:

- ICAO Annex 19, Second Edition-Amendment 1 effective July 2016;
- Safety Management Manual (Doc 9859 – 4th edition published October 2018);
- ICAO Annex 13 (Amendment 18, effective July 2020);
- Safety Management International Collaboration Group (SMICG) documentation (e.g. SMS evaluation tool, risk based decision, SMS terminology): link.
- EU regulation (EU) No 2018/1139 (for basic safety aspects);
- EU regulation (EU) No 376/2014 (for reporting aspects) and ASD Just Culture declaration;
- EU regulation (EU) No 1321/2014 (Part-CAMO);
- EU regulation (EU) No 2021/1963 amending Regulation (EU) No 1321/2014 as regards safety management systems to be established by maintenance organizations;
- EU regulation (EU) No 2022/201 amending Regulation (EU) No 748/2012 as regards safety management systems to be established by design and production organizations;
- EASA AMC/GM to Part ORA, Part ORO, Part ATCO AR/OR, Part CAMO, Part 145, Part 21;
- FAA 14 CFR Part 5 – Safety Management Systems;
- FAA AC 21-58 – Safety Management Systems for Part 21 Type and Production Certificate Holders;
- FAA AC 120-92D – Safety Management Systems for Aviation Service Providers
- AIA NAS9927 (1st issue dated May 31, 2016);
- International Standards (IAQG 9100:2016 & IAQG 9110:2016, ISO 31010);
- ISO/IEC Directives Part 2 – Principles and rules for the structure and drafting of ISO and IEC documents;
- IAQG Supply Chain Management Handbook (SCMH) – Chapter 7.22 - Safety Management Systems.

4. TERMS AND DEFINITIONS

4.1. Terms

Throughout this standard the following verbal forms differentiate requirements from provisions where a choice exists:

Understanding: Provides explanations and information to assist the user in the interpretation of the requirements contained in ICAO Annex 19 Appendix 2.

Means of Compliance: Serves as a means by which the requirements contained in ICAO Annex 19 Appendix 2 can be met.

Can: Denotes a possibility or a capability.

May: Denotes a permission.

Should: Denotes a recommendation

Must: Denotes necessary conditions.

Shall: Denotes a requirement. Compliance with a requirement is mandatory and no alternative may be applied.

4.2. Definitions

The following definitions are either based upon those within the reference documents listed in section 3 “Supporting reference documentation” or established by the drafting group of this standard.

The definitions within the regulatory material may include some different wording than in this standard. The user of the standard should refer to such regulatory material and adapt the definitions within its SMS documentation as necessary.

Accident
An occurrence associated with the operation of an aircraft which takes place between the times any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which:

a) A person on board or on ground is fatally or seriously injured.
b) The aircraft sustains damage or structural failure.
c) The aircraft is missing or is completely inaccessible.

(Source: ICAO Annex 13).
Note: In principle this definition is also valid for Unmanned Aerial Systems (UAS) when their operation takes place between the time, they become airborne until they land on the ground or in the water.

Accountable Executive
A single, identifiable person having accountability for the effective and efficient performance of the organizations SMS. *(Also called "Safety Accountable manager") (see §6.1.2 for the role/duties of the Safety Accountable Executive/Manager)*

Aircraft
Manned or unmanned aerial system (with or without pilot).
(Source: SM-0001 Drafting Group).

Continuing Airworthiness Management
A process by which a type certificated aircraft is thereafter kept in a condition where it remains airworthy, being compliant with the technical conditions fixed to the issue of the Certificate of Airworthiness and kept in a condition for safe operation (technically fit for flight).
(Source: based on ICAO Document No 9713 – 1998).
Note: This process is under the responsibility of the aircraft operator or its delegated approved organization (e.g., CAMO)
Note: Continuing Airworthiness is defined in the EU rules [Article 2 to Regulation (EU) No. 1321/2014] as follows: "All of the processes ensuring that, at any time in its operating life, the aircraft complies with the airworthiness requirements in force and is in a condition for safe operation."

Continued Airworthiness
The post-certification phase of an aircraft's design life, during which the design approval holder has duties to collect data on "failures, malfunctions and defects" (see for example EU Part 21.A.3A) to identify potential threats to the continuing airworthiness of the aircraft, and for which phase the design approval holder is required to make available 'instructions for continued airworthiness' to ensure the safe operation and support the development of the operator's maintenance programs.
(Source: based on EU No 748/2012 - Part 21 wording).
Note: The activities in respect of failures, malfunctions and defects in EU regulation (Part 21.A.3) are referred to as Continued Operational Safety (COS) in US regulation (14 CFR Part 21.3).

Corporate SMS
Corporate governance, structure and processes to cover some or all elements common across domains (such as accountability, safety policy, hazards identification and safety risks management principles, safety data collection and assessment, safety awareness and training).
(Source: SM-0001 Drafting Group).

Corrective Action
The action to eliminate or mitigate the root cause(s) of an existing detected non-compliance or other undesirable conditions or situations. to prevent or minimize their recurrence.

Environment, Health and Safety
A discipline aimed at protecting human health and safety by minimizing hazards in the workplace, environment, and communities

Event
Any anomaly in operating an aviation product or in performing an organization's activity.
(Source: SM-0001 Drafting Group).

Foreseeably
Being such as may be reasonably anticipated. Identification of every conceivable or theoretically possible hazard is neither possible nor desirable; therefore, judgment is required to determine the adequate level of detail in hazard identification. Organizations should exercise due diligence in identifying significant and reasonably foreseeable hazards related to their operations.
(Source: derived from NAS9927).
Note: Regarding product design, the term "foreseeably" is intended to be consistent with its use in airworthiness regulations, policy, and guidance.

Hazard
A condition or an object with the potential to cause or contribute to an aircraft incident or accident.
(Source: ICAO Annex 19).

Incident
An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.
(Source: ICAO Annex 13).

Just Culture
A culture where individuals are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training, but where gross negligence, wilful violations and destructive acts are not tolerated.
(Source: based on EU No 376/2014).

Management System
A framework of policies, processes and procedures used by an organization to ensure that it can fulfil all the tasks required to achieve its objectives.
(Source: based on ISO 9000:2015).

Mandatory Reporting
Legal duty to report certain events, occurrences or data as defined by the State regulation.
Should not be confused with compulsory internal reporting as it may be defined by the organization itself.
(Source: SM-0001 Drafting Group)

Occurrence
Any safety-related event which endangers or which, if not corrected or addressed, could endanger an aircraft, its occupants or any other person and includes in particular an accident or serious incident (as defined in ICAO Annex 13).
(Source: EU No 376/2014).

Operational Performance
In terms of organizational risk, the term "Operational Performance" describes the measurement of a broad range of activities undertaken by the organization that could impact product safety, including design, certification, manufacturing (from the procurement of raw materials to the distribution of finished goods), and the continued operational safety of the organization's fielded products and services. The scope of operations varies with the type and size of the organization.
(Source: SM-0001 Drafting Group).

Operating Environment
Key internal and external factors that influence the working conditions and situations in which the organization's processes, procedures, personnel, equipment, and facilities operate and the ability to achieve safety objectives. Example factors may include customer needs, suppliers, outsourcing design activities, program schedule constraints, supplier deliveries, conducting production activities in various locations, manufacturing schedules, customer feedback, risk assessment and corrective action schedules, budgetary constraints, and staffing constraints.
(Source: FAA AC21-58)

Organization
In the scope of this standard, any entity, approved or non-approved, independent of size, performing an activity in Design, Manufacturing or Maintenance (DMM) of aircraft, propellers, aircraft engines or parts and appliances. ICAO is making use of the term "service provider" for those organizations.
(Source: SM-0001 Drafting Group).

Organizational factor
A condition that affects the effectiveness of safety risk controls, related to the culture, policies, processes, resources, and workplace of an organization.
(Source: GM1 to EU Part-145)

Organizational System Description
A description of an organizational system including its structure, policies, communications, processes, products, services and operations to determine the scope and perimeter of the system to which the SMS is applied. Operating environment is part of the system description.

Procedure
A specified way to carry out an activity or a process.
(Source: ISO 9000:2015).
Note: When a procedure is documented, the term "written procedure" or "documented procedure" is frequently used. The document that contains a procedure can be called a "procedure document".

Process
A set of interrelated or interacting activities which transforms input elements into outputs, respecting constraints, requiring resources, meeting a defined mission, corresponding to a specific purpose adapted to a given environment.
(Source: based on ISO 9000:2015).

Product
A broad term that includes aircraft, aircraft engine, aircraft propeller, aircraft part or appliance or both, their subcomponents (hardware and software) and associated deliverables such as documentation necessary for operation and maintenance (e.g., Instructions for Continued Airworthiness, Aircraft Flight Manual).
(Source: SM-0001 Drafting Group).

Product Safety
A broad term that covers the extent to which the product is capable of safe operation for its intended use; it is influenced by its design, manufacture, operation and maintenance. Product safety is influenced directly by the robustness of the organizational practices of the design, manufacturing and maintenance entities interacting with the product, and indirectly by activities contributing to the safety of the aviation system, such as traceability, record keeping and reporting.
(Source: SM-0001 Drafting Group)

Quality escape
Any product released by an internal or external supplier or sub-tier supplier that is subsequently determined to be nonconforming to contract or product specification requirements or both.
(Source: AS/EN/SJAC 9131).

Reporting
Reporting is an important element of hazard identification and can be accomplished with various levels of protection:

Anonymous Reporting: The identity of the individual reporting a safety concern is not provided, and employees will not take actions (i.e., search telephone, email or digital records) in an attempt to determine the identity of the individual.

Confidential Reporting: The identity of the individual reporting a safety concern is provided, however, it will only be shared with employees within the organization who have a need to know.

Open Reporting: The identity of the individual reporting a safety concern is provided and can be shared with all internal employees working on the concern after agreement by the reporting person.

Risk
The combination of predicted severity (criticality) and likelihood (probability) of the potential effect of a hazard.
(Source: NAS9927).

Risk Assessment
An evaluation of safety risk based on engineering and operational judgement and/or analysis methods to support the determination of whether the achieved or perceived risk is acceptable or tolerable.
(Source: GM1 to EU Part-145)

Risk Control
A means to reduce or eliminate the effects of hazards.
(Source: NAS9927).

Risk Mitigation
The process of incorporating defences or preventive controls to lower the severity or likelihood of a hazard's projected consequence or both.
(Source: ICAO Doc. 9859 SMM).

Safety
The state in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level.
(Source: ICAO Annex 19).

Note: risks of harm to persons or damage to property are to be considered.

Safety Accountability
The obligation for the safety performance of the organization. Accountability cannot be delegated.

Safety Assurance (SA)
Processes within the SMS that function systematically to ensure the performance and effectiveness of safety risk controls and that the organization meets or exceeds its safety objectives through the collection, analysis, and assessment of information.
(Source: NAS9927).

Safety Culture
An enduring set of values, norms, attitudes and practices within an organization, which is concerned with minimising the exposure of the workforce and the general public to dangerous or hazardous conditions.
(Source: EASA Guidance Material (GM) to Part 21).
Note:

1. *In a Positive Safety Culture, a shared concern for, commitment to, and accountability for safety is promoted. A Positive Safety Culture enables proactive identification and mitigation of risks, in a just and fair environment, to prevent accidents, injuries or loss of life.*
   (Source: SM-0001 Drafting Group).
2. *The objective of safety culture is to enhance the organization employees' understanding of their role in safety, to share and promote safety values and to encourage the positive behaviour and mind-set to address any identified safety related questions or concerns in an environment of trust and mutual respect. A strong safety culture goes beyond mere compliance to the rules and regulations (i.e., initial and continuing airworthiness requirements)*
   (Source: based on ICAO SMM).
3. *For the purposes of this document, the aspect of personnel and workforce safety is not included. Only aspects which are related to product safety are addressed in this document, which is the subject of the current SMS implementation regulations.*

Safety Data
A defined set of facts or set of safety values (e.g., events reports, safety risk assessments) collected from various aviation-related sources, which is used to maintain or improve safety.

Such safety data is collected from proactive or reactive safety-related activities, including but not limited to:

- Accident or incident investigations.
- Safety reporting.
- Continuing airworthiness reporting.
- Product operational performance monitoring.
- Inspections, audits, surveys.
- Safety studies and reviews.

Some Safety data can be used as SMS data.
(Source: based on ICAO Annex 19).

Safety Information
Safety data processed, organized or analyzed in a given context so as to make it useful for safety management purposes.
(Source: based on ICAO Annex 19).

Safety Management System (SMS)
A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies and procedures.
(Source: ICAO Annex 19).

Safety Management System (SMS) Data
Data used to measure SMS performance.
Examples:

- Hazards report register and samples of reports.
- Outputs of risk assessments.
- Safety performance indicators and related charts.
- Record of completed or in-progress safety assessments.
- SMS internal review or audit records.
- Safety promotion records.
- Personnel SMS/safety training records.
- SMS/safety committee meeting minutes.
- SMS implementation plan (during implementation process).

(*Source: SM-0001 Drafting Group).*

Safety Manager
The person (or group of persons fulfilling this role) ensuring that the SMS is implemented and maintained in a cohesive, coherent, and effective manner.
(Source: SM-0001 Drafting Group)
Note: It is important to distinguish this role of "Safety Manager" from the role of "Safety Accountable Manager" (also called "Safety Accountable Executive") (see §6.1.2 for the role/duties of the Safety Accountable Manager)

Safety Objective
A measurable goal or desirable outcome related to safety.
(Source: NAS9927).

Safety Performance
Realized or actual safety accomplishment relative to the organization's safety objectives.
(Source: NAS9927).

Safety Policy
An approach for managing safety within an organization that defines management commitment to safety and their overall safety vision.
(Source: SM-0001 Drafting Group)

Safety Promotion
A combination of training and communication of safety information to support the implementation and operation of an SMS in an organization enhancing its safety culture.
(Source: based on SMICG Terminology).

Safety Responsibility
The obligation to carry forward assigned safety related tasks to their successful achievement. Responsibility can be delegated.

Safety Risk Management (SRM)
A process within the SMS identifying the hazard, analyzing, assessing and controlling related risks.
(Source: based on SMICG terminology).

Service Provider (or product and service provider)
Any organization providing aviation products and/or services. The term thus encompasses approved maintenance organizations and organizations responsible for type design and/or manufacture of aircraft.
(Source: SM-0001 Drafting Group)

Substantive Change
A change (internal or external) involving matters of major or practical importance to an organization that could have a consequential impact on safety of aircraft operations. Substantive changes may include modification, expansion or contraction of the nature and scope of an organization's structure, operating environment, roles and responsibilities, policies, processes, procedures, products, operations, facilities, and/or human resources.
(Source: SM-0001 Drafting Group)

Systemic Issue
A problem or change experienced by the whole of an organization and not just particular parts of it.

5. POSITIVE SAFETY CULTURE

A safety culture is the natural by-product of having humans in the aviation system. **Safety culture has been described as "how people behave in relation to safety and risk when no one is watching".** It is an expression of how safety is perceived, valued and prioritized by management and employees in an organization, and is reflected in the extent to which individuals and groups:

a) Are aware of the risks and hazards faced by the organization and its activities;
b) Continuously behave to preserve and enhance safety;
c) Have the resources required and are empowered to implement safety practices;
d) Are willing and able to adapt when facing safety issues;
e) Are willing to communicate safety issues without fear of retribution; and
f) Consistently assess the safety related behaviours throughout the organization.

In a Positive Safety Culture, a shared concern for, commitment to, and accountability for safety is promoted. **A Positive Safety Culture enables proactive identification and mitigation of risks, in a just and fair environment, to prevent accidents, injuries or loss of life.** A Positive Safety Culture acts as a foundational element of the SMS and directly impacts the effectiveness of the system, and there is a shared concern for, commitment to, and accountability for safety across the organization.

A Positive Safety Culture, as promoted by Annex 19 Appendix 2 §1.1.1 [a] is built upon five fundamental elements:

- Just culture: Employees trust they will be treated fairly for errors, mistakes, and inadvertent violations. However, they understand there is a line between acceptable and unacceptable behaviour where appropriate accountability lies.
- Informed culture: Employees and the organization know the human, technical, organizational, and environmental factors that contribute to the safety of the whole system in a timely manner.
- Reporting culture: Employees identify hazards and understand how to report their errors and experiences. They understand they are expected to report, are supported, and even celebrated, for doing so without fear of retribution.

- Learning culture: Employees and the organization know how to draw conclusions from safety information systems and are willing to implement major reforms.
- Flexible culture: Employees and the organization are able to adapt quickly to new hazards, changes in the operating environment, and/or emerging competition without sacrificing safety.

Each of these elements aims at the empowerment and engagement of all members of the organization to act as active contributors to the aviation safety system. An organization should endeavour to operate in such a way that individual and organizational behaviours support these elements of a Positive Safety Culture.

An absence of accidents does not indicate the presence of safety. Gauging safety by outcomes alone will not indicate the health of an organization's safety management system or their safety culture. Exhibiting the behaviours in appendix 7 will help to ensure that the systems, tools, processes, attitudes, training, and other elements are present that can help foster the culture that will lead to improved safety outcomes.

A Positive Safety Culture relies on a high degree of trust, respect, and psychological safety between personnel and management. Time and effort are needed to build a Positive Safety Culture, which can easily be damaged by management decisions and actions, or inactions. Continuous effort and structural support (e.g., organization policies, procedures, and reward systems) are needed. When leadership actively models and endorses safe practices and behaviours, Positive Safety Culture and the SMS become integrated with the normal operation of the organization. The ideal situation is a fully implemented and effective SMS and a Positive Safety Culture. Hence, an organization's Positive Safety Culture is often seen as a reflection of the maturity of its SMS.

Positive Safety Culture and SMS are interdependent. There is an expected correlation between an organization's Positive Safety Culture and incident and accident prevention.

Positive Safety Culture entails courageous leadership putting safety first in decision making.

There is an evolving understanding of the development and assessment of an organization's Positive Safety Culture. This will be further addressed in future revisions of this Standard.

Appendix 7 provides examples of enablers and disablers to the establishment of a Positive Safety Culture within an organization.

6. ACHIEVING SMS REQUIREMENTS

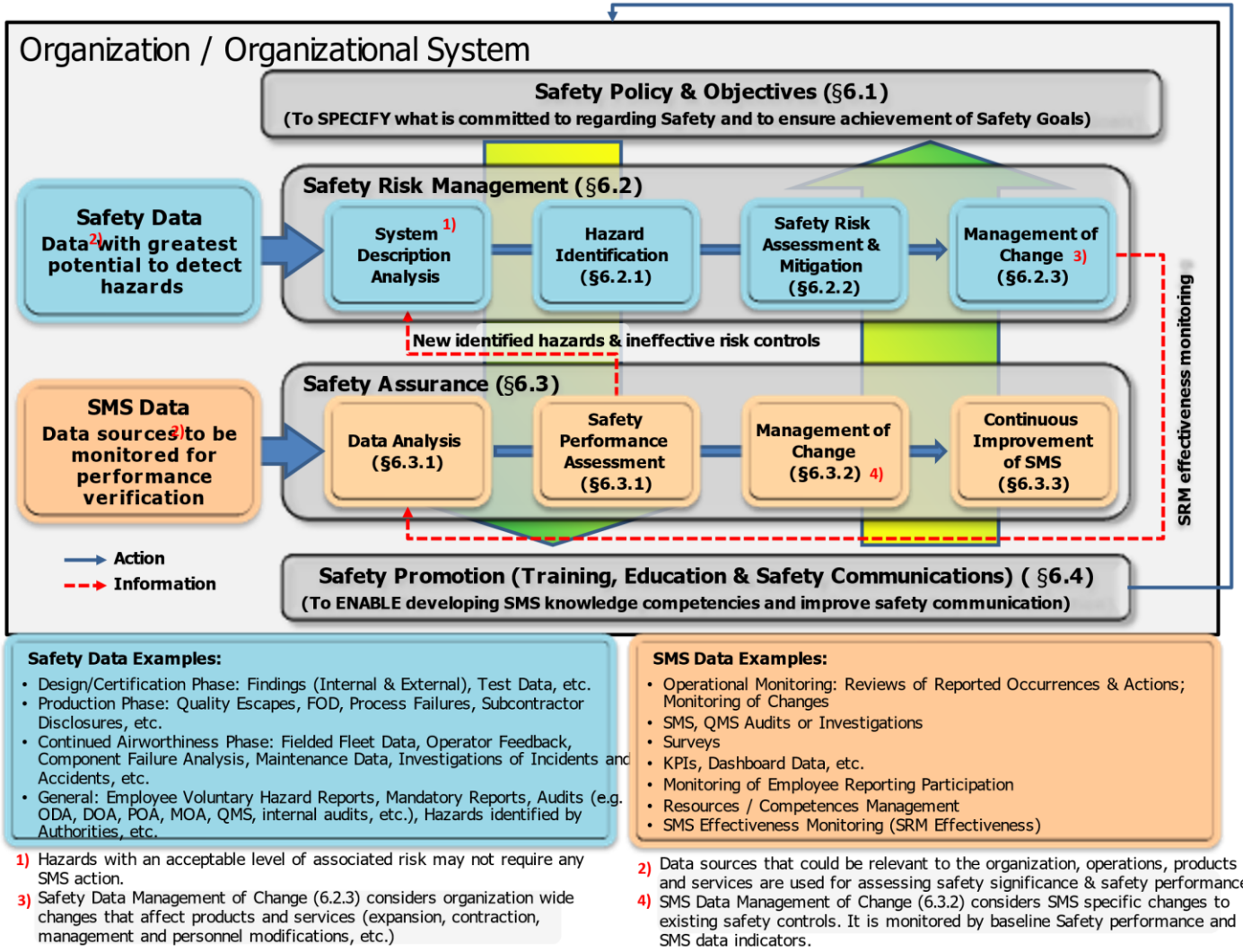
This section provides guidance to further understand and apply the ICAO Annex 19 framework for the implementation and maintenance of an SMS appropriate to the size, scope, and complexity of the organization.

The framework comprises four components and twelve elements forming the minimum requirements as follows:

1. Safety policy and objectives
    - 1.1 Management commitment.
    - 1.2 Safety accountability and responsibilities.
    - 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.

Figure 1 provides an overview of the ICAO Annex 19 SMS components and the interactions among them, with a specific focus on Safety Risk Management and Safety Assurance.

Figure 1: SMS Overview and Interactions between SMS Components



The components and elements shown in Figure 1 and the related paragraphs and references are further described in this section.

Continuous improvement of SMS is based on safety performance monitoring and measurement which are further detailed in sections 6.3.1 and 6.3.3.

The structure of this section is as follows:

- Within grey blocks: SMS Standards and Recommended Practices from ICAO Annex 19 Appendix 2 for each SMS component and element.
- Underneath each grey block: Guidance for further understanding of each SMS component and element, for the desired outcome and for associated means of compliance.

Note: Section 6 provides guidance specifically for Annex 19 Appendix 2 SMS framework.

The SM-0001 is written as an international standard, and this section is compliant with Annex 19 Second Edition-Amendment 1 (July 2016) – Appendix 2. It is also intended to be usable as guidance material and as an acceptable means of compliance to the corresponding Annex 19 transposition into aviation safety regulations, which introduces variation in requirements by regulators. This document has been structured around the SMS elements outlined in ICAO Annex 19. Superscripts have been used where regulators have identified additional or unique requirements beyond Annex 19.

Superscript's nomenclature (* helps with searching)
FAA: *F
EASA: *E
ANAC: *A
TCCA: *T

In addition to a positive safety culture, a defining characteristic of an SMS is that it supports aviation safety decision-making. It is therefore necessary for an organization to define and understand the extent of its system(s) that can affect aviation safety. An organizational system description serves to identify the features of the product or services, the organization, and the Design, Manufacturing, Maintenance and associated Services processes that might be sources of aviation safety hazards and associated safety risk and therefore be appropriate for application of safety risk management (SRM) and safety assurance (SA). This allows the organization to allocate safety management resources and disciplines to sources of potentially significant safety risk and avoid devoting them to low or insignificant risk.

The organizational system description should identify (sub) contracted activities, including any interfaces, to define the scope of SMS and to enable management of safety risk and safety risk controls. These systems, which could be made up of products, people, processes, procedures, facilities, services, and external factors, and their interactions, contribute to control of safety risk and may be sources of hazards. The use of an organizational system description should enable the organization to have a clearer understanding of its interactions and interfaces. It should be updated whenever there is a newly introduced element (e.g., organization, activity, interface) or change to the internal or external factors that could affect safety, as part of management of change.

For Design, Manufacturing, Maintenance and associated Services organizations, the important systems include both those which could directly impact aviation safety and those which affect the ability or capacity of an organization to perform effective safety management. For many organizations, such systems include the processes used to accomplish:

- Design and Certification;
- Manufacturing;
- Continued Airworthiness;
- Maintenance.

Through the organizational system description, the organization defines the extent of the organization's functions that are subject to Authority oversight. The extent of the organization encompassed by the system description should be related to the safe operation of aircraft. For Design, Manufacturing, Maintenance and associated Services organizations, that may include as applicable:

- Processes used to design and certify a safe and compliant product (compliance assurance);
- Processes used for manufacturing of a safe and compliant product (conformity assurance), including suppliers;
- Processes used to maintain, repair and overhaul to ensure airworthiness of maintained articles; and
- Processes used to assure product continued operational safety (safety assurance).

** Note: The organizational system description is a requirement for Design and Manufacturing organizations subject to FAA Part 5, refer to Appendix 8.

6.1 Safety Policy and Objectives

6.1.1 Management commitment

ICAO Annex 19 Second Edition-Amendment 1 (July 2016) - Appendix 2

1.1 Management commitment

1.1.1 The service provider shall define its safety policy in accordance with international and national requirements. The safety policy shall:

a) reflect organizational commitment regarding safety; including the promotion of a positive safety culture;

b) include a clear statement about the provision of the necessary resources for the implementation of the safety policy;

c) include safety reporting procedures;

d) clearly indicate which types of behaviours are unacceptable related to the service provider's aviation activities and include the circumstances under which disciplinary action would not apply;

e) be signed by the accountable executive of the organization;

f) be communicated, with visible endorsement, throughout the organization; and

g) be periodically reviewed to ensure it remains relevant and appropriate to the service provider.

6.1.1.1 Safety policy

Understanding
The provisions contained in ICAO Annex 19 – *Safety Management* include requirements to be met when developing a safety policy. Additional requirements may be contained in national regulations.

An organization's safety policy is how management formally documents its commitment to safety. This commitment addresses the first element of the ICAO Safety Management System Framework. The safety policy is foundational to SMS implementation as it communicates the principles and values that establish the organization's safety culture and guide behaviour essential to assure product safety and manage operational risk. It must therefore accurately reflect how the organization responds to safety-related issues and actively promotes continuous safe practices within the organization.

The Safety Policy shapes the organization's safety strategy considering that the organization's long-term viability and success rely on this commitment to safety and the processes in place. With safety as a core value, it drives the organization to consider safety in all sufficiently significant decisions. The document conveys the commitment and responsibilities of the organization's management and is signed by the Accountable Executive or Accountable Manager, as appropriate.

To be fully effective, the safety policy should be communicated to and understandable throughout the organization. Therefore, it may be beneficial to include an organization's safety policy in the Safety Promotion component of its SMS.

Within the safety policy, the organization communicates its vision and clear commitment to safety. In broad terms, this is accomplished by creating and fostering a Positive Safety Culture throughout the organizational structure, including a reference to a non-punitive approach to promote employee safety hazard reporting, and assurances to provide for the flow of data and information required to address safety issues and concerns. The Safety Policy should support the consideration of human factors aspects in relevant activities, e.g. establishment of a Positive Safety Culture that encourage employee hazard reporting and safety risk management that consider and mitigate human errors and fatigue management.

The safety policy is supported by the organization's safety objectives, which may be articulated in a separate document or contained within the policy itself. Section 6.1.1.2 of this Standard contains a detailed discussion of safety objectives.

It is important that the safety policy remains relevant.

Environmental, Health and Safety (EHS) Policy and Product Safety Policy Relationship & Integration
Organizations may choose to develop a combined safety policy that addresses both product safety and employee health & safety. There are, however, distinct requirements for product & services safety and employee health & safety that could result in distinct systems and policy statements.

Desired outcome
The organization commitment to safety is embodied by the policy statement, which is visibly supported by the highest management of the organization.
The Safety policy addresses the requirements within applicable regulations.
It is accessible and understandable by all parts of the organization.

Means of Compliance

The safety policy is a high-level document stating principles and broad objectives. It should be kept simple and to the point, with details of the organization and SMS processes and procedures being described in a separate Safety Management System manual (SMS manual), equivalent document or set of SMS procedures. The safety policy could be a standalone document or integrated into existing management system documentation (e.g. a design organization handbook). The safety policy should be high-level and easy to understand as it needs to be communicated throughout the organization.

Considering the specific ICAO Annex 19 Appendix 2 Section 1.1.1 requirements for a safety policy, the safety policy should:

a) Convey[*F] management's commitment to the safety performance and safety objectives of the organization toward its employees. Safety should[*F] be highlighted as a primary responsibility of all employees with a strong and clear commitment to meet relevant legal requirements and applicable standards.**

b) Address[*F] the provision of material, human and financial resources sufficient to perform the planned activities of the SMS. Depending on the structure and governance of the organization, final decisions on allocation of resources may be made at various levels. The Safety Accountable Manager/Executive (as defined in the ICAO SMM) may be responsible for all safety activities and for the allocation and management of resources for these activities. If the Safety Accountable Executive does not have this responsibility, the highest level of management should show their commitment. The person(s) making final decisions on resources allocated to the SMS should jointly sign the safety policy alongside the Safety Accountable Executive or use another method that shows a joint commitment

c) Include a requirement for reporting of hazards, safety issues and concerns. While a reporting system is a necessary part of an SMS, organizations may[*F] adapt their confidential employee reporting system, depending on the maturity level of their safety culture. The information collection system should include provisions to maintain confidentiality and, when applicable, protect anonymity in safety data and safety information

d) Include a reference to establishment and commitment to "just & fair culture"* principles/concept or an organization's "code of conduct" or "code of ethics" ** or equivalent, that identifies[*F] expected acceptable and/or unacceptable behaviours. The safety policy statement with respect to culture and behaviours should be made with proper consideration of the applicable local or national requirements.

Note:

* *For organizations subject to EU regulations,* the requirements for "Just Culture" per EU No 376/2014 are acceptable to address this ICAO Annex 19 requirement.

** *For organizations subject to FAA Part 5, refer to Appendix 8*.

e) Be signed[*F] or endorsed by the Safety Accountable Executive or manager, as appropriate, as the organization's safety champion. It is possible to have a single document that represents both the signed Accountable Executive commitment statement and the Safety Policy addressing the specific ICAO Annex 19 1.1.1 requirements. It is also acceptable to have linked documents; that is, a high-level commitment statement complemented by a more descriptive Safety Policy and supported by required SMS manual or procedures.

f) Be accessible and understandable to employees at all levels in the organization, considering multiple sites and languages. The safety policy should[*F] be communicated and actively promoted by management with the objective to foster a Positive Safety Culture within the organization.

g) Be reviewed[*F] periodically to check its validity and relevance, with respect to factors such as: external requirements, safety performance, organizational structure, and scope of activities, etc. Continuous improvement of the SMS can lead to revisions of the safety policy to adapt safety priorities and objectives. The review process and timing may vary according to each organization's needs.

Appendix 1 provides:

- Examples of safety policies
- Examples of high-level organizational Safety Objectives [and supporting tasks].

6.1.1.2 Safety Objectives

ICAO Annex 19 Second Edition-Amendment 1 (July 2016) - Appendix 2

1.1 Management commitment

1.1.2 Taking due account of its safety policy, the service provider shall define safety objectives. The safety objectives shall:

a) form the basis for safety performance monitoring and measurement as required by 3.1.2;

b) reflect the service provider's commitment to maintain or continuously improve the overall effectiveness of the SMS;

c) be communicated throughout the organization; and

d) be periodically reviewed to ensure they remain relevant and appropriate to the service provider.

Note: Guidance on setting safety objectives is provided in the Safety Management Manual (SMM) *(Doc 9859).*

Understanding

Safety objectives are defined in support of the safety policy. Safety objectives are intended to maintain or enhance the safety of aircraft, and the organization's performance in respect of its contribution to aviation safety. These safety objectives should be meaningful to the organization, and thus adapted to its type of business, size, complexity, maturity and specific needs.

Organizations may define their objective(s) at the highest level, to identify what the organization aims to achieve in the long run. This style of objective, providing a vision, or overall direction, is particularly suited to be included directly in the safety policy, if the organization considers it to be appropriate to do so. More specific strategic and/or tactical objectives could be defined, where it is considered appropriate to focus on aspects of an activity, or priorities. It is up to the organization to determine the set of strategic and/or tactical objectives appropriate to the organization's needs.

Safety objectives should be periodically reviewed and checked for relevance, progress and need for adaptation, as appropriate to the organization's needs, and as suited to the nature of the objectives. Safety objectives may not change year-to-year but will likely evolve over time.

Desired outcome

In pursuit of enhancing aviation safety, safety objectives are set for the period to suit the needs of the organization in the progress of its safety performance.

Means of Compliance

Considering the specific ICAO Annex 19 Appendix 2 Section 1.1.2 requirements for safety objectives:

a) The organization should define safety objectives reflecting its contribution to the safety of the aviation system (as seen from outside the organization) and its internal activity affecting that contribution. Objectives will therefore vary depending on the nature of the organization and its position in the wider aviation system.

Primary objectives for a design organization may be related to the in-service safety performance of the products (or components thereof) it has designed. While a production or maintenance organization may have visibility of the in-service performance of the products they have manufactured or maintained, it is much less likely, and therefore they may need objectives that focus on their broader contribution to aviation safety, in terms of the conformity of products/parts released, or the satisfactory completion of the maintenance work released. In support of these external contributions, an organization may be able to identify objectives related to the processes and capabilities on which they rely, and the culture and commitment of the workforce carrying out those activities, or objectives related to the functioning of the SMS itself. These objectives could include monitoring the correct deployment and then the continuous improvement of the SMS, measurement of its activity, and allocation of appropriate means and staff competencies.

Safety objectives may consider the management of interfaces within the organization as well as with other organizations.

The safety objectives may be presented as a standalone document to constitute the organization's safety performance dashboard, which can also be used to report the safety performance results (an example of safety performance dashboard is given in Appendix 3). They may alternately be combined within a document with the safety policy. The safety policy should*F provide a reference to the safety objectives or could*F directly include safety objectives.

Evaluations of performance of the organization against an objective (a task included in the Safety performance component of the SMS, see §6.3 "Safety Assurance" for further details) should be tailored to the specific features of the organization and to the objective being considered. These evaluations may remain qualitative, or be based on numerical treatment of collected data, or any suitable determination of performance.

b) The establishment of objectives is intended to drive the organization strategy to maintain or improve safety performance. It may be appropriate to set strategic (long term) and tactical (short to medium term) goals and objectives to enable periodic reviews and performance assessment.

Strategic objectives reside at the organizational level and are typically measured by analyzing trends rather than using specific performance targets.

c) During the process of communicating the safety policy and associated objectives throughout the organization, "local" safety objectives, if applicable, should be consistent with the general organization-level objectives. Such local objectives aim to show the contribution to safety for an individual/group of employees. Each employee should be aware of the potential consequences of his/her actions and behaviour and of its positive contribution to the SMS through the understanding of the safety objectives.

d) The SMS should include a periodic review of safety objectives, for example on a yearly basis, or at a frequency adapted to the organization's specificities, changes, and safety achievements. This review should be aligned with the review of safety performance in terms of achieving the objectives.
Organizations can establish objectives at an appropriate cycle, review progress periodically, and evaluate to what degree they were achieved. These evaluations can then be the basis of establishing the objectives for the following cycle.

e) Tactical safety objectives are good candidates for a Specific, Measurable, Achievable, Realistic, and Timely (SMART) approach.

Appendix 1 provides examples of different types of Safety Objectives.

6.1.2 Safety Accountability and Responsibilities

ICAO Annex 19 Second Edition-Amendment 1 (July 2016) - Appendix 2

1.2 Safety accountability and responsibilities

The service provider shall:

a) identify the accountable executive who, irrespective of other functions, is accountable to the organization for the implementation and maintenance of an effective SMS;

b) clearly define lines of safety accountability throughout the organization, including a direct accountability for safety on the part of senior management;

c) identify the responsibilities of all members of management, irrespective of other functions, as well as of employees, with respect to the safety performance of the organization;

d) document and communicate safety accountability, responsibilities and authorities throughout the organization; and

e) define the levels of management with authority to make decisions regarding safety risk tolerability.

Understanding
Accountability for the SMS is assigned to one individual "an accountable executive". The organization should define clear SMS related responsibilities including senior management and risk acceptance authority.

Desired outcome
A safety accountable executive is identified and has the appropriate authority to fulfil the duties and understands the role.
Personnel are aware of their contribution to the safety of the product or service.
All necessary safety management related functions are identified, attributed and understood by the people involved.

Means of Compliance
Safety accountability and responsibilities need to be defined for:

1. An accountable executive,
2. Management with SMS responsibilities, and
3. Responsibilities for all employees.

Safety Accountable Executive or Safety Accountable Manager:
The organization must identify a "Safety Accountable Executive" or "Safety Accountable Manager" who is a person accountable (having ultimate responsibility) for the SMS within the organization.

The accountable executive should[*F] satisfy the following:

1. Be the final authority over operations.
2. Control the financial resources required for the organization.
3. Control the human resources required for the organization.
4. Retain ultimate responsibility for the safety performance of the organization.

This individual's authority and responsibilities may[*F] include, but are not limited to:

1. Ensuring that the SMS is properly implemented and is performing across all pertinent areas.
2. Developing and signing the safety policy.
3. Communicating the safety policy throughout the organization.
4. Regularly reviewing the safety policy to ensure it remains relevant and appropriate to the organization.
5. Regularly reviewing the safety performance and direct actions necessary to address substandard safety performance.

This individual's authority and responsibilities also may include:

6. Responsibility for the conduct of the organization's functions covered by the scope of the SMS, and as described in the organizational system description, if applicable;
7. The authority to stop the operations if there is an unacceptable level of safety risk;
8. Ensuring the establishment of the organization's safety objectives and safety targets and risk tolerability";
9. Acting as the organization's safety champion;
10. Accountable for the management of and decisions taken with respect to safety issues;
11. Establishment and maintenance of the organization's competence to learn from the analysis of data collected through its safety reporting system.

Note 1: Safety responsibility can be delegated (i.e., cascaded down) within the scope of the defined job responsibilities, provided such delegation is documented, but the ultimate accountability remains with the identified accountable executive/manager.
Note 2: In this context, the term "accountability" refers to obligations which cannot be delegated. The term "responsibilities" refers to functions and activities which may be delegated.

Organizations holding multiple certificates or approvals may utilize a corporate SMS approach (see 7.6) or may identify SMS accountability through different structures according to each organization's complexity, needs and constraints. This would be acceptable provided each certificate/organization approval holder meets the requirements for safety accountabilities.

Examples include, but are not limited to:

- One Safety Accountable Executive/Manager for each organization and certificate/approval holder (e.g. design, manufacturing or maintenance);
- A single Safety Accountable Executive/Manager at an appropriate management level to cover the overall SMS of the organization and multiple certificates/approvals. [*F]

SMS Management Responsibilities:
In addition to identification of the Safety Accountable Executive/Manager as outlined above, the organization should consider the necessary organizational responsibilities and governance with respect to safety management functions, including management with SMS processes, and the individual, or group of individuals, assigned safety responsibility per Section 6.1.3.

In addition to strategy and leadership functions (i.e: operation directors, technical directors, program directors…), key safety management functions that need[*F] to be addressed are:

- SMS Implementation, management and maintenance,
- Hazard identification and risk assessment in areas of responsibility,
- Monitoring the effectiveness of identified risk controls/barriers or risk mitigation,
- Promoting the SMS and developing a positive safety culture,
- Escalating when appropriate to the accountable executive on the performance of the SMS and opportunities for continuous improvement.

The appropriate organizational responsibility and process for making safety-related decisions with respect to product safety as well as organizational safety should be defined.
The organization must identify the management with the authority to make decisions regarding safety risk acceptance.

Depending on the organizational structure, size and complexity, the responsibility for these functions could be assigned to appropriate persons or groups.

Management throughout the organization has key SMS responsibilities, ensuring that employees understand their roles and responsibilities within the organization's SMS. These responsibilities include:

- Ensuring safety practices and procedures are clearly communicated and understood by employees through training.
- Enforcing safety rules related to safety performance fairly and uniformly.
- Evaluating employees on compliance with safe work practices.
- Encouraging employees to report safety issues without fear of reprisal.
- Ensuring inspections, investigations, and safety training records are kept in accordance to company policy.

Organizations that have established subsidiaries to deliver products and services under a parent company should consider the interfaces among multiple entities and any implications regarding safety accountability.

Examples of aspects or activities that support the governance of safety management functions include:

- Strategy and leadership
    - High-level SMS direction;
    - High-level decision-making;
    - Provision of necessary resources and personnel.

- Implementation, management and maintenance of the SMS [Per Section 6.1.3]:
    - Consistent application of SMS activities;
    - Continuous improvement process of an SMS;
    - Ensuring that the SMS operates as defined and is effective;
    - Collecting and analyzing safety information in a timely manner;
    - Administering safety-related surveys;
    - Monitoring and evaluating the effectiveness of corrective actions;
    - Ensuring that risk assessments are conducted when applicable;
    - Monitoring safety concerns reported within the aviation community that could affect the organization or its products/services;
    - Ensuring safety-related information, including organizational goals and objectives, are made available to all personnel through established communication processes;
    - Providing periodic reports on and monitoring of safety performance;

- Ensure safety promotion throughout the organization;
- Ensuring the safety training is available and meets acceptable standards;
- Advising the accountable executive on SMS performance and / or improvements.

Tactical and day-to-day operational aspects that support the SMS should also be identified, assigned, and addressed, such as:

- Product specific analysis of hazards and risks, and determination of mitigations;
- Conducting activities associated with compliance monitoring.

There are potentially many arrangements that organizations may put in place to ensure the necessary safety management functions and decision-making are performed at the appropriate level (including escalation as necessary). Depending on the organization's needs for the management of SMS aspects and activities, some organizations implementing SMS make use of terms such as: "SMS Boards", "SMS Leadership Boards", "Safety Boards", "Safety Review Boards", "Safety Governance Boards", "" [etc.], and/or, assign specific responsibilities and distribute to individuals.
These Boards typically include or report to the Accountable Manager or Accountable Executive.
When identifying responsibilities of management staff and employees, organizations should consider which personnel are included in safety related tasks and activities.

Employees:
All employees have a responsibility for hazard identification and escalation through appropriate processes or employee confidential reporting methods. The safety performance of the organization should[*F] be accessible to employees along with the awareness of the employee's role in impacting the organization's safety objectives and safety performance.

6.1.3 Appointment of Key Safety Personnel

ICAO Annex 19 Second Edition-Amendment 1 (July 2016) - Appendix 2

1.3 Appointment of key safety personnel

The service provider shall appoint a safety manager who is responsible for the implementation and maintenance of the SMS.

Note: Depending on the size of the service provider and the complexity of its aviation products or services, the responsibilities for the implementation and maintenance of the SMS may be assigned to one or more persons, fulfilling the role of safety manager, as their sole function or combined with other duties, provided these do not result in any conflicts of interest.

Understanding
The appointment of 'Key Safety Personnel' is identified separately from the overall requirements in 6.1.2 to assign safety-related duties through the management structure of the organization.
This highlights that the implementation and maintenance of the SMS is a task in itself, and therefore tasks associated with this safety manager role need to be assigned to one or more individuals having expertise in specific areas required to successfully implement the SMS. It is important, therefore, that the task assignment is clear, so that there are no gaps or overlaps in responsibility, particularly with others assigned safety responsibilities, and that individuals combining the tasks of implementation and maintenance of the SMS itself may then generate the need to make inputs (e.g. the overall 'health' of the SMS, or potential improvements in it) to the governance system defined in 6.1.2.

Desired outcome
The desired outcome is:

- To implement and maintain a Safety structure/SMS that fits the needs of the organization,
- To be supported by personnel,
- To ensure that key safety personnel have the necessary knowledge as identified in section 6.4.1, experience and resources to perform their safety-related duties.

Means of Compliance
The allocation of SMS management responsibilities is at the discretion of the organization.
This includes the appointment of a person, or group of persons, to provide guidance, direction and support for the planning, implementation and operation of the organization's SMS. This could be their sole function, acting as dedicated safety manager(s), or combined with other duties, provided the appointed personnel can remain objective and fulfil their responsibilities with respect to SMS, while avoiding 'conflict of interest'. Depending on the organization, and the duties assigned, such personnel may need to be directly responsible to the Safety Accountable Executive.
When the organization allocates SMS management responsibilities to a group of persons, it should ensure that the activities of these persons are coordinated, so that the organization's SMS as a whole is working as intended. Such a coordination may be achieved by assigning this duty to an individual, and this is specially recommended for the initial development of the SMS.
Some or all of these responsibilities could also be undertaken by the Safety Accountable Executive, provided that the individual can also remain objective and fulfil their responsibilities with respect to SMS, and is able to support appropriate co-ordination.
Coordination may also be required to manage risks that impact multiple entities within the organization.

6.1.4 Coordination of Emergency Response Planning

ICAO Annex 19 Second Edition-Amendment 1 (July 2016) - Appendix 2

1.4 Coordination of emergency response planning

The service provider required to establish and maintain an emergency response plan for accidents and incidents in aircraft operations and other aviation emergencies shall ensure that the emergency response plan is properly coordinated with the emergency response plans of those organizations it must interface with during the provision of its products and services.

Understanding
ICAO Annex 19 directs organizations that are required to have an "Emergency Response Plan (ERP)" by other regulation or directive, to also coordinate that plan with other entities it may interact with by virtue of operation/employment of products or services. Thus, ICAO Annex 19 does not explicitly require an ERP, but rather the coordination thereof, if one is required. ERPs relate to the management of emergencies related to aircraft operation, and requirements for the creation of ERPs are contained in the Annexes relevant for certain types of organization or activity (such as Annex 11 for air traffic services, or Annex 14 for aerodromes).

Currently, design, manufacturing and maintenance organizations, covered by ICAO Annex 8, are not required by this Annex to have Emergency Response Plans, and therefore this SMS item does not apply directly to such organizations, unless local Aviation Authority has required an ERP for this type of organization.

Any organization, however, may choose to establish plans to protect its activity when faced with some significant business disruption. Such plans are known by different names, such as 'crisis management', "business continuity planning', 'disaster recovery' or similar, and may require organizations to temporarily work in different ways while the disruption is in effect. With regard to an SMS, it is important to ensure that, when such plans are created, due consideration is given to the potential effect of the temporary ways of working on the aviation safety. It can be seen as a particular example of Management of Change, per Section 6.2.3.

Desired outcome
In cases where an ERP is implemented voluntarily, the desired outcome is to assure proper coordination with operational entities (e.g., air operators and aerodrome operators) to safely manage the transitions between normal and emergency operations.

Means of Compliance
Coordination of an ERP is not an element within the standard for design, manufacturing and maintenance organizations as it is not required by ICAO Annex 19.

Note: Design, manufacturing and/or maintenance organizations may be triggered by aircraft operators when implementing their own ERP.
Some design, manufacturing and/or maintenance organizations carry out flight operations as part of their work, such as test flights for new designs, or check flights for newly produced aircraft. Flight operations are subject to additional Aviation Authority requirements, beyond the scope of this standard, and these operational requirements may require emergency response planning and appropriate coordination.

Note: A voluntary ERP should not be subject to auditing by National Aviation Authorities in the context of this standard.
Note: ERP is required for Part 145 organizations seeking voluntary SMS acceptance from the FAA.
EU Part 145 regulation states that procedures should be implemented to enable the organization to react promptly if the operator's ERP requires support of the Part 145 organization.

6.1.5 SMS Documentation

ICAO Annex 19 Second Edition-Amendment 1 (July 2016) - Appendix 2

1.5 SMS documentation

1.5.1 The service provider shall develop and maintain an SMS manual that describes its:

a) safety policy and objectives;

b) SMS requirements;

c) SMS processes and procedures; and;

d) accountability, responsibilities and authorities for SMS processes and procedures.

1.5.2 The service provider shall develop and maintain SMS operational records as part of its SMS documentation.
Note: Depending on the size of the service provider and the complexity of its aviation products or services, the SMS manual and SMS operational records may be in the form of stand-alone documents or may be integrated with other organizational documents (or documentation) maintained by the service provider.

6.1.5.1 SMS Documentation

Understanding
In this Section, “documentation” is intended to mean any information relating to organizational safety management that is made available to personnel via different mechanisms and in a variety of formats or media, such as physical paper, electronic, web pages, etc.

The extent of SMS documentation can differ from one organization to another and can include interfaces as described in section 7.5.

The organization should ensure the adequate control and maintenance of these documents per standard industry and regulatory practices.

The SMS documentation should[*F] be reviewed periodically and updated as needed.

Considerations for specific content of SMS documentation:

a) Safety Policy and Safety Objectives
The SMS documentation should[*F] include the safety policy and safety objectives as outlined in Section 6.1. These may be independent documents that are referenced in the SMS documentation structure or be included in an SMS manual.

b) SMS Requirements
As part of the SMS documentation, SMS requirements applicable to and adopted by the organization should be documented**.** These should indicate internal requirements (e.g., organization, corporate) and external requirements (e.g., ICAO Annex 19, Aviation Authorities, customers, etc.) and reflect the nature of the organization's scope of business to which the SMS applies.

c) SMS Processes and Procedures
The SMS documentation should[*F] reference the key processes and procedures that will be used to meet applicable requirements and to achieve the expected outputs.

The structure and format of the documented processes and procedures, and their method of recording (hard copy or digital media or both) should be defined by the organization.

d) Accountability, Responsibilities and Authorities for SMS Processes and Procedures
The SMS documentation should clearly identify the organizational accountabilities and governance structure outlined in Sections 6.1.1, 6.1.2 and 6.1.3, including the Safety Accountable Executive/Manager and the responsibilities and authorities of key stakeholders with respect to the safety performance of the organization.

Responsibility, authority and interrelationships may be indicated by such means as organization charts and descriptions of roles and responsibilities, as needed to provide clear understanding.

Desired outcome
The desired outcome is for the organization to create comprehensive, accurate and current documentation to support SMS development and implementation.

Means of Compliance
The manner and format of documentation is at the discretion of the organization. It may be embedded within existing documentation of any other management system implemented by the organization.

The SMS documentation may include a top-level document (SMS Manual or similar), which describes the organization's SMS implementation of the four components and twelve elements described in this section. Alternatively, a structure of SMS-related documents could be used in lieu of a SMS single manual.

The SMS Manual may be a standalone document, or it can be embedded within an existing organization description document (e.g. manufacturing organization exposition/manual). Where details of the organization's SMS processes are already addressed in existing documents, appropriate cross referencing to such documents is sufficient.

The SMS documentation contents and publishing format may be physical and/or electronic and should be accessible to personnel appropriate to their role.

Examples of SMS documentation are provided in Appendix 1 (e.g. Safety Policy).

6.1.5.2 SMS Records

Understanding
Records associated with the organization's SMS are intended to document key activities of the SMS as it operates. This includes key decisions, supporting data and information, both technical and personnel—related, used in the conduct of SMS Governance [Section 6.1], Safety Risk Management [Section 6.2], Safety Assurance [Section 6.3] and Training and Promotion [Section 6.4].
These records are useful for supporting audits [internal and external], and for future safety-related decision-making and continuous improvement.

This requirement to document and maintain SMS records is intended to apply to records generated during the implementation and operation of the organization's SMS. Records generated in advance or outside of the SMS are not subject to these requirements.

Desired outcome
Maintain documents and records that are up to date and reflective of current operations.

Means of Compliance
The type, format and content of SMS records should be determined by the organization and the organization should follow these internal procedures for record keeping and retention. The organization should determine the data to be retained to suit its own needs.

The SMS record publishing format may be physical and/or electronic and should be accessible. Retained SMS records need to be retrievable.

Organizational record retention policies typically stipulate how long records are to be retained; they should be consistent with regulatory requirements and needs of the SMS. For example, it could range from "no retention required" to the "life of the product plus 10 years".

Regardless of their attributes, most organizations implementing an SMS already have documented processes and procedures in place through requirements from other management systems such as a Quality Management System (QMS). These processes and procedures may also support the development and implementation of SMS. The organization should determine where processes and procedures can be used as-is or where updates may be needed to meet SMS intent. A gap analysis against SMS requirements may be useful to accomplish this determination.

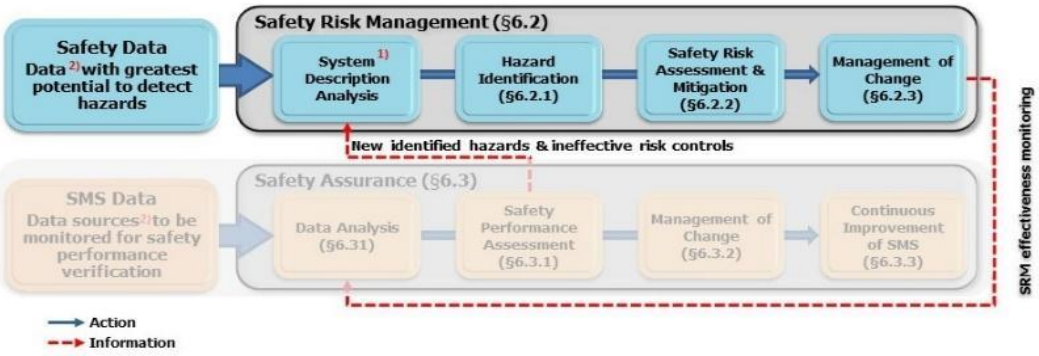
Note: For specific record retention requirements for FAA Part 5, refer to Appendix 8.

6.2 Safety Risk Management

The aim of Safety Risk Management (SRM) is to prevent the occurrence of serious aviation incidents or accidents and to improve safety performance. To that end, SRM identifies hazards, analyzes, assesses and controls safety risks.

As shown in Figure 2, the SRM process contains multiple steps which are covered within this section including system description analyzis, hazard identification, safety risk assessment and mitigation, and management of change.

Figure 2: SRM steps



This section contains the requirements for Management of Change related to the SRM process, and it is a complement to Section 6.3.2 within the Safety Assurance section.

Description of the organizational system is useful for defining the scope of the SRM application (hazard Identification, safety risk assessment and mitigation). Some State regulatory materials require that the organizational system is documented for companies that hold an organizational approval (e.g., DOA, POA, MOA in EU regulatory framework). For those companies, such a documentation can serve as the system description.

In all cases, the organization should take actions to maintain safety risks at an acceptable level.

6.2.1 Hazard Identification

ICAO Annex 19 Second Edition-Amendment 1 (July 2016) - Appendix 2

2.1 Hazard identification

2.1.1 The service provider shall develop and maintain a process to identify hazards associated with its aviation products or services.

2.1.2 Hazard identification shall be based on a combination of reactive and proactive methods.

Understanding

Hazards are the sources of risks. They may be identified reactively however the SMS is intended to enhance the ability to identify hazards proactively. A broad range of issues or observed conditions will be the source for hazard identification.

Hazards can be identified based on data from events that have occurred or in anticipation of potential events that could lead to an unacceptable level of risk. With regard to design, certification, manufacturing, in service and maintenance activities, hazards are the conditions that could foreseeably lead to a noncompliant, nonconforming or otherwise inadequate product or service that, if not addressed, could rise to an unacceptable level of risk.

Hazard identification refers to the processes used to proactively detect and document conditions and objects having the potential to contribute to an accident or incident, which require safety risk assessment and mitigation. This allows the organization to allocate safety management resources to sources of potential significant safety risk, and to make business decisions for allocation of resources to lower or insignificant risk.

Hazards can originate from technical, environmental, organizational factors and human performance.
The process of identifying hazards will often generate a larger set of issues or concerns, such as collection from employee reporting or a non-conformance. SMS processes will need to assess these for effectively identifying hazards that may represent an unacceptable risk.

Desired outcome

The desired outcome is to implement Safety Risk Management processes that shall proactively identify hazards including those having systemic implications on operational safety and manage change in a manner that supports the organization's safety objectives.

Hazards may be associated with functions internal to Design, Manufacturing and Maintenance organizations, as well as external functions associated with suppliers and consumers of the organizations' products and services. Reactive hazard identification may include measuring established indicators and investigating mishap events that have already occurred (i.e. a lagging indicator) while proactive hazard identification may use monitoring activities or analysis to anticipate those accidents or incidents. Therefore, interfaces between Design, Manufacturing and Maintenance organizations, their suppliers and customers may help identify hazards experienced throughout the product life cycle.

Means of Compliance

To enhance Hazard identification, the organization should*F*E implement a confidential employee reporting system, based on the Just Culture policy defined and deployed by the organization.
See § 6.1.1.1 for additional background on Just Culture / Positive Safety Culture.

Hazard identification relies[*F] on establishing processes for analysing:

- Changes in activities or organization;
- The high-risk areas/systems of the organization related to design, manufacturing, in-service and maintenance activities;
- Organizational and / or environmental changes that could impact safety. Safety data from both internal and external sources (e.g. design and certification data, manufacturing data, maintenance data, continued airworthiness data, mandatory reporting, employee voluntary hazard reports, external audits (ODA, DOA, POA, MOA, QMS), hazards identified by Authorities, etc.).

Organizations should already have established and documented methodologies and processes for collecting and monitoring reported events, occurrences and potential issues, such as the following:

- For design and certification activities:
  - Findings;
  - Noncompliance related to the product's design;
  - Issues identified by analysis (ex.: Failure Mode Effect and Criticality Analysis (FMECA) functional hazard analysis);
  - Flight test events;
  - Test data.

- For manufacturing or maintenance activities or both, procedural hazard includes:
  - Non-conformance related to the product;
  - Quality escapes;
  - Process failures;
  - Subcontractor disclosures;
  - FOD (Foreign Object Damage);
  - Any work performed not in accordance with approved data;
  - Any deviation of a tool detected during calibration;
  - Inaccurate, incomplete or ambiguous information in the manufacturing or maintenance data.

- For continued airworthiness activities:
  - Fielded fleet data;
  - Operator feedback;
  - Product support feedback;
  - Component failure analysis;
  - Maintenance data;
  - Investigations of incidents and accidents;
  - Preliminary mishap notifications;
  - Deficiency reports (Service Difficulty Reporting System (SDR));
  - Near misses;
  - In service events (e.g., failures, malfunctions, or defects);
  - Supplier notices of escapement;
  - Noncompliance's related to product certificates or approvals;
  - In-service failures;
  - Malfunctions or defects;
  - Quality escapes.

Consideration should also be given to additional organizational and human performance hazards that may lead to:

- Inadequate training, time, rest, experience, supply;
- Inadequate environment, staffing, conditions, planning;
- Financial impacts;
- Contract and legal limitations;
- Incomplete or unavailable maintenance or equipment data;
- Safety culture deficiencies;
- Disruptive events internal and external to the organization;
- Instances in which routine procedures have failed, or may fail, or contain weaknesses.

The sources listed above may lead to actions necessary to address the identified issues. In addition to that activity, SMS establishes procedures and processes to identify hazards across the organization, programs, departments, facilities, etc., through the systemic use of that data.

Hazards may also arise from organizational changes to the following:

- The organization (relocation of a facility, opening a new facility, etc.);
- Employee responsibilities;
- Operations (such as Flight Test);
- Resources (human and physical) (usually would involve scarcity of that resource);
- Implementation of new systems[*F];
- Revision of existing systems[*F];
- Organization's privileges or limitations (such as scope change);
- Development of operational procedures[*F]
- Policies and/or processes;
- The effective level of independence of personnel relied upon to carry out independent or objective checks of technical, or regulatory compliance material (e.g. through "interference" with the relevant duties, or conflict of interest);
- Substantive changes due to "external or environmental" constraints (e.g. new regulations not linked to Safety), or new sanitary procedures in a pandemic context;
- Identification of hazards or ineffective risk controls through safety assurance processes[*F].

Any of these types of events or occurrences could be used to identify aviation safety hazards that then become inputs to safety risk management.

See Appendix 2 for "Examples of Safety Risk Management (SRM)".

6.2.2 Safety Risk Assessment and Mitigation

ICAO Annex 19 Second Edition-Amendment 1 (July 2016) - Appendix 2

2.2 Safety risk assessment and mitigation

The service provider shall develop and maintain a process that ensures analysis, assessment and control of the safety risks associated with identified hazards.
Note: The process may include predictive methods of safety data analysis.

Understanding
SRM requires the assessment of the severity and likelihood associated with identified hazards in order to obtain the level of safety risk. Various guidance/methods (see Means of Compliance below) are available for assessing risk.

Safety risks should be assessed while determining their acceptability. An appropriate quantitative or qualitative method can be used. Aspects to consider in the assessment may include technical, processes, human behaviours and organizational attributes (including interface management).

The terms 'product safety' or 'product risk assessment' are used when it is important to distinguish between risks to the product's effect on aviation safety, and other risks to the organization's activity or personnel.

A large part of product risk assessment may already be defined in the frame of compliance with other regulations such as the following:

- During design and certification, compliance with existing certification procedural and airworthiness regulations, defines an acceptable safety risk;

- During manufacturing, a product's conformity to its approved design and conditions for safe operation are already defined by Part 21 requirements. The associated manufacturing and conformity attestation processes are an acceptable way to achieve an acceptable level of safety risk. For example, conditions such as assembly variations or a need to repair damaged parts or assemblies may arise during manufacturing. In such a situation, the manufacturing organization, in coordination with the design organization use approved processes that address these situations to ensure the product conforms to its approved design and is in a condition for safe operation;

- During operational phase, safety risk acceptability is defined by the continued airworthiness for in service products which is performed by the type certificate holders. Some regulated organizations such as commercial operators and maintenance organizations, perform safety assessments on compliance with procedures, instructions for continued airworthiness, and regulations.

However, it is important to recognise that systemic (e.g. human or organizational) factors may affect the design, manufacture, or maintenance in a way that compromises the aviation safety, in a manner not necessarily recognised by the three approaches above. SRM should therefore additionally provide the means to assess the systemic risks.

Risk assessment and mitigation normally includes the following activities:

1. Analysis or review of the system description; operating environment, and/or organizational system description;
2. Hazard and consequence identification;
3. Hazard assessment (severity and likelihood of the consequences of the hazard occurring);
4. Risk categorization (Low, Medium, Serious, High);
5. Acceptance of risk (including identification of management personnel that can accept high, serious, and medium risks) *;
6. Risk analysis (determination of root cause);
7. Risk mitigation/reduction;
8. Risk control decision (recognition and acceptance of residual risk);

9. Risk burndown/tracking;
10. Risk closure (The risk has been mitigated to an acceptable level, and there is a plan in place to monitor the risk to ensure that mitigation strategies remain effective);
11. Claims, arguments and evidence that the safety action(s) have been met and documented in a safety case.

** For organizations subject to FAA Part 5, refer to Appendix 8.*

Means of Compliance

The organization should[*F] define a process to analyze safety risk associated with identified hazards, a process for conducting risk assessment that allows for determination of acceptable safety risk, and a process to develop safety risk controls.

Before being implemented, selected risk mitigation actions should[*F] be assessed to ensure acceptable risk is achieved.
It is up to the organization to select the methods and tools to be implemented.

Engineering judgement/qualitative assessment should be considered as minimum acceptable means to identify and assess safety risks.

Various methods, techniques and tools can be used for risk assessment. Whatever the selected method, the risk assessment should always focus on impacts on aviation safety.
Examples of methods that can be used are listed in Appendix 2 “Examples for SRM”.

Note: It is neither possible nor desirable to perform detailed safety risk assessments for all hazards. Hazards should undergo a triage process, using a heuristic approach for predicting the approximate risk level of a hazard, without performing a detailed safety risk assessment. This allows the organization to allocate safety management resources to sources of potential significant risk, and to minimize the allocation of resources to lower or insignificant risk. Consider that, depending on their nature, categorization and identification scenario, not all identified hazards must result in SMS action (i.e. safety risk analysis and risk control actions).

Examples of situations where SRM should be applied by different types of organizations are listed in Appendix 2 “Examples for SRM”.

Organizations implementing a process for continued airworthiness already have the primary foundations for collecting, analysing and mitigating risks related to the product.

This process which includes failure, malfunction and defects collection, risk analysis and actions to maintain product airworthiness is a major contributor to SRM and an input to the safety assurance process, as described in §6.3.1. Continued airworthiness also includes contributions from all involved stakeholders, such as design, manufacturing and maintenance organizations.

Reactive continued airworthiness activities should be complemented with proactive hazard identification and related safety risk management (e.g. product safety enhancement beyond continued airworthiness duties).

Indeed, the continued airworthiness data/information are also key source data for proactive risk assessment for products in operation.

6.2.3 The Management of Change

ICAO Annex 19 Second Edition-Amendment 1 (July 2016) - Appendix 2

3.2 The management of change

The service provider shall develop and maintain a process to identify changes which may affect the level of safety risk associated with its aviation products or services and to identify and manage the safety risks that may arise from those changes.

Understanding

Aviation organizations experience changes due to expansion or contraction as well as modifications to existing management systems which may affect the level of safety risk associated with its products or services. Hazards may inadvertently be introduced whenever change occurs. In addition, change may affect the effectiveness of existing safety risk controls.

If an organization elects to use new or unestablished methods and processes, or to introduce changes to existing ones that potentially have a substantive impact on safety, it should develop and use hazard identification processes to identify new or existing conditions that could foreseeably lead to unacceptable risk.

Note: "change" in the context of ICAO Annex 19 should be understood as a change to the system (*e.g. organization, responsibilities, processes) and its associated operating environment and not directly to the product. Changes to the product are already controlled via other regulatory requirements (e.g. Part 21), including acceptance of such changes by certificate/approval holders when initiated by suppliers.*

Note: It is neither possible nor desirable to implement a safety risk assessment process for all changes to the system. Changes should undergo a triage process, using a heuristic approach for predicting the approximate risk level of a change, without performing a detailed safety risk assessment. This allows the organization to allocate safety management resources to sources of potential significant risk, and to minimize the allocation of resources to lower or insignificant risk. Consider that, depending on their nature, categorization and identification scenario, not all identified changes must result in SMS action (i.e. safety risk analysis and risk control actions).

The management of safety risks resulting from changes should consider the following:

- Criticality of systems and activities, including impact on external organizations;
- Stability of systems and operational environments;
- Past performance (Which data and information are available that can be used to help in the analysis of the change?).

Note: Refer to ICAO SMM §2.8.2 for additional details.
Note: Consideration should be given not only to the risks associated with the change but also the temporary transitional risks when implementing the change.

Desired outcome
Management of change should proactively identify hazards related to organizational change. If a risk is identified, it should trigger SRM actions in a manner that supports the organization's safety objectives.

Means of Compliance
Even though each organization is unique, several features of the operational environment are common or similar among organizations. Thus, there are typical changes that could have a potentially substantive impact on safety management.

An organizational system description is valuable when determining the scope of SMS applicability, and the changes to which it could be subjected. Within the context of the system description / operating environment, the following triggers may[*F] be considered as requiring SRM:

- Implementation of new systems;
- Revision of existing systems;
- Development of operational procedures;
- Identification of hazards or ineffective risk controls through safety assurance processes.

Categories of substantive changes that may require SRM include:

- Changes to the organization;
- Changes to responsibilities;
- Changes to the principles of key procedures;
- Initial implementation or revision of systems;
- Changes to resources;
- Changes in the intended use of the product (e.g., where new usage of the product is out of the qualified/certified design limitations).

Special consideration, including human performance, should be given to the transition period during change implementation.

Examples within these categories are provided in Appendix 2.

Note: Certain regulatory material defines criteria for substantive changes. Such changes should be considered for SRM applicability.

Management of change could rely on the support from tools or methods [e.g., 8D (Disciplines of problem solving), PPS (Practical Problem Solving), 5M (Means, Methods, Machines, Manpower, Materials), PFMEA (Process Failure Modes & Effects Analysis)] documented within some Industry standards.

Availability of subject matter experts: It is important that key stakeholders are available and involved in the management of changes. This may include individuals from external organizations.

Risk mitigation associated with management of change should include necessary stakeholder communication and training. Effective communication, promotion, training, and staff engagement contribute to the success of any change initiative. When personnel are well-informed and actively involved, the process becomes more effective and the outcomes are generally more successful.

6.3 Safety Assurance

Safety Assurance (SA) relies on the following activities:

- Ensuring the effectiveness of risk controls defined in Safety Risk Management (SRM);
- Monitoring safety performance of products and services;
- Monitoring the effectiveness of SMS processes as encompassed in the organizational system description.

Safety Assurance monitors the activities of the SMS including the management of change. Safety Assurance also drives continuous improvement. Thus, SA requires the organization to gather, analyze, and monitor data to assess its safety performance. The outputs from SA are strongly connected to SRM because SA provides a closed loop to SRM. SA measures the effectiveness of corrective actions and controls from the SRM process and identifies if there are new, potential hazards, as shown in Figure 1. SRM in turn will produce new risk controls and new performance requirements that address the deficiencies that were discovered through SA activities. Based on this flow of information, SA and SRM are iterative processes that feed each other and evolve with SMS maturity (see section 8 “SMS Implementation Plan”).

A strong foundational quality management system, compliance monitoring and operational process monitoring will benefit safety assurance. It includes the internal and external audit procedures that may be required to meet regulatory requirements of the certificate holder.

As introduced in 6.1.2, there are several arrangements possible for implementing safety assurance accountability and responsibilities in an organization. Safety Review Boards, or equivalent, are often used as a forum to monitor and respond to safety assurance information.

Data Collection for Safety Assurance

SMS relies on data driven decision-making. For example, safety performance data serves as the evidence when comparing the effectiveness of the SMS against safety objectives which drive continuous improvement of the SMS. As a result, an organization’s SA process collects data on both product and processes, and internal and external sources.

Organizations will typically have multiple opportunities for data collection:

- Interfaces with the operators of the products and services;
- Interfaces with customers and suppliers;
- Interfaces with Aviation Authorities;
- Channels to collect internal information.

Mandatory event reporting to aviation authorities and voluntary employee reporting are also important examples. In Europe, regulation (EU) No 376/2014 and associated guidance material provide details on the requirements for voluntary employee reporting.

Data can be:

- Quantitative: Data sources that are represented numerically and generally are statistical measures. These identify and provide a clearer picture of the 'area' being measured; such as incident rates or non-conformance rates;
- Qualitative: Data sources that describe qualities or characteristics, such as employee safety reports and in-depth causal assessments in accident reports. Qualitative data is valuable for hazard identification.

Examples of safety data related to product performance are in section 6.2.1.

Examples of organizational performance data include:

- Status of ongoing initiatives that support safety objectives;
- Status of risk mitigation actions;
- Number of, and participation in SMS reviews;
- Number of employees trained in safety topics;
- Corrective actions from aviation authorities, including limitations from Aviation Authorities due to suspension or revocation of privilege/delegation;
- Level of Involvement (LOI) of the Aviation Authority in the product certification (i.e., level of involvement related to the criticality of the new design and the performance of the design organization);
- Response time for closing safety related findings (e.g., internal audits; Authority's audits);
- Resources or competences management (e.g. key safety positions fulfilment such as safety management staff, certification staff in design or certifying staff in manufacturing or maintenance or both);
- External factors related to the environment (e.g., ambient noise and vibration, temperature, lighting and the availability of protective equipment and clothing);
- Lead time for issuing mitigations or corrective measures in the Continued Airworthiness process;
- Identified deficiencies in interface management.

Safety data, including the examples above, needs to be processed, analyzed or both to establish safety performance indicators as detailed in section 6.3.1 Means of Compliance. Furthermore, understanding the limitations of safety performance data is critical to avoid inaccurate conclusions. Failing to identify data quality issues and appropriately caveating analysis results can lead to implementing inadequate risk mitigations or introducing unintended consequences into the operation.

As shown in Section 6.3.1 Means of Compliance, the organization is required to collect data to support Safety Assurance. Employees should be aware of the data collection systems that are relevant to their duties. This is key for effective use, especially when the systems allow employees to report data anonymously (e.g., potential hazards and, if available, proposed solutions and safety improvements).

6.3.1 Safety Performance Monitoring and Measurement

ICAO Annex 19 Second Edition-Amendment 1 (July 2016) - Appendix 2

3.1 Safety performance monitoring and measurement

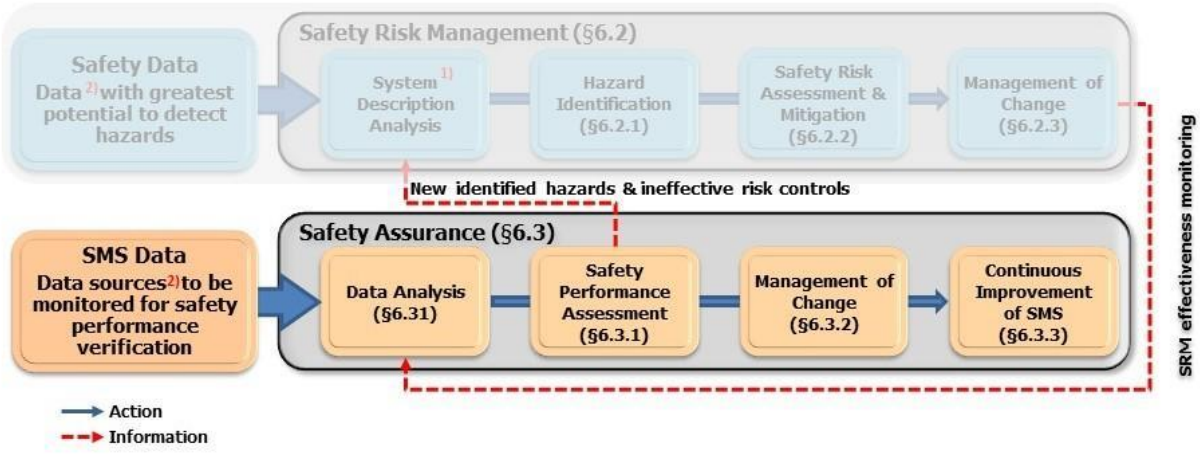
3.1.1 The service provider shall develop and maintain the means to verify the safety performance of the organization and to validate the effectiveness of safety risk controls.

Note: An internal audit process is one means to monitor compliance with safety regulations, the foundation upon which SMS is built, and assess the effectiveness of these safety risk controls and the SMS. Guidance on the scope of the internal audit process is contained in the Safety Management Manual (SMM) *(Doc 9859).*

3.1.2 The service provider's safety performance shall be verified in reference to the safety performance indicators and safety performance targets of the SMS in support of the organization's safety objectives.

Understanding

Figure 3: Safety Assurance steps



An organization's SMS assures that operational safety risks are maintained at an acceptable level of safety or better. As shown in Figure 3, the SRM process cannot be open loop. To achieve a closed loop, the SA process includes methods that monitor the performance of the SMS, such as monitoring both the SMS functionality and the effectiveness of the risk controls implemented to achieve the expected level of aviation safety.

Safety performance monitoring and measurement (see Annex 19 Appendix 2 element 3.1) assesses an organization's capability to manage safety risk. It examines how successful the processes are in managing risk, including the effectiveness of risk controls from both a product safety and organizational safety perspective. This SMS element identifies if any residual risk remains in a system after risk controls have been implemented.

Additionally, this element provides data to measure the organization's progress towards meeting their safety objectives, which are defined in the Safety Policy. This allows for a proactive approach to safety by using quantifiable indicators that are relevant to the organization's safety performance.

As noted in the introduction to 6.3 Safety Assurance (SA) encompasses the following activities:

- Ensuring the effectiveness of risk controls from Safety Risk Management (SRM) through targeted monitoring. Thus, the requirements for data collection will be unique to the documented SRM assumptions;
- Monitoring the safety performance of products and services could be proactive or reactive. Both are valuable for measuring the ultimate objectives of the SMS, to eliminate or minimize safety-related events, which is the ultimate objective of the SMS;
    - Reactive: measuring and investigating mishap events that have already occurred (i.e. a lagging indicator);
    - Proactive: anticipating incidents or accidents before they occur. For example, product data trend monitoring can drive proactive action;
- Creating a health assessment through monitoring the effectiveness of SMS. It includes traditional quality process monitoring with SPI trending. This type of monitoring can be proactive and predictive by finding and eliminating hazards or mitigating risks prior to an unsafe event.

Desired outcome

Safety Assurance should produce a structured, proactive approach to monitoring the effectiveness of risk mitigations, establish the safety performance of the product, organization's processes and activities, and determine the effectiveness of organizational activities and processes supporting SMS processes. The objective is to determine progress in meeting the organization's safety objectives, drive continuous improvement, and feed any new, potential hazards back into SRM.

Means of Compliance

The organization should*F have processes to collect data that will monitor safety performance against safety objectives. These processes gather data that will help organizations determine the compliance with and effectiveness of risk controls, identify new hazards within operational processes, and monitor for changes to the operational environment. This should*F involve multiple sources of data that encompass organizational, process, and product aspects, including as appropriate but not limited to:

- Product and services safety performance (i.e., events, event rates);
- SMS processes performance (i.e., responsiveness, effectiveness);
- Process audits (including internal, external, compliance audits);
- Operating environment changes (i.e., leadership turnover, new policies);
- Confidential employee reporting;
- Investigations of accidents or incidents;
- Potential non-compliances;
- Investigation of hazards received from external sources.

Optionally, safety surveys can be used to provide additional data/insight.

The organization will*F develop and maintain processes to analyze safety data. The organization should*F show that the collected data helps determine the need for safety risk management if there are ineffective risk controls or new hazards identified. Collected data also serves to support continuous improvement when process deficiencies are identified.

The analysis of data collected, as outlined in section 6.3, will be commensurate with the products and organization diversity, complexity and criticality and reflective of the uniqueness of the organization including its capabilities, processes and activities. Regardless of who in the organization is responsible for processing the collected data and implementing corrective actions, they should report the data to the SA function for the purpose of assessing the safety performance and contributing to the periodic review of the SMS with the Accountable Executive.

The organization is expected[*F] to assess the performance of the SMS against their safety objectives. Safety Performance Indicators (SPI) are key to this evaluation and the organization is expected to develop and maintain appropriate indicators. Developing appropriate SPIs will evolve with experience and maturation of the SMS.

SPIs should be measurable, actionable and reliable. SPIs should be compared to acceptable targets that align with the organizational safety objectives. SPIs should include a mix of outcome indicators (e.g., accident rates) and process indicators (e.g., validation of safety critical processes, record keeping). Safety performance assessment results can be used for multiple purposes, including:

- Measuring the effectiveness of risk mitigation by comparing SPIs to targets set in the safety objectives statement;
- Identifying potentially new hazards resulting from ineffective mitigations including any unexpected recurrence of an issue, which would be fed back into SRM.

After identifying data sources, develop analytic processes for assessing safety performance trends and additionally define targets to align with the organization's safety objectives. Lastly, establish thresholds for each SPI to indicate when additional analysis and/or mitigation is required. When appropriate, establish these thresholds using standard deviations or other statistical models.

Internal and external audits provide another source of data for an organization to use to assess the performance of their SMS. Interfaces between internal audits and SMS key processes should be defined. These audits should go beyond compliance to address effectiveness.

These audits are not tools for establishing safety indicators but instead generate "SMS data" for understanding and assessing the system operations.

Audits could cover topics related to the:

- Organization (including discharge of responsibilities, knowledge resource management, documentation, means and tools) and the deployment and maturity of the safety culture;
- SPIs representing the effectiveness of the risk mitigations and controls in the context of the SRM;
- Effectiveness of the operational processes, such as the:
    - Design and development process (including certification);
    - Manufacturing process;
    - Maintenance and repair process;
    - Continued airworthiness process (e.g., product malfunction, failure or defect collection or both, reporting, analysis or correction or both).

When the organization holds an organization approval, such audits should be coordinated and accounted by the compliance monitoring function required by such approval.

In non-approved organizations, the audits should be performed in the context of the organization management system with necessary adaptations of the audit program.

National regulations may require organizations to retain safety data and/or safety information from safety assurance processes for a specified period of time.

Appendix 3 provides practical examples of Safety Assurance.

6.3.2 The Management of Change

ICAO Annex 19 Second Edition-Amendment 1 (July 2016) - Appendix 2

3.2 The management of change

The service provider shall develop and maintain a process to identify changes which may affect the level of safety risk associated with its aviation products or services and to identify and manage the safety risks that may arise from those changes.

Understanding
This section contains the requirements for Management of Change, and it is a complement to Section 6.2.3 within the Safety Risk Management section.
Management of change could also influence safety objectives, communication, promotion and training aspects of SMS.

One function of Safety Assurance is it contributes to processes which monitor for substantive changes that could introduce unacceptable risk into the operating environment. This includes planned or unplanned changes as well as internal or external interfaces. The SA process will monitor the risk mitigations associated with substantive changes to the SMS including the impact of the change on existing safety risk controls.

Safety Assurance activities also track the effects that change has on desired outcomes, ensuring that change does not compromise safety performance. It is beneficial to develop a safety assurance plan together with the SRM strategy for mitigating risk due to their closed loop relationship. This includes understanding the baseline safety performance and establishing an initial set of indicators to measure the impact of the change.

Desired outcome
Management of change assesses any substantive change to verify if any new hazards apply or if previous hazards might be reopened. It should trigger SRM actions in a manner that achieves the organization's safety objectives.

Means of Compliance
There is a process that assesses the effectiveness of mitigations put in place for managing risks associated with substantive changes, as a feedback loop to SRM and includes monitoring the effectiveness of stakeholder communication and training. [Section 6.2.3 Management of Change].

An organizational system description plays a key role in the Management of Change process. The system description helps an organization identify the scope of the SMS's applicability when implementing changes. The system description also identifies how changes could affect the SMS and aviation safety performance. Additionally, if the implemented change affects the system description, the organization should update the system description to reflect the change.

6.3.3 Continuous Improvement of the SMS

ICAO Annex 19 Second Edition-Amendment 1 (July 2016) - Appendix 2

3.3 Continuous improvement of the SMS

The service provider shall monitor and assess its SMS processes to maintain or continuously improve the overall effectiveness of the SMS.

Understanding

SMS continuous improvement is a gradual and continuous process. It focuses on increasing the organization's ability to fulfil its safety policy and objectives effectively and efficiently.

Continuous improvement should enhance the level of safety performance with action plans that are based on safety performance monitoring and measurement (refer to Section 6.3.1 Safety Performance Monitoring and Measurement).

Likewise, reporting and interfacing with other entities (such as international organizations and regulators) may assist organizations in identifying opportunities for increased safety performance.

Desired outcome

The desired outcome is the development of visible organizational improvements including initiatives that seek to enhance safety performance. Implemented effectively, safety assurance outputs support the continuous improvement of the SMS because it allows organizations to identify areas for improvement within their SMS and against its safety objectives.

Means of Compliance

The organization should[*F] consider the results of its safety performance measurements when defining continuous improvement actions for the SMS. Metrics may vary according to numerous factors, including the maturity of the SMS and current safety performance. If SMS implementation is ongoing, the SMS Maturity Assessment and Oversight Model in this Standard can help determine the current state of the SMS and identify work required to fully implement all SMS elements. Once the SMS has been fully implemented, the organization should determine appropriate metrics and methods that drive continuous improvement of the system and achieve the highest level of SMS effectiveness (as determined by the SMS Maturity Assessment and Oversight Model).

Management's commitment is essential to achieve continuous improvement of the SMS. As a result, the Accountable Executive and appropriate members of the organization's senior leadership team should be accountable for this element. Therefore, it may be appropriate to articulate this commitment in the organization's Safety Policy or other documentation provided to internal and external stakeholders. Continuous improvement of SMS should include integration of SMS oversight within the overall management system.

Management's commitment to continually improve safety management processes should be an integral part of an organization's safety objectives. While SPI trends may reflect continuous improvement, SMS maturation may also be apparent through improvements in safety culture and the overall effectiveness of safety management processes.

By using safety data from Safety Assurance processes, the organization should ensure:

- There is data analysis at the organizational level to establish an action plan, together with the stakeholders responsible for implementation. The action plan should address the root causes of failures or malfunctions at the system level where safety performance has not reached the expected level;
- Implementation of improvement actions;
- They are considering recommended practices and lessons learned to enhance the SMS. Furthermore, the organization should disseminate these recommended practices across the organization through safety promotion activities (refer to Section 6.4 Safety Promotion).

Organizations should organize SMS reviews to assess continuous improvement, with members of their management (as defined in Section 6.1.1.1 Safety Policy) using a frequency and format that corresponds to the level of risks and the complexity of the organization. The outcomes of the SMS review should serve as inputs to SRM.

6.4 Safety Promotion

Safety Promotion utilizes various methods to supplement the organization's policies, procedures, and processes to provide an enduring value system and enable a robust Positive Safety Culture within the organization.

Safety promotion consists of training, and communication elements, in order to enable the dissemination of safety information and support the implementation, operation and continuous improvement of the SMS.

6.4.1 Training and Education

ICAO Annex 19 Second Edition-Amendment 1 (July 2016) - Appendix 2

4.1 Training and education

4.1.1 The service provider shall develop and maintain a safety training programme that ensures that personnel are trained and competent to perform their SMS duties.

4.1.2 The scope of the safety training programme shall be appropriate to each individual's involvement in the SMS.

Understanding
The purpose of training is to acquire a proficiency level in targeted skills and competencies in order to foster a Positive Safety Culture and understanding of SMS principles inside the organization.

The organization should define and maintain a safety training program, tailored to the organization's employees, as appropriate for the competencies required by each job function and for key managers to have an overall understanding of safety management fundamentals. In some organizations, key individuals may have multiple roles within the SMS, and training should reflect these different skill sets, and varying degrees of knowledge required to meet the objectives of the SMS.

The training program should document who needs to be trained and at which training level in order to acquire the necessary proficiency level in targeted skills and competences.

Safety training should ensure that employees (depending on their role):

- Are competent to fulfil / carry out their duties and responsibilities relevant to the operation and performance of the SMS;
- Understand how their activity and performance could impact safety, and
- Know what means, tools and resources are available for SMS operation.

Desired outcome

Managers and staff have the skills and knowledge required to perform their SMS-related functions and that they remain proficient in performing these functions. By doing so, this contributes to aviation safety.

Means of Compliance

The organization should*F define a safety training program to meet the safety policy objectives.
The safety training program should consider the timing of initial and frequency of recurrent training as appropriate. Such training enables staff to perform their functions so that they contribute to aviation safety.

This program should cover at a minimum, the scope, content, methods of delivery (e.g., classroom training, e-learning, on the job training) and frequency of training that best meet the organization's needs considering the size, scope, required competencies, and complexity of the organization.

The safety training program and content should be periodically reviewed and assessed for effectiveness to ensure it meets the needs of the SMS. This review should consider lessons learned from previous safety issues managed (e.g. knowledge derived from hazard identification, employee reports, risk management processes, human performances, regulations, and positive safety culture).

The SMS training should address the requirements for each role. Typically, this would consist of basic training and specialized training as required. Depending on the role, a combination of the following components could be used (not necessarily in the same order):

- The reason and benefit of participating in the SMS, including applicable regulatory duties;
- Safety Culture;
- Human Performance Principles including fatigue management;
- How the SMS is implemented in the Organization;
- Safety reporting systems;
- Personnel and manager role in the Safety Risk Management incl. methodology;
- The organization's safety policy and objectives.

The organization should*F maintain a record of all safety training provided to each individual subject to the training program. The record shall cover the achievement of competencies identified for key safety personnel.

Such records should be retained according to the organization's data retention policy.

Note: See Appendix 8 for specific retention requirements for FAA Part 5.

6.4.2 Safety Communication

ICAO Annex 19 Second Edition-Amendment 1 (July 2016) - Appendix 2

4.2 Safety communication

The service provider shall develop and maintain a formal means for safety communication that:

a) ensures personnel are aware of the SMS to a degree commensurate with their positions;

b) conveys safety-critical information;

c) explains why particular actions are taken to improve safety; and

d) explains why safety procedures are introduced or changed.

Understanding

The purpose of the safety communication is to make employees at all levels aware of the safety matters within the organization; Safety communication should flow in both directions, allowing for “top-down” communications, e.g. regarding the organization’s SMS structure, safety objectives, risk management and safety achievements, as well as less formal “bottom-up” communications that provide insights from operational personnel, e.g. feedback about lessons learned, opportunities for improvement.

This will enhance the Positive Safety Culture and will make employees, contractors and external stakeholders aware of the significance of their activity in the safety of the products and/or services delivered by the organization. Effective safety communication should ultimately make all personnel feel as though they are an integral part of the SMS, and contributors to the safety outcomes of the organization.

The communication within the organization should be addressed to all personnel of the organization, with a level and a frequency of information appropriate to their roles in the organization.

Safety communication may have external elements, e.g. for benchmarking and sharing best practices with industry-wide entities.

Firstly, organizations may benefit from benchmarking and sharing of best practices with external entities for the purposes of improving their own and industry-wide safety processes.

Secondly, safety information may be shared with suppliers, customers, and other external entities that directly support the organization’s SMS for the purposes of ensuring alignment with the company’s safety policy and objectives, aligning on risk mitigation activities, and facilitating data sharing for the company’s safety assurance processes.

Desired outcome

Internally, safety information flows efficiently in both directions, allowing for “top-down” communications regarding the organization’s safety policies and objectives as well as “bottom-up” communications that provide insights from operational personnel regarding observed or perceived safety issues.

Information on potential hazards, systemic safety issues, and best practices are shared between interfacing organizations where relevant.

Means of Compliance

Effective communication involves adjusting the content of the communication and the way in which the information is delivered to match the target employee's role in the organization. The communication should be simple and concise so that it is easily understood and considered.

The organization may extend safety communication, as appropriate, to external key stakeholders (e.g., customers, suppliers).

At a minimum, SMS communications should[*F]:

- Ensure that employees are aware of the SMS policies, processes, and tools that are relevant to their responsibilities;
- Convey hazard information relevant to the employee's responsibilities;
- Explain why safety actions have been taken, especially for employees who report concerns as they should be provided feedback on actions or no actions based on the report;
- Explain why safety procedures are introduced or changed.

A safety communication may include, but is not limited to the examples listed below:

- Safety objectives and the organization's level of achievement;
- Status of SMS hazards/risks;
- Status of the Safety Assurance indicators;
- Safety statistics and trends;
- Updated SMS processes / procedures;
- Lesson learned from SMS hazards/risks;
- A safety minute or anecdotal, personal testimonials, organizational safety successes or failures, etc.

The communication of safety information, including safety policy and objectives can be delivered as:

- Text (e.g., newsletter, email);
- Visual media (e.g. posters, short videos);
- Crew or team briefings;
- Feedback sessions by external speakers;
- Testimonies by employees;
- Intranet websites;
- Other means as appropriate depending on the size and complexity of the organization.

Feedback on the effectiveness of communications can be used to adjust future communication strategies.

Safety communications may be retained as part of SMS data.

*** Note: See Appendix 8 for specific retention requirements for FAA Part 5.*

Refer to appendix 4 for "Examples of safety promotion".

7. INTERFACES BETWEEN ORGANIZATIONS

This section addresses the interfaces between organizations as mentioned in Annex 19 Appendix 2.

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Note 2: The service provider's interfaces with other organizations can make a significant contribution to the safety of its products or services. Guidance on interface management as it relates to SMS is provided in the Safety Management Manual (SMM) (Doc 9859).

7.1 Interface principles

Organizations do not operate in isolation, and any management system (e.g., safety management system, quality management system, environmental management system, design assurance system) should consider interactions with others. In this standard, the term 'interface' is used to describe in generic terms the interaction between organizations, and includes the occasions when the interface is formalized, and offers the opportunity to exchange information. Interface management in the scope of an SMS may take a variety of forms, depending on the needs of the organizations involved, the level of risk identified and accepted and the ability of the organizations to affect the interface.

In most cases, organizations directly interfacing with each other are expected to formally define the interactions through contractual arrangements. A typical case would be the arrangements made between a customer and a supplier. Another example would be an agreement for co-operation formalized between two equal parties, such as to collaborate on a project, or to exchange information for mutual benefit. The contract is the means to define the exact nature of the activities being performed by one party for the other, and duties to be performed for the SMS across the interface may therefore be defined within the formal contractual agreements. This can include, as appropriate, defining the items to be exchanged when both parties have an SMS, or more specific requirements for one party to support the needs of the other's SMS.

In the context of an SMS, interface management has a role to play in all four components (safety policy and objectives, SRM, SA and safety promotion).

In all interface cases, the protection of information from safety data collection and boundaries around proprietary information should be respected.

7.2 Types of Interfaces

The following paragraphs describe examples of interfaces, which may be considered:

Internally within one company/group/legal entity:

- Each organization holding its own SMS (e.g., SMS in design organization, SMS in manufacturing organization);
- Each organization holding its own SMS supported by a Corporate SMS approach (refer to §7.6);
- One single corporate SMS across multiple organizations (e.g., SMS covering both design and manufacturing organizations with a single accountable executive).

Externally with separate companies/legal entities:

- Having implemented an SMS (e.g., operators, manufacturing organizations, maintenance organizations);
- Not having implemented an SMS (e.g., engineering services suppliers, manufacturing suppliers, contracted organizations).

Note: The system description of an organization with an SMS implemented should capture the interfaces with other organizations, at an appropriate level of detail. For instance, it is impossible to make a detailed organizational system description that covers all SMS interfaces for a large manufacturer dealing with hundreds of suppliers, customers, etc.

When a supplier is required to implement an SMS, the TC/STC/POA/PC/MRO holders can rely on such supplier's SMS when it is subject to National Civil Aviation regulation and oversight. Otherwise, the TC/STC/POA/PC/MRO holders will have to rely on interfacing, contracts and their own SMS. Examples of items that could be considered when establishing interface arrangements are contained in Appendix 6 to this Standard.

Externally with Aviation Authorities:

- As required by applicable regulation, certain information may need to be provided to the Authority by the organization. However, Aviation Authorities may receive from other channels (operators, other National Aviation Authorities, various entities under their jurisdiction) valuable information related to the safety of a product or they may have access to generic safety data (e.g., recommendations from official investigation bodies). Provided, the Aviation Authority is able to share such information, it may be beneficial for the organization.

7.3 Type of information exchanged

Again, depending on the organization, many safety related information exchanges may be considered. Some types of information are discussed further in section 7.3.1 to section 7.3.4

7.3.1 Safety policy and objectives

When considered appropriate, safety policies and objectives may be shared between interfacing organizations to facilitate a better understanding of SMS approaches. Such an exchange is normally for information only, as policies and objectives are mostly specific to each organization, and if any particular aspects are to be managed across the interface, these will be covered in contractual arrangements described in 7.1 to ensure consistent SMS approaches.

7.3.2 Safety Risk Management

Safety risks in one organization may impact other organizations through the potential consequences of the risks or the management of their mitigation. Information associated with fleet occurrences, events, defects, malfunctions, failures, and non-conformances should be exchanged through a contractual interface process, noting that such contractual arrangements may already be in place to satisfy continued airworthiness responsibility or other duties."

Safety information from Aviation Authorities such as mandatory safety risk control instructions, and safety risk control actions defined by the Type Certificate Holder should be communicated through an effective interface process to all affected supplier and customer organizations.

Mature SMS systems may leverage the interfaces and the respective knowledge of companies to identify and anticipate new risks and mitigate their impact in a proactive manner, even if not previously experienced. A good practice is to establish a reporting system about mutual risks, best practices and lessons learned between the interfacing organizations.

The lack of interaction between organizations or insufficient management of interfaces should be seen itself as a hazard possibly generating risks. These would be assessed with the appropriate tools of the SMS.

7.3.3 Safety Assurance

As a minimum, safety assurance activities should originate with data exchanges necessary for continued airworthiness which are subject to regulatory requirements (e.g., Part 21, EU 376/2014). This is only the foundation from which the relationship between SMSs starts.

Information and data sharing may be developed by a dedicated SMS network between interfacing organizations, to facilitate common understanding and the use of good practices where applicable (e.g. by the common use of this International SMS Industry Standard). Safety performance could be accounted for during the assessment of suppliers (for initial qualification or continuous monitoring).

It may be good practice to plan continued improvements of the interface program with specific organizations from time to time.

7.3.4 Safety Promotion

Safety promotion principles and priorities may be shared between interfacing organizations to ensure consistent SMS approaches and to create a shared Positive Safety Culture between the organizations (e.g., regular sharing of safety policies, top safety objectives and risks, best practices).

7.3.5 Example of Interfaces between organizations for product safety

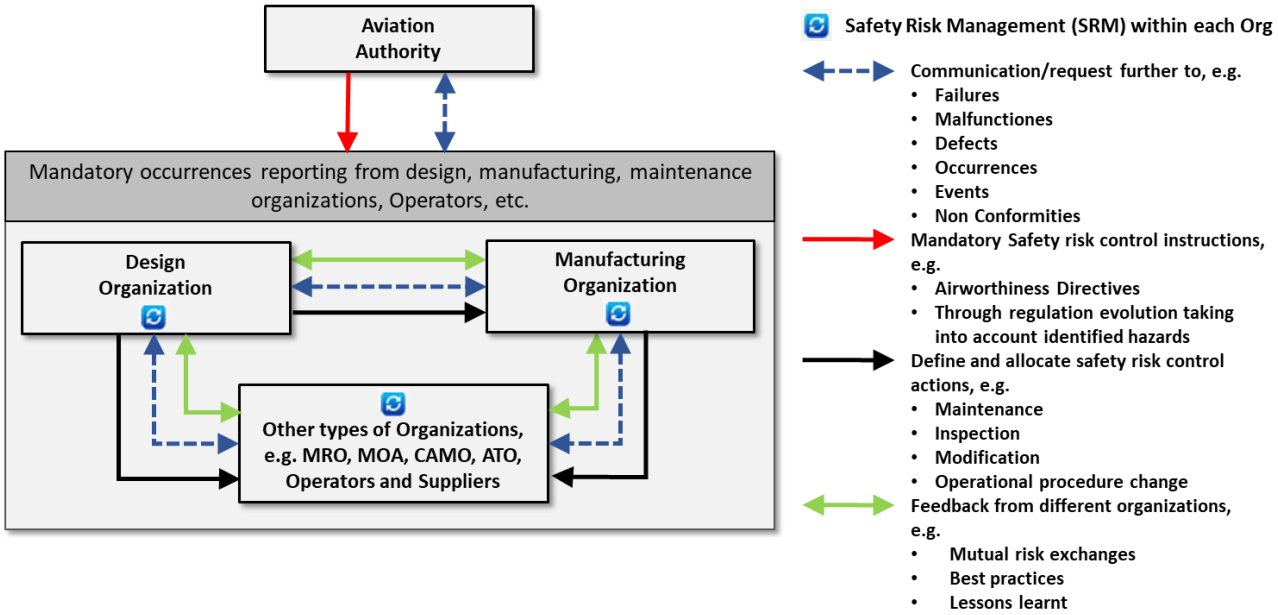
Figure 4 depicts general cases of possible exchange of data between interfacing organizations.

The interface applies both proactively and reactively.

More detailed cases are presented in the Appendix 7 to this Standard.

Figure 4

Example of Safety Data Flow and Associated Communication Between Organizations for Safey Data Management



7.4 Limitation of information flow

Although it is desirable that organizations work collaboratively through their interfaces, in order to better identify their inherent hazards (and possibly detect emerging ones), assess associated safety risks and develop mitigations, there is a need for guidelines on limitations to be applied to the flow of information.

In a world with increased interactions between a large number of stakeholders in aerospace, unlimited exchanges with an obligation of reciprocity, hold the threat of generating multiple inquiries, over multiple links, thereby increasing the level of “unnecessary noise”. More specifically, the flow of information queries, both up and down, along single or even multiple-tier supplier arrangements needs to be properly controlled.

SMS is dealing with the inner working of each organization, and it may not be necessary or useful to propagate all hazard and risks analyzes across interfaces: at some point it is sufficient to know that the risk is assessed and controlled by the relevant people.

The level and details of data exchanges should be adapted and commensurate to the complexity and safety risks of the products, services and interfacing organizations. It also should be adapted to the maturity of each organization with regard to safety management.

For interfaces between supplier and customer, a level of definition of the interface requirements is expected to be included in contractual arrangements. An organization is not required to justify hazard identification and decide risk control actions beyond its obligations in order to avoid interfering situations.

Exchange and management of safety or SMS data exceeding the needs for continued airworthiness should be agreed upon between organizations and documented. This should prevent excessive system interaction between organizations (e.g., an operator in the context of its own SMS requesting to audit a TC holder's SMS).

7.5 Interface documentation

When relevant, the interface between organizations for safety management should be documented and maintained.

This documentation should consider the following objectives:

- Support the understanding of the organization's boundaries and their interactions;
- Clarify how the organizations (with or without implemented SMS) are interfacing;
- Address the management of relevant safety issues/items.

Examples of documentation for SMS interface provisions (such provisions could be the subject of dedicated documents or part of a broader documentation suite):

- Organization's handbook or exposition;
- Contract;
- Organization interface document;
- General policy statement;
- Arrangement;
- Quality assurance plan;
- Common applicable procedures when different organizations are within the same company or group.

This documentation can contain the following elements for the interfacing topics and activities:

- Organization and responsibilities (e.g., rights and duties to report issues, defects or occurrences, accountabilities and ownership for hazard identification and risk control, clear identification of interfacing focal points);
- Processes and deliverables descriptions (directly or indirectly through cross-reference to procedures);
- Criteria for reporting safety issues, noncompliance findings, nonconformities and occurrences. These criteria should focus on early communication of safety occurrences and potential safety issues;
- Agreed means for timely safety issue reporting between organizations;
- Periodic reviews of the interface.

7.6 Corporate SMS approach

Depending on the structure of an organization, (which may range from very complex multiple-company global corporations to simple highly focused small companies) or the range of its activities, it may elect to set up a “corporate SMS”, in which some or all of the SMS features are shared between different service provider roles, which would otherwise each require a dedicated SMS.

This could, for example, be the case for an organization acting as a design, manufacturing, and maintenance service provider, one required to meet different regulations for its different activities or one having a complex ‘divisional’ structure.

Many variations of such sharing are possible. A corporate SMS may, for example, include the use of common resources, such as shared functions (e.g. a common safety assurance function), shared tools and methods (e.g. a common reporting system), or corporate-level responsibilities (e.g. a coordination team). It may help streamline the SMS implementation by providing a consistent approach over some or all of the four SMS components across the organizations, with possible effects being that:

- Safety policies and objectives have consistent definition, implementation and continuous improvement throughout the organizations;
- Safety risks are managed consistently across interfaced organizations (e.g., defining a common safety risk methodology, defining criteria for management of top safety risks);
- Safety assurance activities are managed consistently (e.g., monitoring trends, implementing investigations on systemic issues across the organizations, change management);
- Safety promotion defines and ensures shared principles, priorities, lessons learned and best practices between organizations (e.g., top safety objectives/risks) via corporate events and awareness/training sessions.

The scope and nature of the corporate SMS will need to be described and documented as appropriate. A corporate SMS manual could describe the overall and common organization’s SMS implementation over the 4 components and 12 elements of the SMS as defined per ICAO Annex 19 Appendix 2.

A corporate SMS is not compulsory, and it will be necessary to show how each of the service provider activities (e.g., design, manufacturing or maintenance) meet the SMS requirements and that the accountable managers for these activities adequately discharge their responsibilities through the corporate SMS. Organizations may have to account for the oversight of different service provider activities to different overseeing National Aviation Authorities.

7.7 Supplier SMS Interface Approach

An organization’s contribution to the safety of the aviation system relies in turn on the contributions of its suppliers. It cannot be assumed that a supplier will have its own SMS, and even for those that do, a supplier’s systems are highly unlikely to align exactly with those of their different customers. Each organization relies on interface arrangements to include the supplier in its overall SMS, and it is recommended that the topics below are addressed in such arrangements, as appropriate to the supplier’s contribution:

a. identification of hazards, including reactive and proactive methods;
b. analysis, assessment, and control of safety risks associated with identified hazards;
c. identification and management of changes that may impact product safety;
d. assessment of the effectiveness of safety risk processes;
e. provision of training on product safety responsibilities to relevant personnel;

f. communication and awareness of product safety information, including safety-critical information, safety events, and changes to safety procedures, as applicable;
g. reporting of safety events to relevant interested parties in accordance with customer and regulatory requirement;
h. a confidential employee reporting system as a method of product safety hazard identification without fear of retaliation.

Additional guidance material for suppliers on product safety expectations can be found in the International Aerospace Quality Group (IAQG) Supply Chain Management Handbook (SCMH) Chapter 7.22 relevant to Safety Management Systems.

8. SMS IMPLEMENTATION PLAN

8.1 General

The purpose of this section is to assist the organization with SMS implementation. It describes the main principles to implement a robust SMS, by means of an incremental (step-by-step or phased) approach covering the four SMS components. The proposed phased approach recognizes that implementation of a fully mature SMS is a multiyear process. The intent is to allow a smooth implementation of SMS, taking into account the complexity of the organization and maturity of its management system while ensuring the implementation remains flexible.

This guidance should help any approved or non-approved organization to implement an SMS that is compliant with applicable SMS regulation either on a mandatory or voluntary basis.

An SMS should cover the requirements for the four SMS components described in section 6. The reference material in Section 3 provides ICAO, Aviation Authority and other material to assist when implementing an SMS.

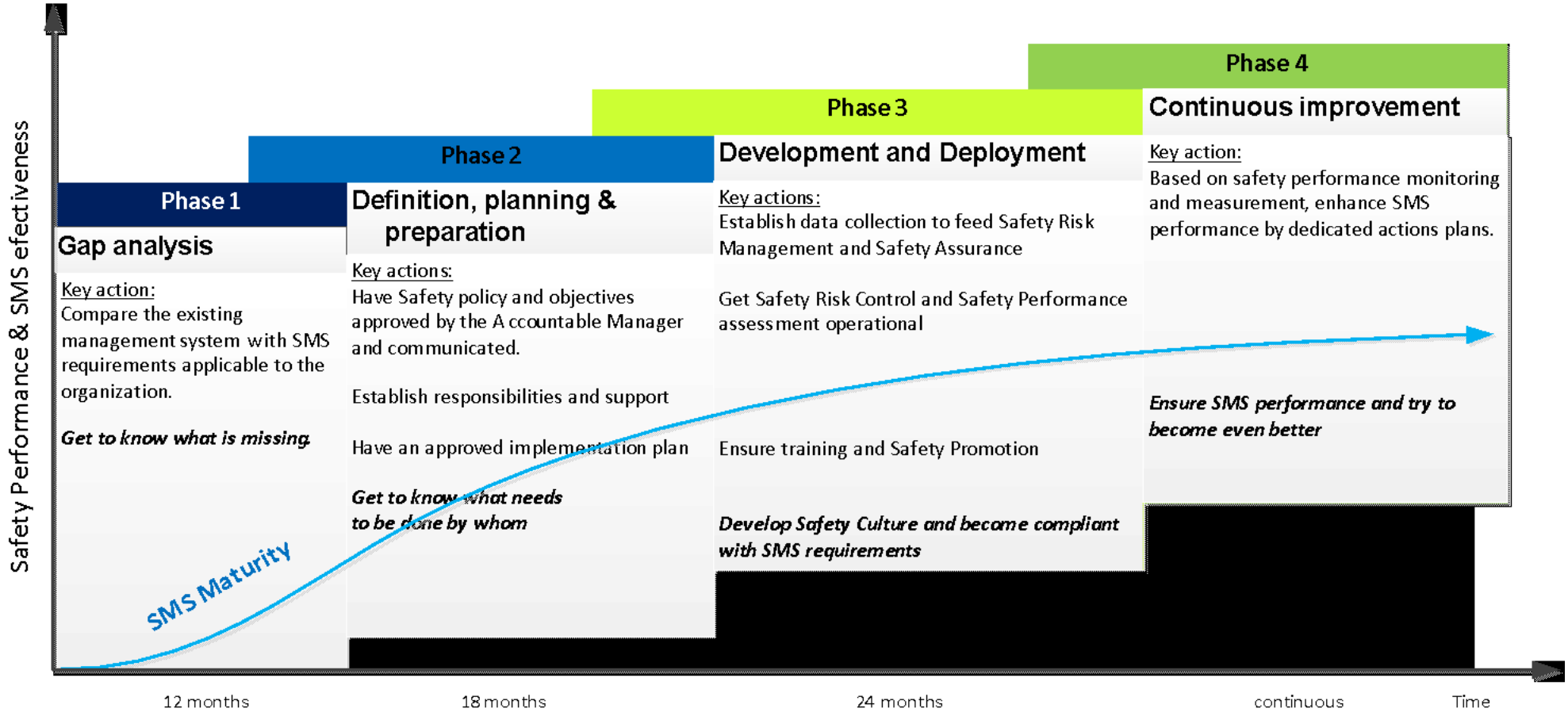
Depending on the SMS component, implementation phases may not be sequential but rather concurrent. Depending on the original maturity of the organization with regard to safety management (based on the gap analysis outputs), the SMS implementation may take time to reach a level for adequate performance, based on requirements, and then pursue enhanced maturity through continuous improvement thereafter.

In addition, means and tools to enhance organizational Positive Safety Culture should be used continuously, as outlined in Sections 5, 6 and appendix 7.

Appendix 5 “Example of SMS Maturity Assessment Method” provides guidance for an organization to self-assess the maturity of its SMS and for continuous improvement activities once the SMS is matured. The Appendix outlines a 5 Level Maturity Scale [Present / Suitable / Operating / Effective / Excellence], and an SMS Maturity Evaluation Tool “grid”. The Tool uses a detailed topic by topic assessment approach, with associated criteria to help determine the overall maturity of an SMS with regard to the 4 components and 12 elements of the SMS Framework of ICAO Annex 19.

Figure 5 shows the overall SMS implementation approach (Topics, Phases, Key Actions and typical timelines).

Figure 5: SMS Overall Implementation Journey



8.2 Implementation Plan

The following three actions should be considered prior to developing an organization's SMS implementation plan:

1. Identify the safety accountable executive/manager (refer to section 6.1.2).

2. Identify the person or the team in the organization responsible for developing the SMS implementation plan, as appropriate.

3. Identify the person, or group of persons, responsible for the functions of the "safety manager", as outlined in Section 6.1.3, responsible to deploy the SMS implementation plan on behalf of the safety accountable executive/manager in addition to his/her operational functions.

The development of the SMS implementation plan could be considered as an improvement project of the organization management system. Project management methods/tools (e.g., Life Cycle Business Improvement Project - LBIP) could help the organization to frame and manage SMS implementation plan.

Phase 1 – Gap analysis
This phase is fundamental to define an efficient and effective SMS implementation plan.
Use of the Global SMS Evaluation Tool in Appendix 5 will assist the organization to identify the gaps between the organization's current management system and the expectations of this standard. Each SMS element is assigned a Maturity Scale/level from 1 (Present) to 5 (Excellence). All the requirements for previous maturity levels should be established to reach the next maturity level. Achievement of SMS maturity is an incremental process, and the next step in maturity is built upon the performance of prior maturity levels.

As the first step of Phase 1, the perimeter of the SMS (organizational system description) should be clarified. Section 6 provides information on how to develop the organization's system description. Further to the review of the SMS requirements applicable to the organization versus the existing management system, the gap analysis will help identify what is already in place within the organization and what is missing.

Organizations granted approvals or delegations or both from their Aviation Authority (e.g., DOA, POA, AMO/MOA, ODA) should find that a large part of the SMS requirements are already fulfilled through compliance with the organizational approval requirements.

Phase 1 should be considered as completed when the gap analysis is achieved.

From the outputs of the gap analysis and considering what is missing in its management system to fulfil the needs of SMS, the organization should consider going through all or part of the following phases:

- Phase 2 Definition, planning & deployment preparation;
- Phase 3 Deployment;
- Phase 4 Continuous improvement.

Phase 2 – Definition, planning & preparation
This phase should be considered as completed when the following items are accomplished:

- Safety objectives defined and approved by the safety accountable executive/manager;
- Safety policy signed by the safety accountable executive/manager and communicated within the organization;
- SMS governance structure in place with safety responsibilities established;
- Personnel who will support SMS implementation plan deployment identified, nominated and aware on the SMS basics and objectives;
- SMS implementation plan approved.

In addition to Section 6.1, the Global SMS Evaluation Tool in Appendix 5 provides more detailed guidance on the expectations for safety objectives, policies, and governance. The tool provides guidance to meet the standards expectations. Depending upon where the organization's maturity is assessed in the gap analysis (Present, Suitable, Operating, Effective and Excellence) the organization should prioritize its implementation efforts.

For example, an organization's objectives and policies would be considered "Present" when, in addition to compliance with airworthiness rules and quality standards, there are policies (Safety + Just & Fair), there exists a description of organizational accountability and responsibilities for SMS, and processes are documented that detail how the SMS will operate.

The SMS implementation plan should:

- Address identified gaps resulting from phase 1, by defining actions and responsibilities;
- Include timelines and milestones;
- Address coordination with interfacing organizations as defined in section 7, where applicable;
- Be approved by the Safety Accountable Manager;
- Be reviewed regularly and updated as necessary.

Phase 3 – Development and Deployment
This phase should be considered as completed when all the actions defined in the implementation plan (Phase 2) are achieved and the deployed SMS is performing at the "Operational" maturity level outlined in this standard.

The Maturity Evaluation Tool in Appendix 5 can be used to assess the level of maturity of the organization's SMS with respect to the four SMS components and specific elements. The tool can also provide the implementation team with the level of definition, documentation and what to look for when assessing effective implementation and performance.

As part of the deployment, the following subjects should be defined, documented and operational for each SMS component, and can be considered in a sequence adapted to the organization priorities and as defined in the implementation plan. The information provided for each component is consistent with the "Operating" level details provided in the Appendix 5 Maturity Evaluation tool.

<u>Safety Policy, Objectives, Governance and SMS documentation</u>

- The Safety Policy:
  - Is communicated to all personnel;
  - Highlights the primary responsibility for safety of all employees;
  - Promotes a Safety or "just & fair" culture, or a "code of conduct" that identifies expected/acceptable/unacceptable behaviours;

- Is assessed on a regular basis for applicability and relevance to the current organizational environment.

- Safety Objectives:
  - Have been established to support the strategic objectives;
  - Are communicated throughout the organization and are promoted by accountable and senior management levels;
  - And associated metrics are being reviewed to ensure they are relevant and being measured to determine effectiveness.

- Governance:
  - A Safety Accountable Manager has been appointed with full responsibility and ultimate accountability for the SMS;
  - Safety accountability, authorities and responsibilities are clearly defined and documented and everyone in the organization is aware of and fulfil their safety responsibilities, authorities and accountabilities and encouraged to contribute to the SMS;
  - The effectiveness of the SMS is reviewed by appropriate Safety management to ensure there are sufficient resources, actions are being monitored and appropriate safety objectives and SPIs have been established;
  - Management decision-making is data informed.

- SMS documentation.
  - SMS documentation is accessible, is consistent with other internal management systems and is representative of the actual processes in place;
  - Changes to the SMS documentation are managed.

Safety Risk Management

- There is a documented process in place to identify Hazards based on safety data from events that have occurred or in anticipation of potential events that could lead to an unacceptable risk;
- There is an anonymous and confidential[*F] employee reporting system to capture safety concerns;
- Safety risk analysis and safety risk assessments are being routinely conducted;
- The level of risk the organization is willing to accept is defined in areas where product safety may be adversely impacted;
- The risk matrix and acceptability criteria are clearly defined and usable;
- Responsibilities for accepting risks are clearly defined;
- Appropriate risk mitigations are being applied to reduce safety risk to an acceptable level, including timelines and allocation of responsibilities;
- Safety risks are being monitored to ensure the adequacy of implemented controls;
- Senior management is actively involved in medium and high-risk hazards and their mitigation and controls;
- The organization is using a defined change management process to identify whether substantive organizational, environmental and process changes could have an impact on safety.

Safety Assurance

- A person or group of persons with responsibilities for the monitoring function has been identified and they have direct access to the Accountable Executive;
- The safety performance of the organization is being measured and KPIs/SPIs, linked to Safety objectives, are defined and evaluated for appropriateness and effectiveness;
- Appropriate Risk controls are being verified to assess whether they are applied and effective;

- Information from safety assurance and compliance monitoring activities feeds back into the safety risk management process;
- Internal audits are occurring on key SMS processes, including relevant interfacing stakeholders.

Safety Promotion

Training:

- There is a program delivering appropriate SMS training to different personnel in the organization;
- The training covers individual safety duties (including roles, responsibilities, and accountabilities), how the organization's SMS operates and, as appropriate, addresses human performances;
- Training is reviewed and maintained as appropriate to the organization's SMS needs.

Communication:

- Safety relevant information and safety / just culture principles are being communicated internally and externally, as appropriate;
- Safety communication is taking place, taking into account that upper and middle management staff are the driving force of an effective SMS.

SMS Readiness Assessment:

An SMS Readiness Assessment is a useful activity to guide the organization at various points in the implementation and maturity level. It can be used as a gap assessment and when ready, to prepare for assessment of the organization's SMS by an Authority:

- Deployed SMS is assessed against the implementation plan. This assessment could be performed using the assessment methods as proposed in Appendix 5 "Example of SMS maturity assessment method;
- As applicable, a declaration that the organization's SMS meets the intent of ICAO Annex 19 requirements, or local Authority requirements, and is at an "Operating" Maturity level, based on the organization's assessment using the Appendix 5 Tool, could be issued to support acceptance by Aviation Authority.

Phase 4 – Continuous improvement

With finalization of Phase 3 the organization should have all required SMS components/elements at an "Operating" Maturity level.

Implementing continuous improvement initiatives is key to manage new hazards or threats associated with the continuous evolution of the global aviation system with the goal to maintain the highest level of aviation safety. Such initiatives should be subject to a continuous improvement action plan (refer to section 6.3.3 "Continuous improvement of the SMS").

Appendix 1 – Examples of Safety Policy and Safety Objectives

This appendix should be considered in conjunction with the section 6.1.5 – SMS Documentation.

1. Background and Purpose

This appendix provides guidance and examples that can be used to support development of an organizational safety policy and safety objectives in conjunction with Section 6.1.1.1.1 Safety Policy and Section 6.1.1.2 Safety Objectives. The examples provided are one means, but not the only means to address the noted requirements.
The safety policy and objectives will depend on the nature of the organization's scope, size, and maturity. Although these examples have been provided by large organizations that hold multiple certificates, they are viewed as useful for smaller organizations or single certificate holder organizations to consider.

2. Safety Policy [Reference Section 6.1.1.1]

An organization's safety policy is how management formally documents its commitment to safety. It should contain the elements and be managed as outlined in Section 6.1.1.1.

2.1. Safety Policy Examples

Safety Policy: Example 1

- *Large multi-certificate holder organization. [Design / Manufacturing/ Maintenance / Flight Test Operations]*
- *High-level safety objectives are embedded in safety policy. [Ref: Safety Objectives Example 2]*

[Organization's] objective is to provide the highest standards of safety, quality, and service to our customers. We will constantly strive to improve these standards, thereby maintaining our position as a global leader in the manufacture of XXX aircraft and provider of associated services. Outstanding safety performance is critical to the success of our business.

Through our Positive Safety Culture, Safety Risk Management, and policy of continuous improvement, we will maximize the inherent safety of our operations by promoting best practices in product and aviation safety to achieve [Organization] high-level product/aviation safety objectives:

- Design and manufacture of safe products;
- Superior continued operational safety;
- Safe internal flight operations;
- Proactive employee participation in product/aviation safety and hazard reporting;
- Inherent compliance to processes, procedures and policies associated with the design, manufacture and continued operational safety of [Organization] products;
- Comprehensive safety risk management of compliance and conformity assurance processes.

The leadership of [Organization] commits to providing the necessary resources to ensure implementation of SMS fundamentals, and will:

- Consult, listen, communicate, and respond openly to our staff and customers;

- Ensure personnel competence and accountability. Everyone employed at [Organization] is responsible for operating appropriately and demonstrating compliance with this policy, associated regulatory requirements, and company processes and procedures at all times;
- Actively engage in Safety Risk Management and Safety Assurance activities;
- Openly report all aspects of our safety performance;
- Recognize those who contribute to improve product safety performance;
- Ensure that a Positive Safety Culture is maintained at all times.

Company procedures ensure the means to sustain and monitor compliance with local and International Standards, and to ensure that we comply with the safety requirements of the Civil Aviation Authorities.

Safety is not the sole responsibility of any single person or department, it involves all employees in the company, and it is the responsibility of all of us to comply with this policy and to strive to improve our safety standards at every opportunity.

This document describes an SMS that complies with current [Civil Aviation Authority] guidelines and regulations. All incorporated documents identified, and every amendment thereto meet the requirements established in this document. The policies and procedures outlined in this document and in all incorporated documents identified herein must be strictly adhered to at all times. In case of conflict between [Civil Aviation Authority] regulations and this Policy, the [Civil Aviation Authority] regulations will prevail.

[END]

Safety Policy: Example 2

- *Large multi-certificate holder organization. [Design / Manufacturing / Maintenance / Flight Test Operations]*
- *Safety objectives referenced – but in separate document. [Ref: Safety Objectives Examples 3 & 4]*

[Organization] is committed to the implementation and execution of a world-class Products and Services Safety Program, consistent with [Organization's] Core Values.

[Organization] is committed to the delivery of safe, high-quality products and services by never compromising on safety or quality and through the continuous improvement of all aspects of our activities that affect the safety of our products and services. The mechanism by which [Organization] champions these values and commitment to safety is through implementing and executing a Safety Management System (SMS) that meets the requirements of the International Civil Aviation Organization (ICAO) Annex 19, "Safety Management".

[Organization] fosters a Positive Safety Culture where every employee understands their role in the Product and Services Safety Program and feels empowered to identify and report any issues that they believe could adversely affect the Safety of our Products and Services, without fear of retribution.

The [Organization] SMS Leadership Board has the required competences, means, resources, and authority necessary to implement and execute [Organization] Product and Services Safety Program. The Leadership Board establishes safety objectives, evaluates progress and effectiveness, and holds management accountable for identifying and mitigating risks and impacts.

The [Organization] SMS Leadership Board deploys the necessary resources to implement the Product and Services Safety Program effectively throughout the lifecycle of our products, and

provides employees with the information, training and tools required to ensure that product and services safety is a core value.
[Organization] is committed to providing world-class dependable products and services that meet customer expectations and all regulatory requirements. Our commitment to safety supports a spirit of continuous improvement in the design, manufacture, and maintenance of our products.

[END]

Safety Policy: Example 3

- *Large multi-certificate holder organization. [Design / Manufacturing / Maintenance / Flight Test Operations]*
- *High-level safety objectives [as specific commitments] referenced in safety policy [Ref: Safety Objectives Example 1B]*

In everything we do and in all aspects of our business, we make safety our top priority, strive for first-time quality, and hold ourselves to the highest ethical standards as set forth in our Code of Conduct [Doc No.]. Our Safety Management System ensures that safety, quality and compliance of our products and services are provided for the people who entrust us with their lives when they operate, maintain, and fly on our products.
This requires our unyielding commitment to the following:

- We commit to a Safety Management System to advance our goals for safety, quality, and compliance;
- We foster a Positive Safety Culture that enables proactive identification and mitigation and risks in order to prevent accidents, injuries or loss of life;
- We ensure all employees understand the requirement to report any safety hazard, incident, or concern;
- We promote a culture that protects and treats people fairly when they openly report safety, quality, and compliance concerns;
- We openly communicate safety actions being taken while appropriately protecting the safety data and safety information driving those actions;
- We clearly define the responsibilities of all employees so that everyone understands their roles in ensuring the safety, quality and compliance of our products and services;
- We eliminate or mitigate potential safety, quality and compliance risks associated with our products and services which must include meeting all applicable requirements and regulations;
- We use actionable key performance metrics and targets that drive continuous improvement of our Safety Management System;
- We allocate sufficient resources [people, processes, tools, and training] to support this safety policy;
- We ensure all employees understand that we all have a daily obligation to pursue safety, quality and compliance as described in this safety policy.

[END]

Safety Policy: Example 4

- *Large multi-certificate holder organization. [Design / Manufacturing / Maintenance]*
- *High-level safety objectives referenced in safety policy [as Principles]. [Ref: Safety Objectives Example 1A]*

This Product Safety Policy is one of a series of individual policies, contained in a single overall Policies document, endorsed by the organization's General Counsel, and mandatory for all employees. This policy text is an extract from the larger document. The Product Safety Policy is supported by relevant parts of other policies, including the Quality Policy, Speak up Policy, and Security Policy, and all are supported by a separate Code of Conduct."

PRODUCT SAFETY

A. Policy values

[Organization] provides mission critical products that people's lives depend on. Our commitment to the safety of our products is therefore at the heart of our 'Operate Safely' core value.

Everything we deliver to a customer is our product - hardware, software, services, and documentation, whether delivered separately or integrated into systems.

B. Principles

Five principles govern our approach to product safety:

1. Leadership commitment and accountability

   Our leaders champion product safety and prioritise it so that safety-related tasks get the right attention, time, and resources. We make accountability for product safety clear and ensure people understand what they are accountable for.

2. Level of product safety

   We design our products to achieve a high level of safety consistent with their application, always ensuring that we meet or better the relevant company, legal, regulatory and industry requirements. We assess what could go wrong and put controls in place to meet the required safety levels throughout the product lifecycle and reduce the safety risks so far as is reasonably practicable. We evaluate how human and organizational factors can introduce risks to product safety and use our understanding when setting our controls.

3. Maintaining and improving product safety

   We are committed to the continuous improvement of product safety and actively engage in setting industry standards and good practice. We measure our performance and rigorously investigate and resolve safety-related issues, systematically embedding the learning from these back into our practices and processes. Everyone is encouraged to report any product safety concerns.

4. Conforming product

   Robust quality is an essential building block of product safety and by following our processes we ensure that our products and those of our suppliers conform to their specification.

5. Safety awareness and competence

   Everyone who works in [Manufacturer] shares responsibility for product safety and is mindful of the safety implications of our actions. Training is provided so that our people understand the [Manufacturer] Product Safety Policy and processes and can fulfil their collective and personal responsibility.

These principles are the foundation of our Product Safety Management System which is governed by the Company Product Safety Assurance Board.

C. Expectations

Always speak up about a product safety concern if you see one, report it if you have any doubt and remember, we are committed to treating everyone fairly and without prejudice in accordance with Our Code.
Always follow the parts of the [Organization] Management System applicable to your role. You should feel able and supported to perform the tasks assigned to you. If you are being asked to do something which you do not feel qualified and/or experienced enough to do you should discuss with your manager.
Make sure you attend the Safety Awareness training appropriate to you. For additional guidance, Group Procedures, product safety documents and key contacts please access:

- Product Safety Management System Manual
- Safety and Product Assurance Engine Room

[END]

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3. Safety Objectives [Reference Section 6.1.1.2]

The following examples are intended to illustrate some of the different approaches to the establishment of safety objectives. In some cases, objectives may directly reflect the expected safety performance of the organization (i.e. focusing on the contribution to the aviation system); in others, topics of priority or focus are identified, to indirectly improve the safety performance of the organization.

As discussed in Section 6.1.1.2, the objectives identified below are meaningful to the organization, sufficiently consistent with its other forms of internal communication, and ultimately support the improvement of the organization's safety performance. Some of the examples also show the breakdown of the objectives into specific tasks.

3.1. Safety Objective Examples [Reference Section 6.1.1.2]

Safety Objective: Example 1

- *Large multi-certificate holder organization. [Design / Manufacturing / Maintenance]*
- *High-level strategic safety objectives integrated into safety policy [two examples]*

Safety Objective: Example 1A

This organization chose to merge its highest-level overall safety objectives within its product safety policy, and the key section (B - Principles) is reproduced below; the objectives of the organization are identified through the description of its 'principles'. It should be noted that this language is chosen to apply consistently across the organization (it has design, manufacturing and maintenance capability), including its non-aviation activities (i.e. supporting the 'corporate SMS' approach)

Extract from Safety Policy:

Section B - Principles

1 Leadership commitment and accountability

Our leaders champion product safety and prioritize it so that safety-related tasks get the right attention, time and resources. We make accountability for product safety clear and ensure people understand what they are accountable for.

2 Level of product safety

We design our products to achieve a high level of safety consistent with their application, always ensuring that we meet or better the relevant company, legal, regulatory and industry requirements. We assess what could go wrong and put controls in place to meet the required safety levels throughout the product lifecycle and reduce the safety risks so far as is reasonably practicable. We evaluate how human and organizational factors can introduce risks to product safety and use our understanding when setting our controls.

3 Maintaining and improving product safety

We are committed to the continuous improvement of product safety and actively engage in setting industry standards and good practice. We measure our performance and rigorously investigate and

resolve safety-related issues, systematically embedding the learning from these back into our practices and processes. Everyone is encouraged to report any product safety concerns.

4 Conforming product

Robust quality is an essential building block of product safety and by following our processes we ensure that our products and those of our suppliers conform to their specification.

5 Safety awareness and competence

Everyone who works in [Organization] shares responsibility for product safety and we have to be mindful of the safety implications of our actions. Training is provided so that our people understand the [Organization] Product Safety Policy and processes and can fulfil their collective and personal responsibility.

[END]

Safety Objective: Example 1B

A separate example of a similar approach to integrating high level safety objectives within an organization's safety policy, in this case, establishing 'commitments' with key phrases highlighted:

Extract from Safety Policy:

In everything we do and in all aspects of our business, we make safety our top priority, strive for first-time quality, and hold ourselves to the highest ethical standards as set forth in [reference to separate code of conduct and other sources]. Our Safety Management System ensures the safety, quality and compliance of our products and services for the people who entrust us with their lives when they operate, maintain, and fly on our products.
This requires our unyielding commitment to the following:

- We commit to a **Safety Management System** to advance our goals for safety, quality, and compliance;
- We foster a **Positive Safety Culture** that enables proactive identification and mitigation of risks in order to prevent accidents, injuries, or loss of life;
- We ensure all employees understand the **requirement to report** any safety hazard, incident, or concern;
- We **promote a just culture** that protects and treats people fairly when they openly report safety, quality, and compliance concerns;
- We **openly communicate safety actions** being taken while appropriately protecting the safety data and safety information driving those actions;
- We **clearly define the responsibilities** of all employees so that everyone understands their roles in ensuring the safety, quality and compliance of our products and services;
- We **eliminate or mitigate potential safety, quality and compliance risks** associated with our products and services which must include meeting all applicable requirements and regulations;
- We use **actionable key performance metrics and targets** that drive continuous improvement of our Safety Management System;

- We **allocate sufficient resources** (people, processes, tools, and training) to support this safety policy;
- We **ensure all employees understand** that we all have a daily obligation to pursue safety, quality and compliance as described in this safety policy.

[END]

Safety Objective: Example 2

- *Large multi-certificate holder organization. [Design / Manufacturing / Maintenance / Flight Test Operations]*
- *Strategic high-level safety objectives explicitly included as part of safety policy*

This organization chose to separately identify high level/strategic safety objectives within the safety policy, to draw attention to particular areas of intended focus. These are long-standing objectives.

Extract from Safety Policy:

Through our Positive Safety Culture, Safety Risk Management, and policy of continuous improvement, we will maximize the inherent safety of our operations by promoting best practices in product and aviation safety to achieve [Organization's] high-level product/aviation safety objectives:

- Design and manufacture of safe products;
- Superior continued operational safety;
- Safe internal flight operations;
- Proactive employee participation in product/aviation safety and hazard reporting;
- Inherent compliance with processes, procedures and policies associated with the design, manufacture and continued operational safety of [Organization] products;
- Comprehensive safety risk management of compliance and conformity assurance processes.

[END]

Safety Objective: Example 3

- *Large multi-certificate holder organization. [Design / Manufacturing / Maintenance / Flight Test Operations];*
- *Safety objectives separate from and NOT included in safety policy; supporting tasks developed for objectives.*

This organization created annual safety objectives with associated detailed supporting tasks, appropriate for tracking progress. The organization's safety policy references that safety objectives will be established but does not explicitly outline them.

	ANNUAL SMS OBJECTIVE	DETAILED SUPPORTING TASK
1	Achieve [regulator] [voluntary] SMS compliance concurrence	*1.1 Prepare for and support regulator SMS assessment*
2	Assure open and proactive reporting of potential and identified safety hazards from internal and external sources and enterprise-wise responsiveness to proactively assess and address.	*2.1 Implement enhanced standard work for potential safety issue read across*
		2.2 Implement Safety Concern Reporting system
		2.3 Publish internal news article showcasing new employee hazard reporting system
3	Proactive identification & management of safety significant Items	*3.1 Establish criteria, process, and publish key procedural documents*
4	Promote continuous improvement in safety culture, processes, and products	*4.1 Complete baseline survey on safety culture*
		4.2 Establish annual SMS training plan
		4.3 Establish annual communications plan
		4.4 Create New SMS Web Page/Site
5	Ensure that employees are aware of the SMS policies, processes, and tools that are relevant to their responsibilities	*5.1 Annual review of Safety Policy by all employees*
		5.2 Establish SMS training matrix
6	Implement safety risk controls to achieve acceptable risk levels and establish risk level as low as reasonably practicable [ALARP] by balancing safety, operational and customer impact considerations.	*6.1 Establish means to monitor effectiveness of mitigations to achieve ALARP.*

[END]

Safety Objective: Example 4

- *Large multi-certificate holder organization. [Design / Manufacturing / Maintenance / Flight Test Operations];*
- *Safety objectives separate from and NOT included in safety policy; supporting tasks developed for objectives.*

Similar to Example 3, this organization created safety objectives with annual supporting tasks suitable for tracking. Most of the objectives remain the same year after year, with the supporting tasks adapted to planned annual projects and tracking. The safety objectives are aligned with the main four components of the SMS framework to ensure that there is at least one objective against each SMS component.

YEAR: 20XX

SMS Component	SMS Objective	Annual - Detailed supporting tasks / key performance indicators
Safety Policy and Objectives	Ensure product safety policies, procedures, accountabilities, and leadership behaviours drive continuous improvement of safety culture	Annual review of safety policy
		Complete product safety culture survey, and analyze results
Safety Risk Management	Assure enterprise-wide responsiveness to, and open reporting of, identified safety hazards	Complete hazard identification training for all employees
		Implement enhanced process for read across of safety issues
		Establish plan for providing awareness to the "aftermarket" of part functional criticality, where warranted.
	Proactive identification and management of safety critical parts, features and risk controls including design, manufacturing, and aftermarket	Establish plan for operator/partner/supplier engagement for SMS collaboration
		Assess method to update FMECA / SSA based on service experience for safety critical parts.
Safety Assurance	Achieve readiness for [civil aviation authority] acknowledgement of fully operational SMS	Prepare for and support SMS assessment by [civil aviation authority]
	Utilization of KPI and audits for monitoring safety performance and driving continuous improvement of products and processes	Implement improved timeliness metrics
		Conduct planned audits of key safety processes
Training and Communication	Ensure that employees are aware of, and adequately trained for, the SMS Policies, processes, and tools that are relevant to their responsibilities	Complete annual employee product safety certification
		Publish annual training plan including key position required training
		Publish annual communication plan
		Develop best-in-class Product Safety website

[END]

Safety Objective: Example 5 ["Divisional" Objectives]

- *Large multi-certificate holder organization. [Design / Manufacturing / Maintenance]*
- *Short term safety objectives to supplement strategic objectives included in safety policy.*

This organization identified items for focus in the coming year for a specific division, divided into three categories, combining both reactive and proactive activity. The local management of the division defined the objectives and agreed to them through the division's safety board. These are reviewed each year.

[Year] Priorities		
Dealing with Unsafe Conditions	**New Risk Discovery**	**Safety Management System**
Rapid and Effective Containment	*[internal 'possible safety issue' report]* sentencing completed in 90 days	*[Internal framework for assessment of safety control effectiveness/ hazards]* emergent findings managed effectively with credible plans to return to 'green' status.
Solutions identified, developed, validated, and implemented to plan	Complete product sampling plans (at assembly and component level) and focused periodic safety reviews	Embed *[review of recent non-involved accident]* learning
Meet *[Identified unsafe condition reports]* closure targets consistently	'Event reports' and 'product delivery escape reports' resolution.	Conduct pilot studies for expected SMS regulation.
Cumulative risk to 'mature fleet' levels		Incorporate new business unit into design organization, and establish internal monitoring system
		Deliver digital reporting system for [identified unsafe condition] and 'possible safety issue'] reporting.

[END]

Appendix 2 – Examples of Safety Risk Management (SRM)

1. Purpose

The purpose of this appendix is to introduce some examples of Safety Risk Management techniques: analysis options and where it should be applied.

- Examples of risk assessment techniques (source ISO 31010):
  - Brainstorming;
  - Engineering Judgment;
  - Checklist;
  - Root cause analysis;
  - Failure mode and effects analysis (FMEA);
  - Fault tree analysis;
  - Decision tree;
  - Bow tie analysis;
  - Monte Carlo simulation;
  - Consequence/probability matrix;
- Examples of risk analysis at product level (source ARP4761):
  - Functional Hazard Assessment;
  - Preliminary System Safety Assessment;
  - System Safety Assessment;
  - Dependence Diagrams;
  - Markov Analysis;
  - Zonal Safety Analysis;
  - Common Cause Analysis.
- European Risk Classification Scheme (ERCS) (published as EU 2020/2024 regulation);
- Safety Risk Assessment matrix (source CS/FARxx.1309);
- Airline Risk Management Solutions (ARMS);

2. Scope for Safety Risk Management (SRM)

SRM should cover the following areas:

- Organizational System Description - to establish the framework for hazard Identification;
- Hazard Identification - to identify hazards according to a method;
- Safety Risk identification - to identify safety risks associated with identified hazards;
- Safety Risk Analysis - to determine the severity and likelihood of a risk associated with identified hazard(s);
- Safety Risk Assessment - from the risk analysis outcomes, to determine if a risk is unacceptable according to defined criteria;
- Safety Risk Control - to eliminate, reduce or mitigate a safety risk through action(s) to be defined when the risk is unacceptable.

Examples of situations where SRM should be applied by different types of organizations:

- All Organizations:
  - Management of Change;
    - Substantive changes in any organization should trigger SRM (e.g. change in products, organizational structure, facilities, personnel, documentation, processes, tools);
      - Implementation of new systems;

    - Substantive revision of existing systems;
    - Development of operational procedures.
  - Identification of hazards or ineffective risk controls through the safety assurance process;

- Design/DOA/TC/ODA Organizations:
  - The novel or unusual features of a certification project, including operational, organizational and knowledge management aspects;
  - The criticality of the design or technology and the related safety and environmental risks, including those identified on similar designs;
  - Substantive changes in design best practices;
  - The performance and experience of the design organization.

- Manufacturing/POA/PC Organizations:
  - New or substantially changed manufacturing approach;
  - Substantive changes to manufacturing and/or quality control processes;
  - Substantive changes in tooling;
  - Changes to FOD criticality designations;
  - Substantive changes to manufacturing planning/work instructions;
  - The performance and experience of the manufacturing organization.

- Maintenance/AMO/MOA/MRO Organizations:
  - New or substantially changed maintenance, repair, overhaul or inspection approach;
  - Substantive changes to maintenance, inspection, and/or quality control processes;
  - Changes to FOD control practices;
  - Substantive changes to tools, tool control or ground equipment;
  - The performance and experience of the maintenance organization.

Examples of triggers when SRM should be exercised with respect to the type of change being made. Examples of common features and triggers include:

Changes to the organization
- Change in ownership;
- Relocation;
- Opening a new facility (manufacturing, maintenance, design, etc.);
- Change in the organization, unless shown that the independent checking function of compliance/conformity is not affected;
- Change in the parts of the organization that contribute directly to airworthiness or conformity;
- Change to the independent monitoring (internal audit) principles.

Changes to responsibilities
- Change of head of the organization (design, manufacturing, maintenance, etc;
- Change in Accountable Executive;
- Change of head of the airworthiness organization;
- Change of head of the internal audit organization;
- Change of responsibilities affecting airworthiness, quality, or continued operational safety;
- Change in continued operational safety responsible organization or location.

Changes to procedures related to
- Type certification;
- Classification of changes and repairs as Major or Minor;

- The treatment of major changes and major repairs;
- The approval of the design of minor changes and minor repairs;
- The issue of information and instructions under a privilege of the organization, e.g., ODA;
- The approval of documentary changes to the Approved Flight Manual;
- The approval of the design of major repairs;
- Substantive change to maintenance procedures or maintenance manuals;
- Continued airworthiness;
- Configuration control;
- Quality system, including creation of a quality system;
- The acceptance of design tasks undertaken by partners or design suppliers;
- Substantive new manufacturing process;
- Manufacturing planning, including creation of new planning;
- The interface/communication between organizations;
- Security arrangements.

Changes to resources

- Substantive reduction in number, qualification and/or experience of staff;
- Changes in key personnel;
- Substantive budget cuts;
- Substantive changes in technology, hardware, software, tooling, etc.

Changes to organization privileges or limitations

- Scope of approval;
- Categories of products;
- Scope of privileges.

Design and Certification System

- Changes to the design review process;
- Changes to the certification basis;
- Changes to the intended use of the product;
- Implementing a new safety critical design procedure;
- Selection of an outsourced supplier for design;
- Changes to the ODA procedures manual;
- Changes to processes for showing compliance;
- Applying traditional methods and practices in non-traditional ways (e.g. incorporating new/advanced technologies, mixed-era technologies, etc.).

Manufacturing System

- Opening a new manufacturing facility;
- Initial selection of a supplier;
- Developing a substantive new manufacturing process;
- Creation of manufacturing planning (routings);
- Creation of the Quality System;
- Qualification and training of new workforce;
- Transitioning a part from one supplier to another;
- Substantive changes to a manufacturing process (including manufacturing rate changes);
- Substantive changes to manufacturing planning (routings);
- Substantive changes to the QS, including build-verification processes/tasks or;
- Moving a manufacturing facility.

Maintenance System

- Opening a new maintenance facility;
- Developing a substantive new maintenance process;
- Creation of the Quality System;
- Qualification and training of new workforce;
- Moving a maintenance facility.

3. Hazard Identification

Hazard identification enables identifying “safety issues” or “threats” (referred to as hazards) that require application of SRM and SA. This allows the organization to appropriately allocate safety management resources to sources of potential significant safety risk.

Challenges

A challenge common to many aviation entities is the ability to implement a robust safety reporting system, enabling personnel to document hazards encountered or observed in the performance of their duties. This can be particularly challenging for organizations having a limited number of employees, making it difficult to assure the confidentiality or anonymity of safety reports. In such cases, fear of retribution can affect reporting rates. Other factors having the potential to inhibit reporting include accessibility and functionality of the safety reporting system that may cause users to perceive the process as being overly onerous or time consuming.

Those who are approaching safety risk management for the first time will encounter the challenge of trying to understand (1) how to identify hazards, and (2) how to retain useful data about the identified hazards. This is especially true in organizations that lack SMS resources and/or experience.

A challenge specific to Design, Manufacturing, and Maintenance organizations is to be informed of hazards encountered during in-service operations associated with their products and/or services. Reports submitted through client organizations’ safety reporting systems may contain information about hazards that can lead to improvements in design, manufacturing, and maintenance processes. The exchange of such information is not always feasible, especially for smaller and sub-tier manufacturers and maintenance organizations whose relationship with the operator may be indirect.

In cases where operators can provide hazard information, Design, Manufacturing, and Maintenance organizations may face challenges in standardizing feedback received from multiple sources unless common taxonomies or hazard classification systems have been developed. In addition, Design, Manufacturing and Maintenance organizations may not have detailed knowledge of the operating environment in which hazards were encountered or observed, potentially leading to inaccurate risk assessments and ineffective mitigations. Once again, this is exacerbated for Design, Manufacturing and Maintenance organizations whose relationships with the operators are indirect.

Design, Manufacturing and Maintenance organizations may also fail to recognize the benefit of leveraging information derived from existing processes. For example, Quality audits may identify potential defects or system failures that may create, or be the result of, hazards in the operating environment; and nonetheless, the interface between Safety and Quality may not be readily apparent.

There are many ways to identify hazards. If an organization has limited resources and the organization’s data collection process is open to all sources, it may receive more input than it can manage. This is especially true in a new system where Safety Management personnel are trying to gather data to create

a useful hazard-risk-control tool. This overwhelming input cannot be discarded or ignored. It should be preserved and prioritized for analysis.

Implementation Strategies

The first step in safety risk management is to implement a data collection process, which can include input from internal and external sources, hazard identification exercises, etc. Hazard identification is an ongoing process that will help to mature the SMS by leveraging useful data. Note that organizations also collect data for safety assurance purposes and for assessing the health of the system – but hazard identification is the first step in the data collection process that will enable all others.

Internal sources of hazard data include safety occurrences and procedural deviations collected through the organization's safety reporting system, audit reports, safety investigations as well as data recorded to monitor system health and operational performance. To be effective, safety reporting systems are readily available and designed in a manner that allows users to efficiently provide the required information. Organizations may be able to leverage existing reporting systems if access to sensitive safety information is controlled appropriately.

Safety reports should be treated confidentially, accessible only to designated individuals. In addition, the organization may allow for anonymous reporting under specific circumstances, consistent with company policies and applicable regulatory requirements. Despite the implementation of processes to ensure confidential or anonymous reporting, safety-related occurrences, as well as the individuals involved, may be known to people within the organization. This is likely if the occurrence is highly visible or if the organization has a relatively small number of employees. In such cases, an effective safety culture and policies that protect persons committing inadvertent errors from punitive actions are critical to the success of the organization's safety reporting systems.

Information may need to be "triaged" so that the most important information is assessed first. The normal mechanism for triaging hazards will be to adopt and use "heuristics" or rough rules that will approximate the results desired by the company and that yield rough results that are expected to be consistent with the SMS' desired results. Importance in this case will be a judgment call for the company, and it will be based on the company's safety priorities. Two companies with different priorities might have different triage heuristics, and the precise nature of the triage heuristics may vary dramatically depending in part on the resources, size, and complexity of the organization.

Many organizations cannot analyze the volume of hazard data received at once. Another issue faced by organizations is the desire to optimize resources by setting aside hazards that have little or no safety impact. Organizations may need to develop triage mechanisms as part of their implementation strategy to rank the input based on first impressions. For the most important issues, formal safety risk assessments will be processed first. Other issues will be held and processed in an order that makes sense based on their apparent importance.

Hazard triage is meant to be a heuristic for predicting the approximate risk level of a hazard without performing a full safety risk assessment. Those perceived to have higher risk levels will be deemed "more important" and will be prioritized for purposes of safety risk assessment. The purpose of hazard triage is to make sure that organizations are prioritizing safety risk assessments for the hazards most likely to have the highest risk levels. This does not mean that they are ignoring the less important hazards. It just means that they will be assessed after the more important hazards. The purpose of triage is to make quick decisions about priority. Therefore, organizations cannot perform a full safety

risk assessment during the hazard triage phase. Thus, triage should consist of simple rules that permit someone to quickly put hazards into risk level categories.

If more than one person performs hazard triage, then the organization should identify education, training, and experience requirements to perform hazard triage. Also, a defined and documented process for training would provide continuity so that each person performs it consistently. If only one person performs hazard triage, that person's education, training, and experience requirements could be less specific, therefore triage can be based on the perceived relative risk of hazards as they are identified. This approach, however, is not recommended for organizations holding more than one certificate, given the broad range of experience and expertise required to perform this activity for different kinds of safety risk assessments. Whether it is for Design, Manufacturing, Maintenance or a combination of these products or services, the reliance on one individual in this case would present a considerable risk. Factors that guide decisions should be documented for use in process development for hazard triage in the future. As the process develops, it may be desirable to consider a layered approach incorporating aspects of Occupational Health and Safety, Ethics & Compliance, Security, and the Environment for a truly holistic evaluation. A multi-disciplinary approach would certainly require a team of individuals.

External data sources may include publicly available information from accident and incident investigations, suppliers, industry, and government sources as well as data provided by entities that utilize the company products and/or services. In all cases, data should be assessed and used in accordance with established safety information protection policies.

Once data has been collected, it should be archived and categorized to derive information relevant to the organization's safety objectives. Taxonomies developed by the CAST-ICAO Common Taxonomy Team (CICTT) and the ICAO Accident/Incident Data Reporting System (ADREP) are publicly available resources that can be used for this purpose. Industry associations may also provide data classification systems for specific uses.

Policies and procedures to govern the retention of safety data and safety information should also be developed and implemented in accordance with any relevant regulatory requirements. The database custodian should ensure that any retained data is stored securely and de-identified once follow-up actions with involved persons have been completed.

The aggregation of data collected by multiple organizations has the potential to provide benefits for all Design, Manufacturing and Maintenance organizations, but can be particularly beneficial in cases where the amount of internal data is limited due to the size of an organization or the scope of its products and/or services. Data aggregation processes can be used to generate information that provides insights into systemic safety issues without implicating contributing entities or their employees. Collaborative information exchange initiatives sponsored by industry associations as well as government entities can enable the use of aggregated data in this manner.

N°	Good practices for hazard identification
1	Avoid trying to identify every conceivable or theoretically possible hazard. This is neither possible nor desirable. Judgment is required to determine the adequate level of detail in hazard identification. Due diligence should be exercised in identifying significant and reasonably foreseeable hazards related to the organization operations.
2	Focus on the areas having the greater potential to introduce hazards that may lead to unacceptable safety risk, e.g.: ● Incident and Accident scenarios (e.g., from reviews and investigations) if not yet covered by existing continued airworthiness process ● Human and organizational factors (e.g., activity which may lead to unacceptable risks and affect the safety of products or services) ● Business decisions and processes changes (e.g., substantive change in the principles of a process or in the organization structure or both) ● Interface with other organizations (e.g., manufacturing subcontractor of critical parts) ● Novelty, criticality or complexity or both in product design, manufacturing or maintenance (e.g., introduction of additive manufacturing, inspection of composite structure)
3	Identify hazard from review/analysis of available safety data*, such as: ● Safety reports/publications (e.g., reports from ICAO, Aviation Authorities, operators, associations). ● Audit reports ● Safety surveys ● Investigations (in the frame of continued airworthiness) ● Safety analysis in the frame of safety enhancement initiatives ● Safety information derived from information sharing with other organizations (e.g. interfacing or benchmarked organizations) *Refer to definition of safety data in section 4 “Terms & Definitions”.
4	Consider hazards across categories, such as: Systemic hazards: ● *Organizational: management, resources, documentation, procedures* ● *Human: limitations of the person(s) in the system who have the potential for causing harm, fatigue, stress* Operational hazards: ● *Analysis and design* ● *Manufacturing Quality* ● *Product operation* Environmental hazards: ● *Regulation, Standards*

N°	Good practices for hazard identification
5	When reporting a potential concern, do not mix a hazard with its foreseeable consequences. A hazard is not subject to severity or likelihood classification, but its associated safety risk is
6	Consider that, depending on their nature, categorization and identification scenario: ● Not all identified hazards must result in SMS action (i.e. safety risk analysis and risk control actions) ● Several hazards can result in combined SMS actions (see Figure A-1 and Figure A-2)
7	Consider identifying hazards incrementally from initial SMS implementation up to and including SMS fully operative
8	Consider reviewing hazards in a continuous improvement loop

Figure A-1: Hazard Identification – Example from SMICG: "Hazard Taxonomy Examples"*

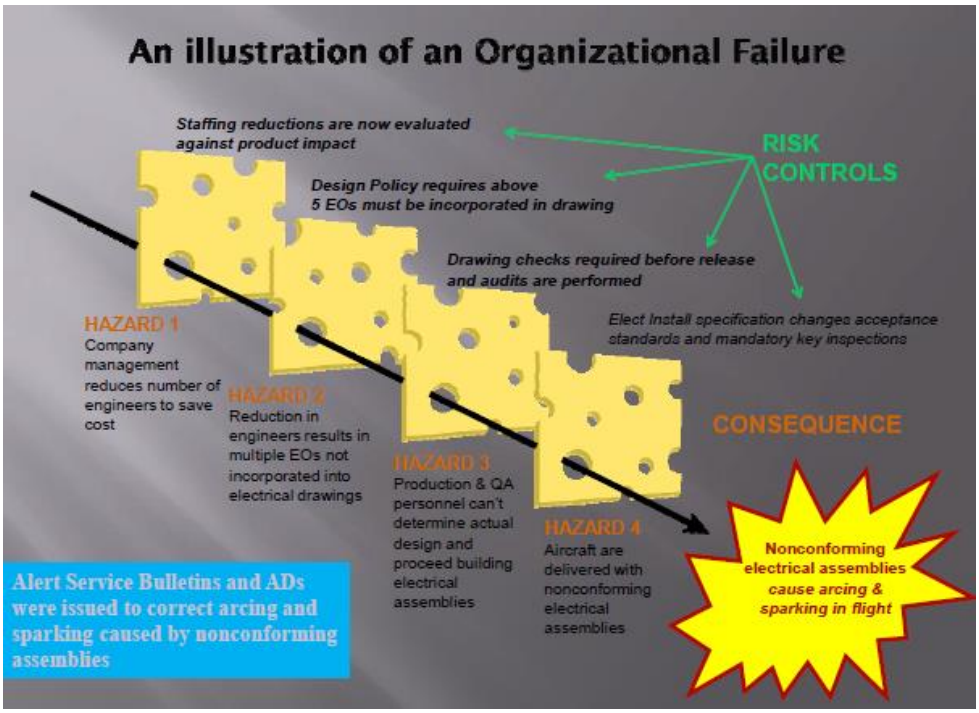


Figure A-1 shows that multiple hazards (safety issues/threats) can produce safety risk(s) with the final unwanted consequence as shown in Figure A-2.

**Note: Swiss-cheese Model: Reason, James (1990-04-12). "The Contribution of Latent Human Failures to the Breakdown of Complex Systems"*

Figure A-2: Multiple "Hazards" produce safety risk(s)

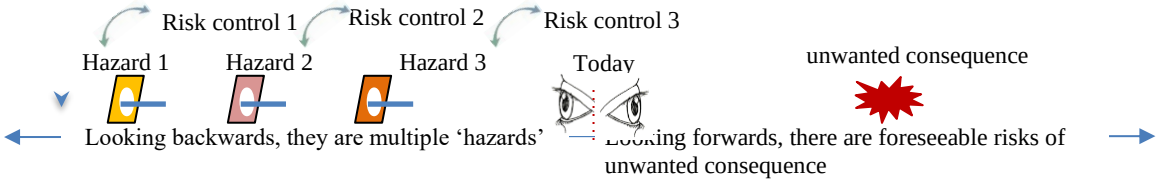


Figure A-3: Single hazard with multiple triggering factors to produce safety risk(s)

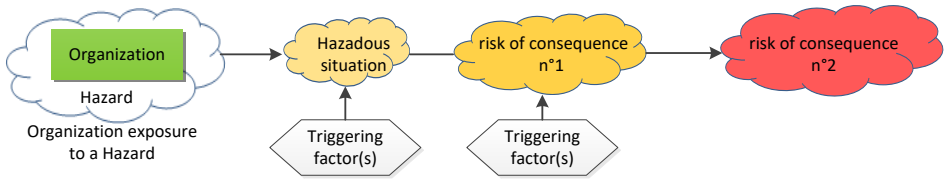


Figure A-3 shows that single hazard combining triggering factor(s) can produce unwanted consequence(s).

4. Safety Risk Assessment & Control

Challenges

In conjunction with their safety risk management processes, organizations will need data capture and analysis tools. Processes alone are not enough. Organizations need a database of hazards that have been identified, a description of the risk associated with each hazard (typically based on the juxtaposition of likelihood of occurrence and severity of consequences in the event of occurrence) and a description of the risk controls associated with the hazard, whose purpose is to reduce the hazard's risk to an acceptable level.

The database of this information is an important tool for the management of safety risk through the SMS. Such a database is often referred to as a "Hazard Log".

If the SMS does not include a "scope" when describing a hazard in the hazard log, then the hazard analysis can become very difficult, because it is unbounded.

Implementation Strategies

It is important to recognize that the SMS may be able to rely on processes that already exist in the business. Businesses implementing SMS often have robust quality systems already in place and these may provide a foundation on which the SMS may be built, including internal mechanisms for accomplishing elements of the SMS (for example, an internal mechanism that already captures hazards), and existing processes that may already mitigate hazards. Integrating the SMS with the existing quality system has been shown to be a better practice that is preferable to trying to create an entirely separate system. It may be useful to recognize that the goal of the quality management system, and the goal of the SMS, are similar; with the SMS providing a more formal mechanism for identifying

and mitigating risk. You can have a quality management system without an SMS, but you cannot have an SMS without a quality management system. One of the things that stands out about SMS is to ensure that we are getting the intended results.

Many of the SMS processes will rely on the Hazard Log, and the benefits of SMS cannot fully be realized until the Hazard Log is populated with data. Effective safety risk management and safety assurance processes rely on the data in the Hazard Log. If a process that exists in the Hazard Log is changed, the organization can use the tool to see what risks are mitigated by the process and can assess how a change to that process might affect related risks. In some cases, a desired change to a process might eliminate that process' ability to mitigate a particular risk. In such a case the process change can still be implemented, but the change mechanism (1) will need to recognize that the original hazard(s) needs a new risk control, because its old risk control has been changed, (2) will need to create a new risk control to properly mitigate the risk associated with the original hazard(s), and (3) will want to make sure that the safety assurance processes examine the new risk control to ensure it is effective.

When developing the fields for the Hazard Log, the business may want to consider including a "scope" field to assist in describing the hazard. The scope describes the system in which the hazard arises.

Initial risk assessments might examine known risks that are common to every certificate holder, and that are typically mitigated in response to government regulations.

For example, several hazards that could be faced by a production approval holder are based on receiving inappropriate or inadequate material or services from a supplier. This hazard is mitigated for production approval holders through regulations that require supplier control mechanisms (such as FAA 14 CFR 21.137(c); EASA 21.A.139(b)(1)(ii)). The written supplier control mechanisms, as well as the regulations that require them, are all risk control mechanisms that mitigate certain risks associated with supplier-sourced hazards.

As another example, one common risk faced by repair stations is that unairworthy parts enter the system and are then installed on an aircraft in a way that jeopardizes safety. Typically, this risk is mitigated through inspection/receipt regulations, and the requirement that the repair station follow those regulations. For example, EASA 145.A.42 provides requisites for receiving aircraft parts and requires the organization to have procedures related to the acceptance of these parts. AMC 145.A.70(a) suggests that these procedures should be included in the Maintenance Organization Exposition. These requirements are – themselves – risk controls that help to mitigate risks. An easy way to start populating your Hazard Log is to begin with the applicable regulations – and the procedures that implement the regulatory requirements - and to consider what hazards do they each mitigate?

Once the Hazard Log has been populated, a risk assessment matrix is used to categorize risks according to their combined likelihood and severity. The company's safety risk matrix is based on the company's safety policy and safety objectives. Therefore, the company's safety risk matrix should serve as a metric for determining "importance." The matrix may include multiple risk areas including but not limited to personnel injury; aircraft damage; collateral property damage; regulatory non-compliance and impact on the organization's reputation.

Safety risk should be identified using the most appropriate methods, techniques and/or tools as mentioned in section 6.2 of this standard.
When identified, safety risk should be analyzed to determine its severity and likelihood. Qualitative analysis and engineering judgment, with appropriate rationale, are acceptable when there is no or not enough quantitative data available.

Safety risk assessment uses the outcomes of risk analysis to determine the acceptability of risk according to defined criteria. When a safety risk is unacceptable, safety risk control action(s) should be defined and implemented. Risk introduced through substantive organizational change should be managed within the context of the impact on product safety. Technical, schedule and cost constraints should be evaluated.

Figure A-4: Safety risk analysis, assessment and control

Various safety risk assessment matrixes can be used.
A generic safety risk assessment matrix is shown in Figure A-5 with customized examples in Figure A-6, A-7 and A-8.

Figure A-5: Generic Safety risk assessment matrix

Risk probability	Risk Severity				
	5 (high)	4	3	2	1 (low)
5 (high)	Unacceptable risks area with risk control actions				
4			Risks area under monitoring for actions if necessary		
3					
2				Risks can be considered acceptable. Monitor mitigation and risk status with change management and SA	
1(low)					

Figure A-6: Safety risk assessment matrix from ICAO Doc. 9859 (SMM)
Note: For detailed understanding of this matrix, refer to ICAO Doc. 9859

Safety Risk		*Severity*				
Probability		*Catastrophic A*	*Hazardous B*	*Major C*	*Minor D*	*Negligible E*
Frequent	5	5A	5B	5C	5D	5E
Occasional	4	4A	4B	4C	4D	4E
Remote	3	3A	3B	3C	3D	3E
Improbable	2	2A	2B	2C	2D	2E
Extremely improbable	1	1A	1B	1C	1D	1E

Safety Risk Index Range	*Safety Risk Description*	*Recommended Action*
5A, 5B, 5C, 4A, 4B, 3A	INTOLERABLE	Take immediate action to mitigate the risk or stop the activity. Perform priority safety risk mitigation to ensure additional or enhanced preventative controls are in place to bring down the safety risk index to tolerable.
5D, 5E, 4C, 4D, 4E, 3B, 3C, 3D, 2A, 2B, 2C, 1A	TOLERABLE	Can be tolerated based on the safety risk mitigation. It may require management decision to accept the risk.
3E, 2D, 2E, 1B, 1C, 1D, 1E	ACCEPTABLE	Acceptable as is. No further safety risk mitigation required.

Figure A-7: Safety risk assessment matrix from AIA Standard NAS 9927
Note: For detailed understanding of this matrix, refer to NAS 9927

RISK ASSESSMENT MATRIX				
SEVERITY / PROBABILITY	Catastrophic (1)	Critical (2)	Marginal (3)	Negligible (4)
Frequent (A)	High	High	Serious	Medium
Probable (B)	High	High	Serious	Medium
Occasional (C)	High	Serious	Medium	Low
Remote (D)	Serious	Medium	Medium	Low
Improbable (E)	Medium	Medium	Medium	Low
Eliminated (F)	Eliminated			

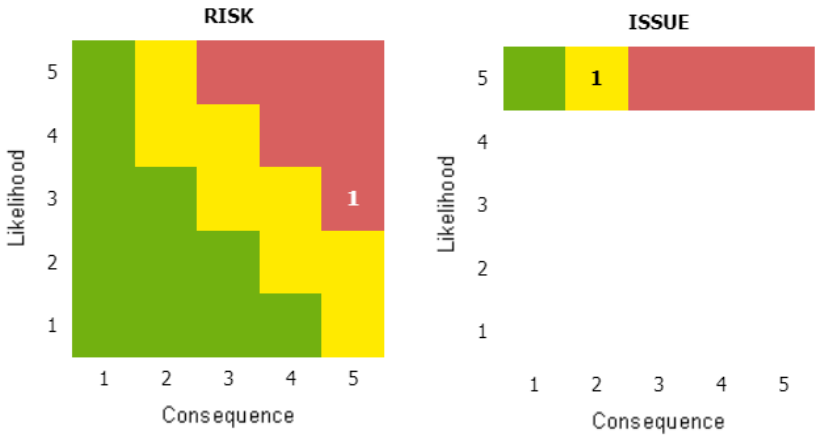
Figure A-8: Safety risk assessment matrix with acceptability information from SMICG document: "SMS for small organizations"

Note: For detailed understanding of this matrix, refer to SMICG document "SMS for small organizations"

		Likelihood		
		Unlikely (1)	Possible (2)	Likely (3)
Severity	Fatal Accident (5)	REVIEW (5)	UNACCEPTABLE (10)	UNACCEPTABLE (15)
	Serious Incident (3)	REVIEW (3)	REVIEW (6)	UNACCEPTABLE (9)
	Negligible (1)	ACCEPTABLE (1)	ACCEPTABLE (2)	REVIEW (3)

The format for a safety risk assessment matrix can be customized by each organization depending on the complexity of its activities and existing practices.

Figure A-9: Organizational risk assessment criteria industry example



Level	Likelihood	Consequences		
		Technical	Schedule	Cost
1	Not Likely (0-10%)	Minimal or no consequence to product safety or slight impact to safety margins or minimal reduction in operational performance.	Minimal or no impact on schedules, no delay in implementation of corrective actions.	Program Budget or Unit Production Cost exceed target by < 3%.
2	Low Likelihood (11-40%)	Minor impact on product safety or moderate impact to safety margins or slight reduction in operational performance with minimal or no impact on organizational objectives.	Low probability of impacting schedules, low probability of delaying corrective actions. May require some additional resources, overtime, minor redesign, process changes and/or clarifications.	Program Budget or Unit Production Cost exceeds target by 3% to 5%.
3	Likely (41-60%)	Moderate impact to product safety or significant reductions in safety margins or moderate reduction in operational performance with limited impact on program objectives.	Moderate probability of impacting schedules, moderate probability of delaying corrective actions. Will require minor redesign, additional resources, higher levels of overtime, workarounds, qualification by simulation/similarity and/or investment.	Program Budget or Unit Production Cost exceeds target by 5% to 10%.
4	Highly Likely	Significant reductions to product	Significant probability of impacting	Program Budget or

	(61-90%)	safety or unacceptable degradation in safety margins or significant reductions in operational performance with moderate impact on program objectives.	schedules, high probability of delaying corrective actions. Will require redesign, additional personnel, new approach, production change and/or qualification testing.	Unit Production Cost exceed target by 10% to 20%.
5	Near Certainty (91-100%)*	Degradation in product safety will jeopardize lives or significant impacts to operational performance will jeopardize organizational success.	High probability of impacting schedules, near certainty of delaying corrective actions. Will require extensive redesign, large increase in personnel, new technology or science, production overhaul and/or re-certification.	Program Budget or Unit Production Cost exceed target by over 20%.
Issue	Has already occurred**			

* No known workarounds are available. If no actions are taken, the risk will be realized and become an Issue.
** Issues are set at a likelihood of 5 because they have already occurred.

The format for an organizational risk assessment matrix can be customized by each organization depending on the complexity of its activities and existing practices.

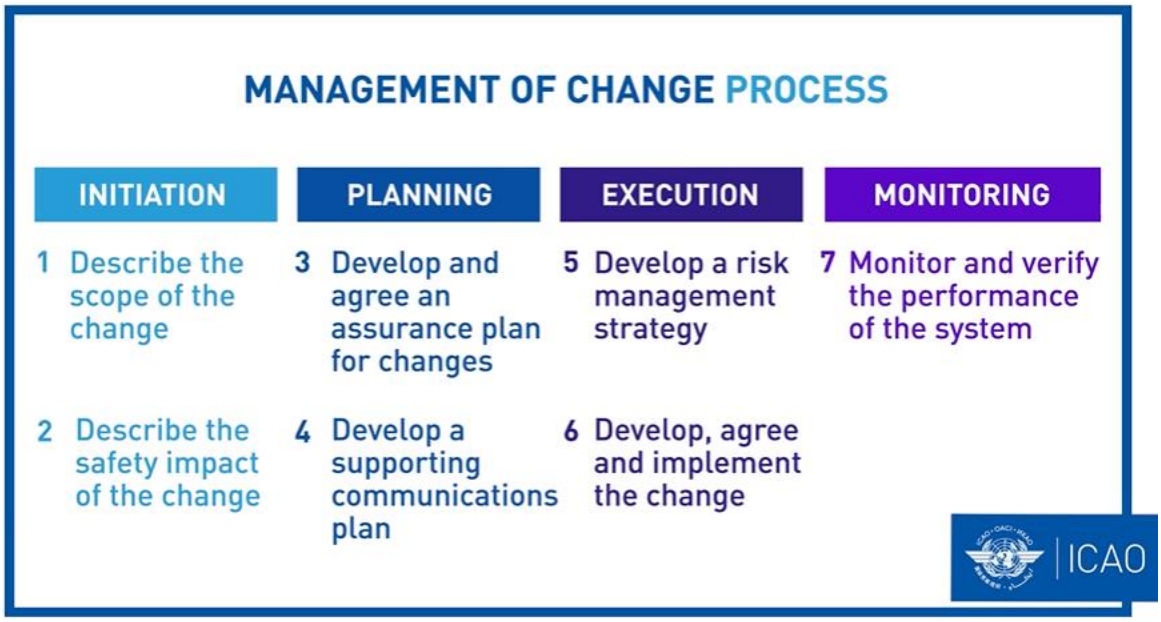
N°	**Good practices for safety risk assessment & control**
1	Risk analysis and risk assessment should only be carried out for confirmed hazards that need further SMS actions (refer to paragraph 3 in this Appendix).
2	Unacceptable risk should be subject to risk control action(s) to eliminate, reduce or mitigate the risk. Evaluate whether the risk will be acceptable with the proposed safety risk control applied, before the safety risk control is implemented. Evaluate for any substitute risks. Before corrective action(s) are implemented an assessment must be made to determine if it will introduce any new hazards or unintended consequences into the system.
3	Risk control actions should be monitored with feedback at least to the following: ● Relevant operational managers impacted by the safety risks ● Relevant safety management staff to monitor the effectiveness of risk control
4	Risk analysis in terms of severity and likelihood should be reviewed if ineffective risk control has been detected.
5	Risk assessment should be regularly reviewed to ensure that the identified risk control actions are still appropriate.
6	Risk control actions could be a combination of short-term actions and long-term actions: • The long-term safety risk control actions may not be known until or can only be determined when the short-term risk control is implemented • One intermediate safety risk control action can be useful before a more severe risk occurs

7	Safety risk acceptability criteria should be reviewed based on: • Feedback from the risk control determination • Safety performance measurement and monitoring
8	Consider that several hazards are already subject to systematic risk assessment and risk mitigation in the frame of product certification or continued airworthiness or both and may not need further SMS activities at product level, e.g.: • "Hazard" taken into account in product design assessment through failure conditions for compliance demonstration with the type-certification basis; • "Hazard" identified in existing Continued Airworthiness process with risk assessment/corrective actions (e.g. AD) at product level. Nevertheless, systemic risk assessments can be relevant (e.g., about organization, design, manufacturing or maintenance processes, tools, competencies). If other risk assessments are used, check (where applicable) that the resulting hazards, risks and severities identified by these methods are consistent with the existing levels retained during certification and resolve discrepancies.
9	Evidence and rationale for decisions on safety risk assessment (risk level) and controls (actions) should be recorded.

5. Management of Change

Management of change processes should be utilized for the changes as described in section 6 of this standard.

Figure A-9: Management of Change Process from ICAO Management of Change - Latest Videos - ICAO TV: "Leading Change Effectively"



N°	Good practices for management of change process
	INITIATION STAGE
1	Describe the scope of the change, including why the change is taking place and how it aligns with organizational goals and plans.
2	Describe the safety impact of the change to the product and services. Establish baseline safety performance and identify an initial set of indicators to measure the impact of the change. This should also consider the individuals and organizations affected.
	PLANNING STAGE
3	Develop and agree on assurance plan for change, including identifying roles and responsibilities of individuals and organizations that will be affected by the change.
4	Develop a supporting communications plan to increase awareness and acceptability of the change. This will encourage people to 'buy in' to the change.
	EXECUTION STAGE
5	Develop a risk management strategy encompassing the outcomes of previous activities and assess the safety risk against the risk tolerability levels.
6	Develop, agree and implement the changes and associated actions to mitigate safety risk.

	MONITORING STAGE
7	Monitor and verify the performance of the system during the implementation of the change and once it is complete, to determine the effectiveness of the risk management strategy and the success of the change.

6. Hazard Log: A Hazard Risk Control Tool

What does the Hazard Log look like? Organizations should expect that it will eventually get quite large, so it is better to have it in a database (or even a spreadsheet) rather than in a paper form. The database should capture information that is important to the company – so expect every company's Hazard Log to be different. The following is a list of data points that may be included:

a. Unique hazard reference number (so that the hazard can be linked to other data in a relational database, such as risk assessment and risk controls);
b. Scope (describing the boundaries of the environment in which the hazard arises);
c. Hazard description;
d. Hazard taxonomy (for classifying the hazard);
e. Potential causes of the hazard (such as safety events);
f. Qualitative assessment of the:
    - Consequences (severity);
    - Likelihood (probability);
    - Risk (a product of consequence and likelihood);
g. A quantitative assessment of the risk associated with the possible consequences of the hazard (based on the qualitative assessments of consequence/severity and likelihood/probability). Ideally, this might be calculated four times:
    - the first assessment would calculate risk if there were no risk controls at all;
    - the second assessment would calculate risk based on existing risk controls;
    - if the second calculation does not yield a desired risk level, then the third assessment might calculate risk based on proposed risk controls (expectations prior to implementation);
    - after implementation of additional risk controls, a fourth assessment would calculate risk after implementation of the proposed risk controls (to assess whether actual results met expectations);
h. Description of the risk controls for the hazard (there may be more than one, and each risk control may respond to risks posed by more than one hazard);
i. Responsibility for management of risk controls;
j. Processes for risk assurance to ensure both proper implementation and effectiveness of each risk control;
k. Record of actual incidents or events related to the hazard or its causes;
l. Risk tolerability statement (including divergences authorized by the Safety Manager);
m. Statement of formal system monitoring requirements (including safety assurance elements);
n. Indication of how the hazard was identified;
o. Hazard owner;
p. Assumptions (these are important because they can be examined when they change in order to identify whether the change in assumptions changes the risk assessment);
q. Third party stakeholders (who may want/need to be informed of both the hazard and the risk controls).

Appendix 3 – Examples of Safety Assurance

This appendix provides practical examples of how safety assurance monitors the following activities:

A. Effectiveness of SRM Risk Controls;
B. Safety Performance Monitoring of Products and Services;
C. Performance Monitoring of SMS Processes.

In addition, it also includes challenges and implementation strategies.

This standard categorizes data into two types, safety data and SMS data. Both types of data support and contribute to safety assurance functions. Generally, safety data monitors the effectiveness of SRM controls. Comparatively, SMS data monitors the effectiveness of SMS processes and promotes continuous improvement.

A. Effectiveness of SRM Risk Controls

The following examples stem from risk mitigation plans that were developed through the Safety Risk Management (SRM) process. SRM effectiveness measures verify that the defined risk mitigation plan has been implemented as intended and that risk mitigations have achieved effectiveness. Depending on the issue, the monitoring may require multiple years in order to collect enough data for validating the effectiveness of the mitigating actions.

Figures A-1 and A-2 show examples from a risk management plan that required retrofitting a configuration. The SRM process determined the required schedule to complete the retrofit so that it would reduce identified risks to an acceptable level. The SA process depends on obtaining data to monitor the effectiveness of controlling risks. The graphs show how the SA function monitors the implementation of the retrofit for compliance with the plan. In addition, the SA function tracks the occurrence rate to determine if the risk management plan achieved its anticipated benefits. As the example shows, this type of monitoring can also set expectations for how much time is required to have high confidence in the effectiveness of the configuration change. In the Figure A-2 example, it requires multiple years to have high confidence that the risk mitigation plan accomplished a reduction in the occurrence of events.

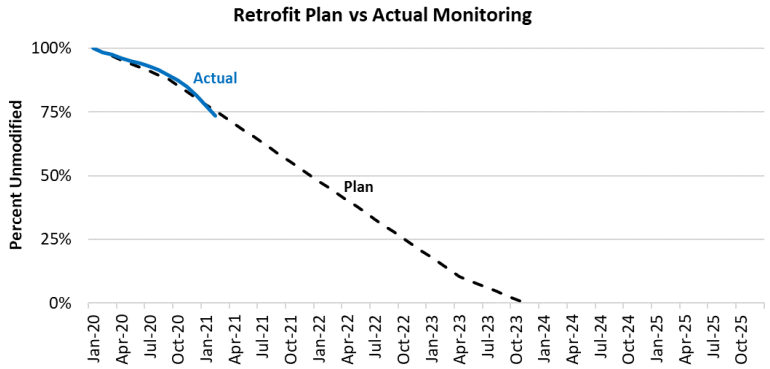


Figure A-1 Example of Monitoring for a Retrofit Plan Assumed in SRM

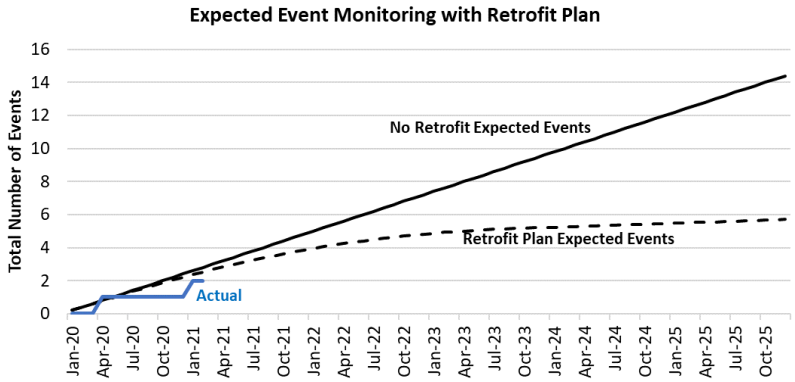


Figure A-2 Example of Monitoring for a Retrofit Plan Event Rate Benefits Assumed in SRM

Milestone tracking is another method for monitoring the implementation of a SRM risk mitigation plan. Figure A-3 shows an example of a milestone tracking matrix that could monitor SRM controls implementation for SA purposes.

Milestone	Plan Date	Actual Date	Status
Develop new inspection technique			
Verify probability of detection			
Obtain regulatory approval			
Publish instructions for continued airworthiness (ICA)			

Figure A-3 SRM Control Plan Milestone Tracking Status Example

Figure A-4 shows an approach for establishing a recurring check-in of identified SRM controls.

SRM Control	30 Day Status	60 Day Status	90 Day Status
Control Action 1			
Control Action 2			
Control Action 3			

Figure A-4 SRM Control Plan Periodic Check-In

A SRM control program usually measures performance changes before and after the implementation of corrective actions. There are many different methods to measure performance, and it depends on the control program specifics. With controls for the management of change aspect, the focus may be on performance before and after a change within different groups of an organization, as shown in Figure A-5.

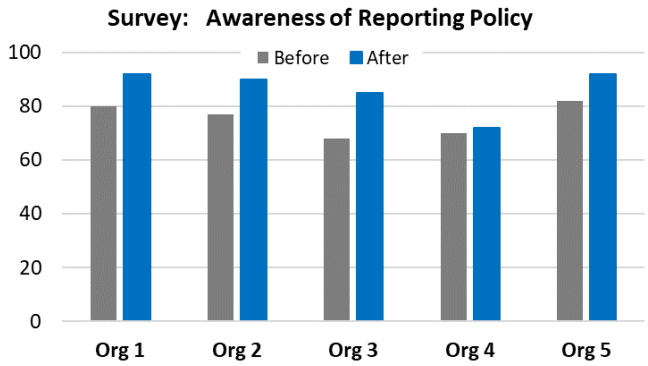


Figure A-5 Example of Measuring an Organizational Change Impact using Survey Response

B. Safety Performance Monitoring

The ultimate goal of SMS is to improve aviation safety performance. However, there are many stakeholders who contribute to the overall safety of aviation. Each one of the following play their own part in safety: aircraft manufacturers, operators, maintenance organizations, and training organizations. Only having the data that one of these single SMS's collects and processes is, by nature, partial and limiting. Therefore, to manage safety effectively, multiple measures are required, such as leading and lagging indicators.

Heinrich's Pyramid, shown in Figure B-1, demonstrates how driving performance monitoring can enable an organization to identify and act on hazards before the hazards manifest into an accident. Effective safety performance monitoring considers potential precursors (i.e., events which could potentially lead to accidents/incidents but didn't) and statistical variations that may be confounding, such as the declining rate of accidents and the reportable number of safety events being offset by a continuing increase in the number of flights.

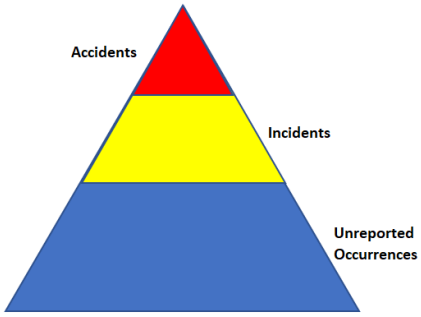


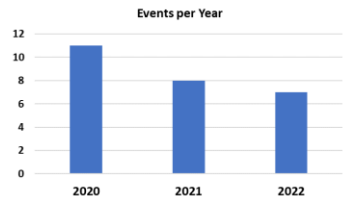
Figure B-1 Heinrich's Pyramid

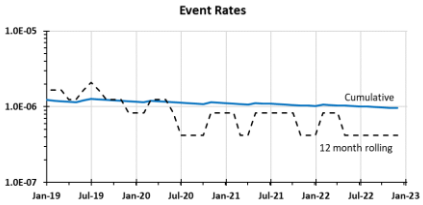
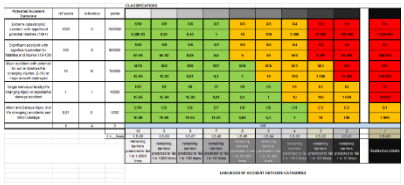
Typical SPI categories are highlighted in the following tables.

SPI Category	Description
Accidents or Incidents	This is a basic safety indicator and supports SMS's ultimate goal of avoiding accidents. This is a lagging indicator. Use caution with this SPI since the absence of incidents may not confirm the absence of unsafe acts.

Reportable Fleet Events	"Fleet Events" describe what is reported from the operation of aircraft or the products present on these aircraft, both which would be of interest to an organization. Continued Airworthiness activities for Type Certificate Holders (TCH) fall into this category. The SMS's SRM process can classify the criticality of events, which can contribute to further trend analysis.
Fleet Events (not necessarily reportable)	Number of non-reportable occurrences. Some fleet events that are not reportable as a single occurrence may indicate a potential hazard if the event increases in frequency.
Quality Non-Conformances	Escapes from an organization's quality system is a typical measure. Some non-conformances may introduce a safety hazard. Escapes involving safety critical hardware may be a leading indicator for potential hazards.
Warranty Returns	Number of warranty returns on specific items or related to items with a specific manufacturing process
Unexpected Component Sales	The number of unexpected sales for a specific component can indicate early wear/corrosion/failure. This can be a leading indicator for a potential hazard.
Engineering Investigations	The number of engineering or root cause investigations an organization performs in association with a product safety concern can be a measure that is both reactive and proactive hazard identification.
Manual Change Requests	The number of requests for clarification, correction of operating manuals, or correction of maintenance manuals. This could be a leading indicator for potential hazards.
Non-Conformances	The number of non-conformance or non-compliance occurrences can be a leading indicator. These could come from regulatory authorities or supplier sources and can be internal or external.
Root Cause Corrective Action Investigations	The number of safety-related root cause investigations throughout the organization, including engineering and factory operations. This SPI provides data for trending and evaluating types of potential hazards.

There are multiple methods to analyze the data for safety performance indicators. Some of the statistical measures an organization can use to evaluate the data include ratios, averages, rates, or trends. The following table highlights a few. Each method provides insights for SRM consideration or SMS continuous improvement.

SPI Type	Example	Remarks
Number of events in a specified period		Simple and easy to understand. Use caution when the volume of activity is not consistent for each period.

Number of events per flight (or hour)		Converting the event occurrence into a rate, such as events per flight or events per operating hours, protects against volume of activity changes affecting trends. Cumulative rates (total events/total hours) reflect full history however will lag new trends. A rolling average (for example, last 12 months events or last 12 months hours) is more sensitive to changing trends.
Events by root cause type		Reviewing events based on the root cause type can provide deeper insight into the reason for trends. This SPI also provide data to direct continuous improvement efforts.
Risk Prioritization		A technique to prioritize reported hazards using risk-based parameters such as potential fatalities and remaining barriers to prevent an accident. Example shown from European Risk Classification Scheme (ERCS). Comparable to a Risk Priority Number (RPN) used in Failure Mode Effects Analysis (FMEA).

C. Performance Monitoring of SMS Processes

SMS processes performance evaluations focus on ensuring that key safety processes are effective and that SMS initiatives, such as promotion and training, are producing positive results. The results from monitoring the SMS operational performance may show that it is necessary to adapt the SPI to the current state of the SMS. Indicators may reflect the specific environment of the organization, as it is likely that the indicators for initial implementation will change as the SMS matures.

During SMS implementation (see Section 8 SMS Implementation Plan), the indicators may be specific to measuring the progress of establishing SMS activities. Examples of such indicators are:

- Key safety personnel nominations and staffing status;
- Number of people allocated to each task or number of days to fill the vacancy of a key safety position;
- Deployment and communication of policy and objectives: Number of people (percentage) in the organization have been reached;
- Number of people (percentage) in the organization who have been trained on SMS with respect to the plan;
- Number of required documents prepared for the SMS;
- Availability and maturity of IT tools needed for SMS (e.g., computers and servers).

Generally, the implementation plan can include the quantitative and qualitative requirements in the examples above to assess progress. When monitoring the number of reported hazards, the increase in

reports over time can be a positive change that reflects employee's confidence in the SMS. In comparison, a decrease in hazard reports may not indicate an improvement in safety, but rather a lack of employee confidence in the SMS or degrading safety culture. Therefore, use caution when establishing targets for the quantity of reports, as it may not achieve high quality reports.

When the SMS reaches a certain maturity level, an organization's SMS data and safety data may provide evidence about the operations of the SMS. Examples of such additional indicators are:

SPI Examples	**Description**
Safety Culture Assessment	Often surveys or focus groups help obtain workforce feedback regarding SMS principles. Using the same or similar questions every year is important for trending.
Employee Reporting	The volume and quality of employee reports can indicate the workforce's adoption to the reporting process. An increase in reports may reflect increasing confidence in the effectiveness of the SMS.
Just Culture Reviews	The number of just culture reviews, in which events involving human decisions are reviewed for potential organizational influences as part of corrective actions.
SRM Hazard Identification	Monitoring the number of items in the risk register can serve as an indicator of activity and trends. This data can be further broken down into proactive or reactive identification.
Key Process Health Metrics	Typical process health metrics include measures of volume (quantity of tasks), quality, delivery (or timeliness), and customer satisfaction. The time to complete incident investigations or time to fully implement corrective actions are examples. This also Includes traditional quality process monitoring.
Internal Audits	The number of audits completed, the number of findings requiring corrective action, and time to complete corrective actions are examples of metrics to monitor the health of the internal audit process.
Interfaces Audits	The number of gaps/disconnects identified within procedures that link groups, departments, or suppliers.

Figure C-1 is an example of an SPI for SMS process performance monitoring. Here, the organization monitors the status of Safety Risk Management activities. The bar chart shows the volume of monthly reports, and the line graph represents metrics for developing control plans for hazards. This provides a good perspective on the over-all health of the SRM process.

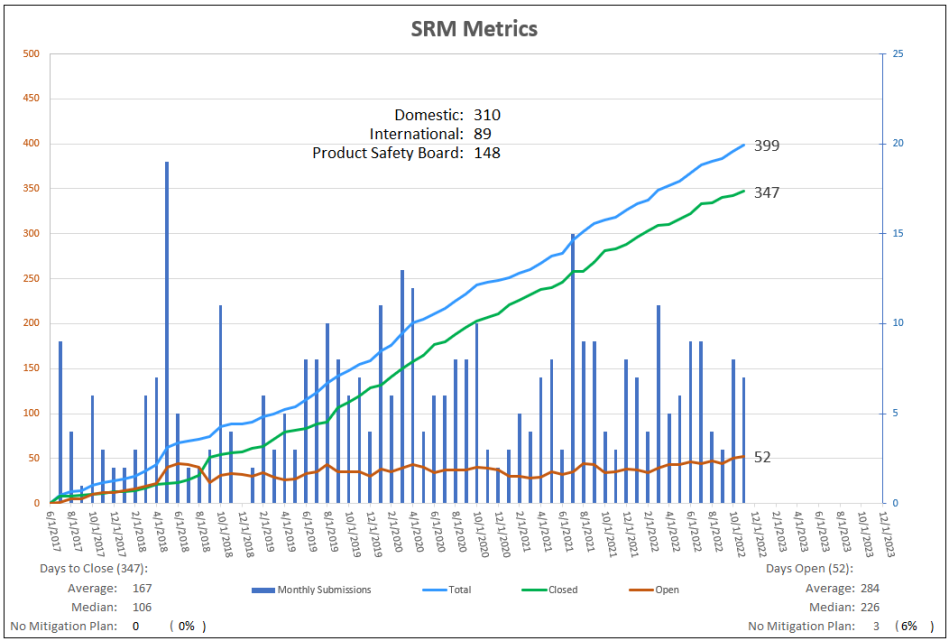


Figure C-1 Safety Risk Management Metrics Example

Figure C-2 is another example of an SPI for SMS process performance monitoring. This metric shows the trending of issues by site or organization over time.

Safety Risk Management Metrics

	Total	2017	2018	2019	2020	2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Last 12 Months
Programs	94	7	25	9	14	29	6	4	2	3	15
Domestic Engineering	4	0	0	2	2	0	0	0	0	0	0
International Engineering	5	0	4	0	1	0	0	0	0	0	0
Contracted Engineering	4	0	1	1	2	0	0	0	0	0	0
Flight Test	27	7	6	5	2	4	1	2	0	0	5
Factory 1	41	2	6	20	7	3	2	1	0	0	3
Factory 2	24	1	5	5	8	4	0	0	0	1	2
Factory 3	6	0	2	1	2	0	0	0	1	0	1
Factory 4	16	0	1	4	3	3	1	1	2	0	4
Factory 5	5	0	0	1	2	2	0	0	0	0	0
Assembly Center 1	35	1	4	2	10	5	1	4	3	1	9
Assembly Center 2	76	4	3	11	15	16	9	5	4	2	23
Domestic MRO 1	7	1	5	1	0	0	0	0	0	0	0
Domestic MRO 2	11	2	1	3	2	2	0	1	0	0	2
Domestic MRO 3	1	0	0	0	1	0	0	0	0	0	0
International MRO 1	2	0	0	1	1	0	0	0	0	0	0
International MRO 2	8	0	1	3	0	1	0	1	2	0	3
Suppliers	32	0	0	0	16	10	2	1	2	1	10
Corp. Flight	1	0	0	1	0	0	0	0	0	0	0
Total	399	25	64	70	88	79	22	20	16	8	77

Figure C-2 Safety Risk Management Metrics by Site or Organization Example

Figure C-3 provides a list that tracks how hazards are identified in the company. This also contributes to assessing the performance of the system.

SRM Sources	
Employee Hazard Reports	77
Fielded Fleet Data	50
Incidents	85
Supplier Letters of Disclosure	32
Bowtie Analysis	14
Engineering Analysis	33
Organizational/Change Mgmt	29
Non-Conformances	24
Non-Compliances	7
Maintenance Data	15
Audits	10
Component Testing	6
Component Failure Analysis	4
FAA	5
Accidents	4
Flight Test Data	3
Surveys	1

Figure C-3 Safety Risk Management Metrics by Source Example

By analyzing this data, organizations can derive information that indicates current safety performance levels as well as trends that may continuously improve safety by proactively managing risk.

When the SMS reaches a certain level of maturity, the acquired SMS data and safety data may provide evidence about the operations of the SMS. Statistical methods, such as ratios, averages, rates or trends, are useful in analyzing the data. Examples of such additional indicators are:

- A decrease in the number of events in the fleet or with the products over a reasonable period with appropriate sample size for statistical significance;
- An increase in the number of voluntary reports received in the organization. This will show adherence to SMS principles;
- Other de-identified information included in mandatory and voluntary safety reports submitted by operational personnel;
- The time or manhours required to investigate incidents or to implement mitigation actions or both. This could be split into planned and actual values of related actions;
- The number of confirmed hazards that go through SRM;
- The number of “Just Culture” reviews that assess incidents or accidents in the organization. It can also include the influence of human performances on events or findings;
- The ratio of issues that were identified by proactive or reactive methods, which measures when a hazard was identified within a particular process;
- Data recorded from aircraft systems as well as systems used in the manufacture, maintenance or delivery of aviation products or services;
- Studies or analyzes from industry associations and peer organizations;
- Compliance with regulations, industry standards, and an organization’s internal procedures.

The indicators above assess the maturity of SMS processes and could be utilized in a SMS Maturity Grid to summarize and map operational performance. The SMS Maturity Grid could then also serve as a tool to communicate the progress of SMS implementation (see Appendix 5 Example of SMS Maturity Assessment Method).

A safety performance dashboard could also serve as a communication tool to report the measured safety performance of an organization. This dashboard could contain targets, indicators, qualitative assessments, or trends for both the product safety performance and the organizations SMS operational performance. Adapt the dashboard's content and frequency of its updates to the maturity of the organization's safety culture, the safety performance results, and the complexity of the organization.

Challenges

- It is essential to protect data and information from inappropriate access and use. To a certain extent, an organization can achieve this with policies that assure the confidentiality of the individuals involved in an event as well as policies that allow employees to submit safety reports anonymously. Protection policies can also cover individuals who commit inadvertent acts of non-compliance that may be corrected through training or procedural changes. Information protection policies should include provisions to protect individuals reporting safety issues. Nonetheless, it may be difficult to protect the identity of individuals, particularly in relatively small organizations with a limited number of employees. Therefore, organizations can control the access and use of sensitive safety data and safety information to avoid compromising a Positive Safety Culture that is meant to promote the open reporting of safety issues. However, information protection policies should not restrict an organization's ability to take disciplinary action for acts of reckless behaviour and wilful misconduct.

- It can be a challenge to determine the time needed to fully assess the effectiveness of mitigating measures for events that have a low probability of occurring. An indicator may need to have a rather long observation time (e.g., rolling averages over five years), which makes it difficult for short term management of the SMS.

- Understanding the limitations of data to measure safety performance is critical to avoid inaccurate conclusions and may lead to ineffective risk controls.

- Organizations may face challenges defining SPIs that are both measurable and relevant to their overall safety objectives. SPIs that lack relevance, despite being measurable, may not have an impact on safety performance.

- Selecting the wrong SPI – such as one with little relevance to the organization's safety performance or objectives– can give the business a false sense of achievement and masks true safety risks. Personnel with responsibilities related to the safe delivery of an organization's aviation products and/or services are accountable for identifying safety risks within their scope of work. Therefore, while the Safety Manager may act as a facilitator, relevant personnel within the organization retain responsibility for the development and refinement of SPI within their area of expertise. Dashboards or other forms of media can ensure that the accountable manager and their staff are informed about the safety performance for their specific area.
- Given the need for Design, Manufacturing and Maintenance organizations to remain viable in a competitive environment, continuous improvement of a fully implemented SMS may not be readily apparent to leadership. It can be a challenge to an organization to maintain focus on continuous improvement once all SMS elements have been fully implemented. For example, organizations may not understand the necessity for additional improvements if their SMS has been accepted by an appropriate authority, and, if applicable, accredited by a recognized industry audit program.

- Identifying relevant criteria to measure continuous improvement can impact its perceived need, particularly if SPI values are well within acceptable limits. For some organizations, focusing solely on SPIs may be counter-productive, as marginal improvements in safety performance may be impossible to achieve as SPI metrics reach or trend toward target values. Also, other criteria used to measure continuous improvement may be subjective and therefore difficult to quantify. Improvements in a Positive Safety Culture and safety management processes may be relevant in such cases.
- A dynamic operating environment is the norm for many Design, Manufacturing and Maintenance organizations. Frequent change poses another challenge in measuring continuous improvement. Organizations may need to ensure that changes to operating environment have not had an adverse effect on safety, as described in Section 6.2.3 Management of Change. In this setting, focusing on continuous improvement activities may not be as straightforward as in a stable environment.

Implementation Strategy / Scalability

- Safety performance indicators must be meaningful and relevant to the organization.
- Each organization must be aware of the risks they are mitigating, and which indicators can signal if current mitigations are ineffective.
- Implementation plans can include both quantitative and qualitative measures to track progress regularly.
- The metrics a large company selects may not be useful to a smaller company. Considerations for developing leading indicators in a small organization include:
    - A large airframe company is likely to include the number of accidents as one of its metrics. In contrast, a company that specializes in producing avionics might find that the number of accidents among its installed base is a less relevant metric, especially if those accidents are unrelated to the avionics. Alternatively, user feedback about improving the human interfaces with the avionics might be a better metric and an important leading indicator to identify opportunities for safety improvement.
    - Small organizations with limited data pools may find that there are challenges to using the same measures a large organization uses, for example the measure mean time between failure (MTBF) or accidents/incidents. It could be too difficult to gather useful data due to separation between the end user and the article manufacturer. The data could also be too rare to serve as a useful measure in the small business environment. In such a case, small organization could identify leading indicators that might signal an increase in risk. This can include items like internal rejections (why are they being rejected? What is going wrong in the process?), warranty returns (what is causing the returns?), items measuring close to the edges of a tolerance band, etc. A useful measure for a large organization might give a false sense of security to a smaller organization.
- Organizations with large-scale operations may have access to vast amounts of data, making it difficult to manage and analyze information effectively. Alternatively, organizations with small operations or narrow in scope may have limited amounts of data. In such cases, the organization may find that a limited sample size could yield analysis that misrepresent safety trends.
- Organizations with sufficient resources can conduct safety performance analyzes in-house. Additionally, vendors and industry associations may offer analysis services that organizations without the necessary expertise can leverage. However, for small-scale organizations, external solutions may also provide opportunities to aggregate data with industry peers. This allows for more in-depth and consistent analysis processes than may be possible internally.

- For small businesses with limited resources, the challenges noted above may be more pronounced. Safety resources could be re-allocated to different areas of the business once all SMS elements are operating according to the SMS Maturity Assessment and Oversight model. This can often be the case if leadership does not fully support the goal of continuous improvement.

Appendix 4 – Examples of Safety Promotion

This guidance identifies possible difficulties/challenges and offers implementation strategies that can be applied given the different attributes of an organization. In the context of Safety Management, these attributes include multiple factors both internal and external to the organization, including the entity's relative size and complexity, aviation products and/or services as well as characteristics specific to its operating environment.

The two elements of Safety Promotion are ongoing activities that complement one another. While Education and Training assure that personnel have the knowledge and skills to perform their safety-related duties, the Communications element maintains awareness of the organization's safety performance and safety initiatives. For organizations having relatively large and diversified workforces, Safety Promotion activities may be tailored to individuals having specific roles. In smaller organizations, Safety Promotion may be implemented in a common manner for all personnel. In all cases, Safety Promotion should evolve with the organization, reflecting changes in the scale, scope and nature of its products and/or services.

4.1 Education and Training

Challenges

a. Organizations that have various attributes may face challenges providing relevant SMS training that is consistent with the safety-related roles and responsibilities of each individual. The difficulty of training deployment is tailoring the depth of the training according to the personnel involved in the SMS.

b. Personnel directly involved in the delivery of the organization's aviation products and/or services may require in-depth training in all SMS elements as well as policies that govern access to and use of safety data and safety information. In contrast, individuals in administrative or support roles may require training at a level that creates an awareness of SMS processes and the organization's safety objectives.

c. Organizations may also need to consider the most effective means to deliver training. Commercially available safety courses may provide training solutions that are expeditious and cost-effective. Nonetheless, online courses may lack information specific to the organization's SMS as well as its products or services and operating environment.

d. Organizations without full access to all people to computer systems may have difficulties providing access to online learning means. To accommodate such limitations, an organization may elect to deploy training in various formats such as PowerPoint or PDF files and have the training administered by local instructors or supervisors.

e. As with all training programs, there can be challenges in keeping training materials updated. It may be necessary to develop procedures to ensure that training materials are reviewed for implementation of changes in SMS policies, processes and procedures.

f. Organizations should analyze the need to deploy other training, which are complementary to the SMS training provided, considering the specific job aspects of the organization, e.g. QMS activities or Continued Airworthiness activities.

Implementation Strategies and Examples

a. The organization should first identify its relevant courses to be delivered. E.g. the focus for senior leadership is normally on policy, understanding of the need to comply with regulatory requirements, and their role in establishing an effective Positive Safety Culture as well as providing the financial and human resources required to fully implement an SMS. Personnel holding positions at the operational / technical levels require detailed training in specific procedures so that they can effectively perform any safety-related functions and participate in the SMS.

b. The need for education and training programs specifically designed for audiences at different levels within the organization is generally more acute in large organizations, while smaller entities may find that relatively fewer education and training programs are required.

c. Once the organization's education and training needs have been identified, the Safety Manager can propose the most effective means to develop and deliver the training. Organizations may choose the development of in-house education and training programs. Attributes that impact this decision may include but not be limited to the complexity of the organization, its products or services and its operating environment. Commercially available courses offered by vendors and industry associations may provide solutions that deliver training in an expeditious and cost-effective manner. Nonetheless, generic education and training courses may lack information specific to the organization's SMS. Therefore, organizations opting to utilize externally supplied courses should consider supplemental education and training modules to ensure that all personnel have the skills and knowledge required to participate in the SMS.

d. Delivery methods can also have an impact on the organization's education and training programs. In-person delivery offers the benefits of being interactive, providing opportunities for participants to ask questions in real time and for instructors to gain insights that can be leveraged to continually improve the material. Online courses have the ability to deliver material to large and geographically dispersed audiences.

e. Executives and senior leadership may benefit from training delivered in a very focused and personal manner, such as training workshops and one-on-one in-person sessions. This maximizes the use of their time and allows for dialogue on the importance of their role in implementing and enforcing the SMS.

f. There are natural interfaces with the safety communication elements. Over time, examples and lessons learned from SMS implementation should be integrated into the education and training programs. Communicating actual safety benefits can help personnel understand the importance of their participation in the SMS and how information derived from SMS processes drive continual improvements in safety performance.

g. Training programs should include initial trainings and recurrent trainings. Both should be updated to address processes and procedures that are revised or adjusted as data from the SMS is analyzed and used to improve performance.

h. Overall, training sessions, materials and specific curricula should be tailored to the targeted roles, job profiles and responsibilities within the SMS. The following example course outline should be understood as a possible but not proscribed format. Initial, specific and updated training may take any form suited to an organization's existing training systems and processes:

1. Defining Safety Management
1.1. Management's role in establishing and promoting the SMS.
1.2. Benefits associated with SMS implementation.
1.3. Defining safety accountability and responsibility throughout the organization.
1.4. Regulatory Requirements and industry standards.
1.5. Leveraging existing processes to support SMS implementation.

2. Safety Policy and Objectives
2.1. Policies required to support the Company / Organization SMS
2.2. Information Management – Regulatory requirements / implications
2.3. Document retention – Legal requirements / implications.
2.4. Company / Organization Safety Objectives.
2.5. Safety governance – Safety Review Board.

3. Safety Risk Management
3.1 Company / organization safety reporting policies – confidentiality, "non-punitive".
3.2 Weak signals and hazard identification and related risk assessment
3.3 Risk mitigation and management of change
3.4 Risk escalation processes with respect to different management levels of reporting, e.g. CEO meetings.
3.5 Feedback loop to reporters.

4. Safety Assurance
4.1. Monitoring / controlling risk and risk mitigations.
4.2. Company / organization Safety Performance Indicators.
4.3. Overview of change management.
4.4. Achieving continuous / continual improvement.
Maturity assessments
Internal and external audits
Market/customer feedback analysis

5. Safety Promotion
5.1. Overview of initial and recurrent training, to include mandatory and optional offerings
5.2. Safety Communication
Lessons learned – safety successes
Management roles
Communication resources available
FAQ
Award system in place

4.2. Safety Communication

Challenges

a. Leadership teams may underestimate the importance of communicating work being done to implement safety initiatives, including the contributions made by employees who provide safety information or otherwise support the organization's SMS. Employees rely on an effective communication campaign to be aware of progress made with respect to the development, implementation and continuous improvement of the company's or organization SMS. Effort should be made towards engagement of middle management to align with SMS policy and objectives. Communicating how the organization's activities and functions relate to the SMS is important to support a Positive Safety Culture.

b. The method of communication should take into consideration all existing communication channels of the organization. Large organizations that have facilities in multiple locations may face challenges in communicating their safety messages personally and consistently to all personnel. In contrast, organizations having limited resources may have difficulty finding the time and tools required to communicate effectively.

c. All organizations should appreciate that communication is a two-way process, and that it requires management to disseminate information to its employees as well as to receive information and feedback from the workforce. Establishing and maintaining a Positive Safety Culture that promotes the unobstructed flow of information requires management's time and commitment.

Implementation Strategies and Examples

a. The organization should develop safety communication strategies consistent with its attributes as well as the products and/or services it provides. Internal safety publications such as quarterly newsletters, see further examples below, may be effective for organizations needing to communicate with large or widely dispersed groups of employees. Safety communications may need to be adaptable to the changing operating environment, which may require heightened safety awareness. Examples of safety publications:

- Display at the entrance of the site in order to create safety awareness for people during a site visit (e.g. FOD avoidance, relevant hazard awareness);
- Immediate Safety Flash Reports;
- Regular Safety Bulletin / newsletters;
- Comic Messages distributed or posted on the wall;
- Safety Posters;
- Dedicated organizational websites for safety with further links to external information, e.g. SMICG;
- QR code for access to reporting system (app and posters) – Easy reporting.

b. Formalized venues such as “All Hands” meetings can also provide opportunities to raise awareness of safety initiatives and to disseminate information regarding recent events or overall safety performance:

- Newcomer’s onboarding sessions;
- Supervisor flow-down: Success stories, statistics, Human Factors for further use in team talks;
- Team visits / roadshows;
- Annual expectations meetings, e.g. new year greetings.

c. Effective safety communication strategies may also include informal engagements that offer employees opportunities to learn about safety-related topics on a voluntary basis. Examples include workshops, case studies and presentations from guest speakers on safety-related topics. Informal venues may also create the opportunity for external stakeholders to share information as well as to learn more about the organization’s safety programs.

d. Feedback of the communication could be collected by different methods to permit adjustment to future communication strategies:

- Correlation of communication and operation, e.g. increase in reporting;
- Surveys include before/after questionnaires, e.g. for training;
- Interviews;
- Audits;
- Online comments.

Appendix 5 – Example of SMS Maturity Assessment Method

1. Background and Purpose

This appendix provides guidance and proposes a method for the maturity assessment during initial SMS implementation and continuous improvement, as outlined in Section 8 of this document. It is intended as an example, and is one means, but not the only means to assess the maturity of an organization's SMS. Other assessment approaches include but are not limited to: SMICG tool, EASA or Local authority assessment tools.

It is intended to be used by the organizations of all sizes and maturity levels, as a self-assessment for planning, deployment and as an enhancement tool. Use of this guidance may be adopted at any level of SMS development. It is intended to be used by organizations that currently have an SMS and by organizations that do not currently have an SMS. It may be used equally by organizations that are required to have an SMS and by organizations that are not required to have an SMS but are interested in gaining the benefits of having a formal structured SMS. Aviation Authorities may also consider its use to evaluate an organization's SMS maturity.

The maturity assessment content has been developed based on the premise that an organization already has systems or processes in place to obtain basic compliance with airworthiness requirements and/or quality standards and the SMS aspects are built upon these. However, it may still be useful for organizations that currently do not have basic airworthiness and quality processes in place, to assess and plan SMS implementation.

The core text and other appendices of this standard remain the basis for assessment of SMS maturity, even when this appendix is used separately.

Note: This appendix may be handled as a separate document during an evaluation. It may, therefore, contain redundant information, already described elsewhere in the standard, which is considered useful for understanding the method and its practical application. Concepts and explanations (e.g. indicators and examples) in this appendix may use simplified descriptions for the means of compliance with SMS requirements.

This guidance is based on the SMS evaluation tool originally developed by the SMICG. With Rev. B of this standard, the original three [3] Maturity Levels used in Rev A of this standard have been increased to a five [5] level Maturity Level approach. See Figure B-1 below, for an approximate correlation between the two maturity levels approaches.

The new progression of Maturity Levels is: **Present** to **Suitable** to **Operating** to **Effective** to **Excellence**.

The "GLOBAL SMS EVALUATION GRID" has also been updated to provide a more detailed, topic by topic, assessment approach with associated criteria and indicators to help determine the overall maturity of an SMS with regard to the 4 components and 12 elements of the ICAO Annex 19 SMS Framework.

In this Revision of the maturity assessment tool, Safety Culture assessment is not addressed, and the "Evidence" column has been removed. These will be included in the next revision.

2. Definitions of Maturity Levels

During the work on Rev. B, 2 levels were added to the previous Present/Operating/Effective represented in Rev. A.

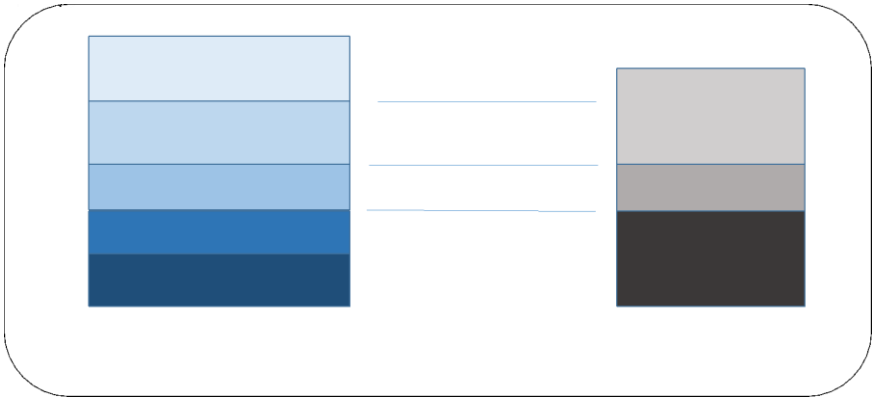
- "Suitable" level was added to take better account of the initial evolutions when setting up an SMS.
- "Excellence" level was added to recognize that organizations may achieve a high level of SMS effectiveness, remain on a continued improvement path and may contribute to safety improvements in their operating environment.

The high-level definitions of the five Maturity Levels used in this assessment tool are as follows:

1. **Present**: The SMS is documented and defined;
2. **Suitable**: Features suitable to size, nature and complexity of the organization and risks;
3. **Operating**: The systems and processes of the SMS are operating;
4. **Effective**: The SMS is working in an effective way and is striving for continuous improvement;
5. **Excellence**: The organization is an industry leader and embraces and shares its best practices with key external stakeholders.

Figure B-1 provides a means for establishing equivalence in achieved levels for those organizations that have already used the original Rev A 3-level maturity scale:

Figure B-1 SMS Maturity Level Scale Comparison



3. Structure of the Global SMS Evaluation Grid and Maturity Scale

The assessment tool consists of a table for each of the 4 SMS Components [containing the 12 SMS Elements]. The table for each SMS Component includes an evaluation grid with the 5-level maturity scale that contains:

1. High level **criteria** for each of the 5 maturity levels of the 4 SMS components [See Figure B-2]

For each SMS Element:

2. Reference to: ICAO Annex 19 Appendix 2. Framework for a Safety Management System (SMS) Criteria and paragraph references [See Figure B-3]
3. Reference to: Means of Compliance from SM-0001 International Industry Standard and paragraph references [See Figure B-3]
4. Detailed **indicators**, as appropriate, for each of the 5 maturity levels [See Figure B-3]

Figure B-2 Global SMS Evaluation Grid – [High Level] Incremental Maturity Scale

MATURITY SCALE ↓	GLOBAL SMS EVALUATION GRID - [HIGH LEVEL] INCREMENTAL MATURITY SCALE ⇔				
	Definition of Maturity levels and associated expectation for SMS Components & Elements	**Safety Policy & Objectives**	**Safety Risk Management**	**Safety Assurance**	**Safety Promotion**
5	**Excellence** The organisation is an industry leader and embraces and shares its best practices with key external stakeholders	Accountable and Senior management are fully involved in the SMS and managing safety policy and objective processes set forth by the organisation to proactively manage risk. The organisation drives continuous improvement of SMS through analytics and metrics. Employees across the organization are engaged with the policy and objectives as is evidenced in day to day operations. Key external stakeholders are clearly engaged with the SMS	The organisation is continuously identifying hazards (operational***, Technical, Human and Organisational) and is actively managing them; this is visible in safety performance. Data sources, hazard identification methods, risk analysis and risk assessment processes are continuously improved. Output from SRM is used to actively drive continuous improvement of the organisation' SMS.	The safety performance of the organization (including organizational factors) is being measured and the SPIs are being continuously monitored and analysed for trends at Accountable executive and Senior management level. Continuous improvement of the SMS is occurring and evident in performance monitoring.	SMS training programme is continuously improved and actively encouraged at Accountable and Senior management levels. Just culture and safety communication are part of day to day business
4	**Effective** The SMS is working in an effective way and is striving for continuous improvement.	Accountable and Senior management are clearly involved in the SMS and proactively managing safety policy and objective processes set forth by the organisation to proactively manage risk. Employees across the organization are engaged with the policy and objectives as is evidenced in day to day operations. Key external stakeholders have a clear understanding of their role and contribution to the SMS	The organisation identifies key hazards (operational***, Technical, Human and Organisational), both internal and external, and is actively managing them. Safety hazards and safety risks are documented and accessible as appropriate to the organsiation. There is effective interaction between SRM and SA. Safety Risk Management is proactive.	The safety performance of the organization is being measured and trends are proactively acted upon by Senior Leadership including the Accountable Executive.	SMS training is routinuously reviewed and improved to take into consideration feedback from different sources. Safety communication is assessed to determine how it is being used and understood and to improve it where appropriate.
3	**Operating** The systems and processes of the SMS are operating.	The safety policy and objectives are assessed on a regular basis for applicability and relevance to the current organisational environment. There is evidence that the organization's fully functioning processes are in use. Promotion of safety objectives and processes by accountable and senior management levels	Hazards are identified and documented based on safety data from events that have occurred or in anticipation of potential events that could lead to an unacceptable risk**. Safety risk analysis and safety risk assessments are being routinely conducted. Safety risks are being mitigated and monitored to ensure the adequacy of implemented controls.	The safety performance of the organization is being measured and the SPIs are being continuously monitored and analysed for trends at Senior management level. Internal audits occurring on key SMS processes, including relevant interfacing stakeholders.	Training is reviewed and maintained as appropriate to the organisation' SMS needs. Safety relevant information is being identified and communicated internally and externally, as appropriate.
2	**Suitable** Features suitable to size, nature and complexity of the organisation and risks	There are policies, processes, organisation' accountability and responsibilities, ready to operate with identified ressources	There is a standard safety risk management process that is applied to areas of the organization that could adversly impact product safety, as defined in the System Description. There is an anonymous and confidential* employee reporting system to capture safety concerns	There is a documented process to assess whether the appropriate risk controls are applied and effective. The KPI/SPI are defined, and the method and triggers for change management are identified.	There is a process to communicate safety relevant information and a SMS training programme in place
1	**Present** The SMS is documented and defined.	On top of compliance with airworthiness rules + Quality standards, there are policies (Safety + Just culture, description of organisation' accountability and responsibilities for SMS, processes documented that detail how the SMS will operate.	On top of compliance with airworthiness rules + Quality standards, There is a standard process that defines how reactive and proactive hazard identification is conducted, how safety risk analysis and safety risk assessments are completed, and how to determine the need for and adequacy of safety risk controls. The System Description is documented. There is a confidential employee reporting system to capture safety concerns	On top of compliance with airworthiness rules + Quality standards, The relevant organization is defined and key SMS processes for monitoring are defined, including a documented process to assess whether the appropriate risk controls are applied and effective.	On top of compliance with airworthiness rules + Quality standards, Safety critical information, and Just culture principles are communicated througout the organisation. There is a training programme for SMS defined.

Figure B-3 Example of the SMS Maturity Scale for the Safety Policy & Objectives Component

	ICAO Annex 19 text	Standard section	SM-001 Standard Means of Compliance	1. Present	2. Suitable	3. Operating	4. Effective	5. Excellence (New)	Indicators (What To Look For)
1	**SAFETY POLICY AND OBJECTIVES - COMPONENT**			On top of compliance with airworthiness rules + Quality standards, there are policies (Safety + Just&Fair), description of organisation' accountabilty and responsibilities for SMS, processes documented that detail how the SMS will operate.	There are policies, processes, organisation' accountabilty and responsibilities, ready to operate with identified ressources	The safety policy and objectives are assessed on a regular basis for applicability and relevance to the current organisational environment. There is evidence that the organization's fully functioning processes are in use. Promotion of safety objectives and processes by accountable and senior management levels	Accountable and Senior management are clearly involved in the SMS and proactively managing safety policy and objective processes set forth by the organisation to proactively manage risk. Employees across the organization are engaged with the policy and objectives as is evidenced in day to day operations. Key external stakeholders have a clear understanding of their role and contribution to the SMS	Accountable and Senior management are fully involved in the SMS and managing safety policy and objective processes set forth by the organisation to proactively manage risk. The organisation drives continuous improvement of SMS through analytics and metrics. Employees across the organization are engaged with the policy and objectives as is evidenced in day to day operations. Key external stakeholders are clearly engaged with the SMS	
1.1	**MANAGEMENT COMMITMENT - ELEMENT**								
1.1.1	The service provider shall define its safety policy in accordance with international and national requirements. The safety policy shall: e) be signed by the accountable executive of the organization g) be periodically reviewed to ensure it remains relevant and appropriate to the service provider	6.1.1.1	The safety policy is a high level document stating principles and broad objectives. It should be kept simple and to the point, with details of the organization and SMS processes and procedures being described in a separate SMS manual, or equivalent document. The safety policy could be a standalone document or integrated into existing management system documentation (e.g. a design organization handbook). Safety should be highlighted as a primary responsibility of all managers with a strong and clear commitment to fulfil relevant legal	There is a safety policy that includes a commitment to continuous improvement, observes all applicable legal requirements, standards and considers best practice signed by the Safety Accountable Manager.	The safety policy is easy to read. The content is customised to the organisation.	The safety policy is reviewed periodically to ensure it remains relevant to the organization.	The Safety Accountable Manager has a clear understanding of the system operation and is fully engaged in implementing the safety policy	All employees have a clear understanding of the safety system operation, relevant to their role, and are committed to apply the intent of the safety policy in their daily business. Key external stakeholders understand, are engaged, and are committed to share information to support the safety policy.	Talk to Safety Accountable Manager to evaluate his/her involvement in revision of safety policy. Confirm it meets applicable Regulations.

4. Using the SMS Maturity Assessment Method

This method can be used for the first time to complete the [Phase-1] Gap analysis outlined in section 8. This Gap analysis and the resulting implementation plan are the main inputs to subsequent maturity assessment(s) of the SMS.

The method can be used as is or can be customized by each organization depending on its size, structure and activities.

For each element of each SMS component, a series of criteria from ICAO Annex 19 is listed followed by the SM-0001 Standard Means of Compliance, and compliance descriptions for each of the 5 levels of maturity. Each criterion and maturity level compliance description should be reviewed to determine whether it is at the Present, Suitable, Operating, Effective or Excellence maturity level so that the overall maturity of the SMS element can be evaluated, taking into consideration the other inter-related elements. Completion of “Present” and “Suitable” levels is based upon available procedural documentation. Completion of Operating, Effective, or Excellence levels is based upon the graduated application, assessment, and improvement of documented processes to produce the desired outcomes and indicators associated with SMS performance (e.g., *“The safety policy shall be communicated, with visible endorsement, throughout the organization”).* This requirement can be declared at the operating level under the conditions that a safety Accountable Manager is nominated and briefed about SMS and safety policy is defined and promoted. These aspects are subject to other items within this assessment tool (such as §1.2 “Safety accountabilities and responsibilities, §4.2 “Safety communication”).

Once all criteria and indicators for each SMS element have been assessed, the outcomes should be recorded with regard to the overall level of maturity of each SMS element.

Each SMS element is assigned a Maturity Scale/level from 1 (Present) to 5 (Excellence). A level is considered achieved if the minimum requirements are met otherwise the element is considered level M-1. A maturity level cannot be “operating” if it is not “suitable” and sustainable. It is an incremental journey.

Reaching one maturity level for the overall SMS will require that each SMS element has reached at least the same maturity level. This removes the need for subjective assessment and averaging between different topics (e.g. if some SMS elements are rated at the “Suitable” level, some others at the “Operating” level and a few at the “Effective” level, then overall SMS maturity remains at the “suitable” level). This also provides specific directions for improvement by focusing efforts on the areas which are preventing achievement of the next Maturity level.

Based on the assessment, a plan for addressing identified gaps or areas of desired improvement can be put in place.

The assessment should be conducted by individuals that are familiar with:

- SM-0001 Standard;
- Safety Management Systems based on the ICAO SMS Framework;
- Management System evaluation principles and techniques;
- Safety Risk Management and Safety Assurance principles;
- Local, National and/or Regional Aviation Authority SMS Requirements, as appropriate.

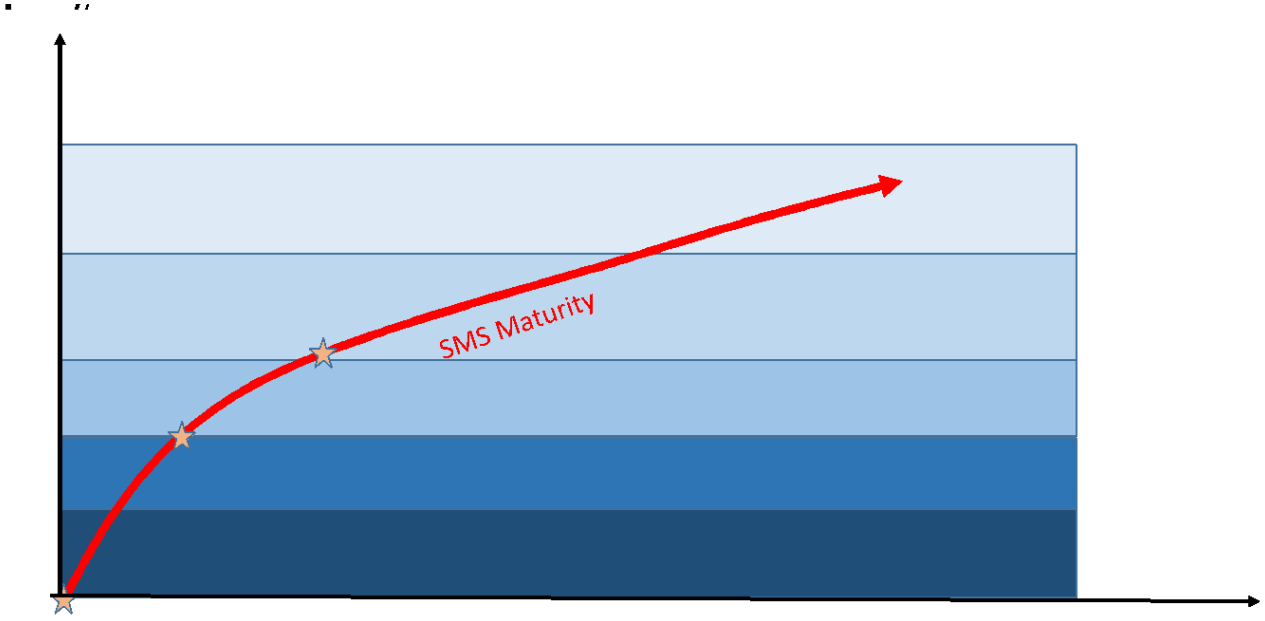
5. The SMS Journey

For most organizations, SMS implementation will take time. It can take several years to reach the "Effective" maturity level, and even longer (if ever) to reach the "Excellence" level.

Figure B-4 shows the different levels of SMS maturity and how an SMS may continuously improve in capability & performance over time.

Each organization can always strive toward excellence as part of their SMS continuous improvement. This method can support the assessment of best practices toward excellence keeping in mind that the ultimate goal of SMS is to proactively enhance safety beyond the minimum required for compliance with airworthiness rules.

Figure B-4 SMS Maturity – Capability & Performance over Time



A: Start SMS development.
B: SMS is documented and suitable.
C: SMS becomes effective, achieving the desired outcomes.

Each organization can always strive towards “Excellence” as part of their SMS continuous improvement. This method can support the assessment of best practices towards excellence, keeping in mind that the ultimate goal of SMS is to proactively enhance Safety beyond the minimum required for compliance with airworthiness rules.

Each organization should begin with an intention to implement and improve their own SMS. Then, over time, as the organization’s capacity increases, they should seek to extend the principles of SMS beyond their own organization, to their partners, suppliers and customers. Eventually, an organization may find it possible to extend the principles of SMS across their industry and into their cultural environment, thus improving the safety of society in general.

SMS Maturity Assessment Method

ATURITY SCALE	GLOBAL SMS EVALUATION GRID - [HIGH LEVEL] INCREMENTAL MATURITY SCALE				
	Definition of Maturity levels and associated expectation for SMS Components & Elements	**Safety Policy & Objectives**	**Safety Risk Management**	**Safety Assurance**	**Safety Promotion**
5	**Excellence** The organization is an industry leader and embraces and shares its best practices with key external stakeholders	Accountable and Senior management are fully involved in the SMS and managing safety policy and objective processes set forth by the organization to proactively manage risk. The organization drives continuous improvement of SMS through analytics and metrics. Employees across the organization are engaged with the policy and objectives as is evidenced in day-to-day operations. Key external stakeholders are clearly engaged with the SMS	The organization is continuously identifying hazards (operational***, Technical, Human and Organizational) and is actively managing them; this is visible in safety performance. Data sources, hazard identification methods, risk analysis and risk assessment processes are continuously improved. Output from SRM is used to actively drive continuous improvement of the organization' SMS.	The safety performance of the organization (including organizational factors) is being measured and the SPIs are being continuously monitored and analyzed for trends at Accountable executive and Senior management level. Continuous improvement of the SMS is occurring and evident in performance monitoring.	SMS training programme is continuously improved and actively encouraged at Accountable and Senior management levels. Just culture and safety communication are part of day-to-day business
4	**Effective** The SMS is working in an effective way and is striving for continuous improvement.	Accountable and Senior management are clearly involved in the SMS and proactively managing safety policy and objective processes set forth by the organization to proactively manage risk. Employees across the organization are engaged with the policy and objectives as is evidenced in day-to-day operations. Key external stakeholders have a clear understanding of their role and contribution to the SMS	The organization identifies key hazards (operational***, Technical, Human and Organizational), both internal and external, and is actively managing them. Safety hazards and safety risks are documented and accessible as appropriate to the organization. There is effective interaction between SRM and SA. Safety Risk Management is proactive.	The safety performance of the organization is being measured, and trends are proactively acted upon by Senior Management level including the Accountable Executive.	SMS training is continuously reviewed and improved to take into consideration feedback from different sources. Safety communication is assessed to determine how it is being used and understood and to improve it where appropriate.
3	**Operating** The systems and processes of the SMS are operating.	The safety policy and objectives are assessed on a regular basis for applicability and relevance to the current organizational environment. There is evidence that the organization's fully functioning processes are in use. Promotion of safety objectives and processes by accountable and senior management levels	Hazards are identified and documented based on safety data from events that have occurred or in anticipation of potential events that could lead to an **unacceptable risk**.** Safety risk analysis and safety risk assessments are being routinely conducted. Safety risks are being mitigated and monitored to ensure the adequacy of implemented controls.	The safety performance of the organization is being measured and the SPIs are being continuously monitored and analyzed for trends at Senior management level. Internal audits occurring on key SMS processes, including relevant interfacing stakeholders.	Training is reviewed and maintained as appropriate to the organization' SMS needs. Safety relevant information is being identified and communicated internally and externally, as appropriate.
2	**Suitable** Features suitable to size, nature and complexity of the organization and risks	There are policies, processes, organization' accountability and responsibilities, ready to operate with identified resources	There is a standard safety risk management process that is applied to areas of the organization that could adversely impact product safety, as defined in the organizational System Description. There is an anonymous and confidential* employee reporting system to capture safety concerns	There is a documented process to assess whether the appropriate risk controls are applied and effective. The KPI/SPI are defined, and the method and triggers for change management are identified.	There is a process to communicate safety relevant information and a SMS training programme in place

1	**Present** The SMS is documented and defined.	On top of compliance with airworthiness rules + Quality standards, there are policies (Safety + Just culture, description of organization' accountability and responsibilities for SMS, processes documented that detail how the SMS will operate.	On top of compliance with airworthiness rules + Quality standards, There is a standard process that defines how reactive and proactive hazard identification is conducted, how safety risk analysis and safety risk assessments are completed, and how to determine the need for and adequacy of safety risk controls. The organizational System Description is documented. There is a confidential employee reporting system to capture safety concerns	On top of compliance with airworthiness rules + Quality standards, The relevant organization is defined and key SMS processes for monitoring are defined, including a documented process to assess whether the appropriate risk controls are applied and effective.	On top of compliance with airworthiness rules + Quality standards, Safety critical information, and Just culture principles are communicated throughout the organization. There is a training programme for SMS defined.

* depend on scalability
** has to be consistent with tolerance level which has to be defined in the Safety Policy/objectives
*** to be defined in Definitions part (operational: beyond safety of the product only, to be completed)

1 SAFETY POLICY AND OBJECTIVES

	ICAO Annex 19 text	Standard section	1. Present	2. Suitable	3. Operating	4. Effective	5. Excellence (New)
1	**SAFETY POLICY AND OBJECTIVES COMPONENT**		On top of compliance with airworthiness rules + Quality standards, there are policies (Safety + Just & Fair), description of organization' accountability and responsibilities for SMS, processes documented that detail how the SMS will operate.	There are policies, processes, organization' accountability and responsibilities, ready to operate with identified resources	The safety policy and objectives are assessed on a regular basis for applicability and relevance to the current organizational environment. There is evidence that the organization's fully functioning processes are in use. Promotion of safety objectives and processes by accountable and senior management levels	Accountable and Senior management are clearly involved in the SMS and proactively managing safety policy and objective processes set forth by the organization to proactively manage risk. Employees across the organization are engaged with the policy and objectives as is evidenced in day-to-day operations. Key external stakeholders have a clear understanding of their role and contribution to the SMS	Accountable and Senior management are fully involved in the SMS and managing safety policy and objective processes set forth by the organization to proactively manage risk. The organization drives continuous improvement of SMS through analytics and metrics. Employees across the organization are engaged with the policy and objectives as is evidenced in day-to-day operations. Key external stakeholders are clearly engaged with the SMS
1.1	**MANAGEMENT COMMITMENT ELEMENT**						
1.1.1	The service provider shall define its safety policy in accordance with international and national requirements. The safety policy shall: e) be signed by the accountable executive of the organization g) be periodically reviewed to ensure it remains relevant and appropriate to the service provider	6.1.1.1	There is a safety policy that includes a commitment to continuous improvement, observes all applicable legal requirements, standards and considers best practice signed by the Safety Accountable Manager.	The safety policy is easy to read. The content is customized to the organization.	The safety policy is reviewed periodically to ensure it remains relevant to the organization.	The Safety Accountable Manager has a clear understanding of the system operation and is fully engaged in implementing the safety policy	All employees have a clear understanding of the safety system operation, relevant to their role, and are committed to apply the intent of the safety policy in their daily business. Key external stakeholders understand, are engaged, and are committed to share information to support the safety policy.
1.1.2	The safety policy shall: b) include a clear statement about the provision of the necessary resources for the implementation of the safety policy	6.1.1.1	The safety policy includes a statement to provide appropriate resources.	There is a process for assessing resources and addressing any shortfalls.	The organization is assessing the resources being provided to deliver a safe service and taking action to address any shortfalls.	The organization is reviewing and taking action to address any forecasted shortfalls in resources.	Provide leadership and resources to support external stakeholders and promote continuous improvement and initiatives in safety management.
1.1.3	The safety policy shall: f) be communicated, with visible endorsement, throughout the organization.	6.1.1.1	There is a means in place for the communication of the safety policy.	The safety policy is accessible and understandable to employees (e.g. consider multiple sites, languages).	The safety policy is communicated to all personnel (including relevant temporary and/or contract employees). The Accountable Executive and the senior management team are promoting their	People across the organization are familiar with the policy and can describe their broader responsibilities and contributions with respect to the safety policy.	Communication of key Safety policy principles/messages to relevant external stakeholders.

					commitment to the safety policy through active and visible participation in the safety management system.		
1.1.3	The safety policy shall: c) include safety reporting procedures	6.1.1.1	The organization's safety policy has a reference to the existence of a product safety reporting system.	The organization's safety policy indicates the importance of reporting safety concerns [without fear of retribution].	The organization's safety policy states that reporting safety concerns is a responsibility of all employees [without fear of retribution].	The organization's safety policy states that reporting of safety concerns is actively sought from key stakeholders.	Promotion of reporting and exchange / sharing of safety data.
1.1.4	a) The safety policy shall reflect organizational commitment regarding safety, including the promotion of a Positive Safety Culture.	6.1.1.1	The management commitment to safety is documented within the safety policy.	The safety policy is signed by the Accountable Executive / by the Safety Accountable Manager There is a commitment in the Safety Policy to a Just & Fair culture.	The safety policy highlights the primary responsibility for safety of all employees. The safety policy references promotion of Safety Culture and is supported by a documented process and / or a Code of Ethics / standards of behaviour.	The organizational commitment to safety addresses interactions with key external stakeholders. The safety policy and commitment statement are reviewed with the accountable executive and senior leadership on a regular basis.	The safety policy indicates that the organization will openly share safety best practices and lessons-learned with other external parties. [Regulators, industry partners and competitors etc.]
1.1.5	The safety policy shall: d) clearly indicate which types of behaviours are unacceptable related to the service provider's aviation activities and include the circumstances under which disciplinary action would not apply.	6.1.1.1	The organization's safety policy has a reference to "just & fair culture" principles/concept or "code of conduct" that identifies expected//acceptable/unacceptable behaviours.	The organization's safety policy has a clear commitment to the promotion of "just & fair culture".	[No further change to Safety Policy expected with regard to "Just & Fair" culture commitment. "Just & Fair" culture evidence to be expanded as part of Section 6.0 activities]	[No further change to Safety Policy expected with regard to "Just & Fair" culture commitment. "Just & Fair" culture evidence to be expanded as part of Section 6.0 activities]	[No further change to Safety Policy expected with regard to "Just & Fair" culture commitment. "Just & Fair" culture evidence to be expanded as part of Section 6.0 activities]
1.1.6	Taking due account of its safety policy, the service provider shall define **safety objectives.** The safety objectives shall: a) form the basis for safety performance monitoring and measurement as required by 3.1.2 b) reflect the service provider's commitment to maintain or continuously improve the overall effectiveness of the SMS c) be communicated throughout the organization d) be periodically reviewed to ensure they remain relevant and appropriate to the service provider.	6.1.1.2	Initial vision-level statement is in the safety policy. Initial strategic Safety objectives have been established and there is a means to communicate them throughout the organization.	Tactical objective / goals have been established to support the strategic objectives. Initial safety targets, metrics or trends could be identified with respect to organizational behaviours and safety culture.	Safety Objectives are communicated throughout the organization. The objectives and the associated metrics are being reviewed, at least annually, to ensure they are relevant and being measured to determine effectiveness.	Achievement of the Safety Objectives is being monitored by senior management and action taken as necessary to ensure they are being met.	The development of safety objectives includes consideration of the relevant activities of key external stakeholders.
1.2	**SAFETY ACCOUNTABILITY AND RESPONSIBILITIES ELEMENT**						

1.2.1	a) identify the accountable executive who, irrespective of other functions, is accountable on behalf of the organization, for the implementation and maintenance of an effective SMS	6.1.2	An Accountable Executive/Safety Accountable Manager has been appointed with full responsibility and ultimate accountability for the SMS.	The Accountable Executive/Safety Accountable Manager has control of the organization's SMS resources and has the authority to stop the operation if there is an unacceptable level of safety risk.	The Accountable Executive/Safety Accountable Manager ensures that the SMS is properly resourced, implemented, and maintained. The Accountable Executive/Safety Accountable Manager is fully aware of their SMS roles and responsibilities. The Accountable Executive/Safety Accountable Manager is accessible to the staff in the organization.	The Accountable Executive/Safety Accountable Manager ensures that the performance of the SMS is being monitored, reviewed, and improved.	The Accountable Executive/Safety Accountable Manager is aware of interfaces, both internal and external, that may interact with the organization's SMS.
1.2.2	b) clearly define lines of safety accountability throughout the organization, including a direct accountability for safety on the part of senior management, c) identify the responsibilities of all members of management, irrespective of other functions, as well as of employees, with respect to the safety performance of the organization d) document and communicate safety accountability, responsibilities, and authorities throughout the organization, e) define the levels of management with authority to make decisions regarding safety risk tolerability.	6.1.2	The safety accountability, authorities and responsibilities are clearly defined and documented.	Key safety roles have been identified for safety accountabilities, authorities, and responsibilities (for example, through job descriptions or organizational charts).	Individuals have been identified to fill key safety roles and are aware of and fulfil their safety responsibilities, authorities, and accountabilities. Individuals within the organization are encouraged to contribute to the SMS.	The Accountable Executive/Safety Accountable Manager and the senior management team are aware of the substantive/significant risks faced by the organization and associated risk mitigations.	Individuals in key safety roles interact with external stakeholders, where appropriate.
1.3	**APPOINTMENT OF KEY PERSONNEL ELEMENT**						
1.3.1	The service provider shall appoint a safety manager who is responsible for the implementation and maintenance of the SMS. *Note: Depending on the size of the service provider and the complexity of its aviation products or services, the responsibilities for the implementation and maintenance of the SMS may be assigned to one or more persons as their sole function or combined with other duties,*	6.1.3	Responsibilities for the implementation and maintenance of the SMS are assigned.	SMS implementation tasks and responsibilities are identified and assigned. A line of communication with senior management with regard to SMS implementation is defined.	The assigned individual /individuals have implemented and are maintaining the SMS and there is access and regular communication with the Accountable Executive and senior management and safety issues are escalated when appropriate. The assigned individual /individuals are visible to and accessible to others in the organization. Sufficient time and resources	The assigned individual /individuals are monitoring SMS performance, identifying, and implementing improvements with the support of the Accountable Manager and senior management.	The assigned individual /individuals are sharing and seeking best practices with other organizations and stakeholders to continuously improve the SMS.

	provided these do not result in any conflicts of interest.				are allocated to maintain the SMS.		
1.3.3	For complex organizations [from SMICG inputs]	6.1.3	*The SP&O team has elected not to introduce the proposed SMICG requirements for committees / governance for large or complex organization. The SM-0001 Section 6.1.2 material is deemed sufficient at this time to cover organizational governance to address SMS requirements.*	*The SP&O team has elected not to introduce the proposed SMICG requirements for committees / governance for large or complex organization. The SM-0001 Section 6.1.2 material is deemed sufficient at this time to cover organizational governance to address SMS requirements.*	*The SP&O team has elected not to introduce the proposed SMICG requirements for committees / governance for large or complex organization. The SM-0001 Section 6.1.2 material is deemed sufficient at this time to cover organizational governance to address SMS requirements.*	*The SP&O team has elected not to introduce the proposed SMICG requirements for committees / governance for large or complex organization. The SM-0001 Section 6.1.2 material is deemed sufficient at this time to cover organizational governance to address SMS requirements.*	*The SP&O team has elected not to introduce the proposed SMICG requirements for committees / governance for large or complex organization. The SM-0001 Section 6.1.2 material is deemed sufficient at this time to cover organizational governance to address SMS requirements.*
1.4	**CO-ORDINATION OF EMERGENCY RESPONSE PLANNING ELEMENT**						

1.4	The service provider required to establish and maintain an emergency response plan for accidents and incidents in aircraft operations and other aviation emergencies shall ensure that the emergency response plan is properly coordinated with the emergency response plans of those organizations it must interface with during the provision of its products and services. Note: The ERP coordination does not apply to Design, Manufacturing and Maintenance Organizations according to the Standard. To be noted that the Standard NAS9927 states that the ERP as mentioned in 14CFR Part 5 does not apply for voluntary implementation of SMS in US Design and Manufacturing organizations. If an ERP exists, following criteria can be used for its maturity assessment.	6.1.4	See SM-0001 Section 6.1.4	See SM-0001 Section 6.1.4	See SM-0001 Section 6.1.4	See SM-0001 Section 6.1.4	See SM-0001 Section 6.1.4
1.5	**SMS DOCUMENTATION ELEMENT**						
1.5.1	The service provider shall develop and maintain an SMS manual that describes its: a) safety policy and objectives b) SMS requirements c) SMS processes and procedures d) accountability, responsibilities and authorities for SMS processes and procedures Note.— Depending on the size of the service provider and the complexity of its aviation products or services, the SMS manual and SMS documentation may be in the form of stand-alone documents or may be integrated with other organizational documents (or	6.1.5 App. 3	The SMS documentation describes the organization's safety-related policy, processes, responsibilities, and SMS scope, to the extent defined.	Safety documentation is consistent with other internal management system and is part of the organization's documentation general processes. SMS documentation is adapted to the actual SMS implementation SMS documentation is readily available to all relevant personnel.	SMS documentation is representative of the actual processes in place. Changes to the SMS documentation are managed. Relevant SMS documentation is available to all personnel. Elements of SMS documentation are being promoted for use and reference to specific groups of people, as appropriate.	SMS Documentation is proactively reviewed for improvement by relevant stakeholders.	SMS documentation is enriched by the results of contacts with the SMS practices of relevant external stakeholders.

	documentation) maintained by the service provider.						
1.5.2	The service provider shall develop and maintain SMS operational records as part of its SMS documentation.	6.1.5	The SMS documentation defines the SMS outputs, and which records of SMS activities will be stored. Storage rules (nature, retention period…) and procedures are defined	Processes have been defined for records to be stored are produced in the appropriate format. Practical storage and retrieval of data is operational. Data protection and confidentiality rules have been defined (including conformity to personal data retention regulations).	Selected records from SMS activities are appropriately stored and found to be complete and consistent with appropriate data protection and control.	SMS records are routinely used as inputs for safety management related tasks and continuous improvement of the SMS.	SMS records definitions and storage rules are periodically updated based on experience. Tests are periodically performed to check retrieval of data.

2 SAFETY RISK MANAGEMENT

	ICAO Annex 19 text	Standard section	1. Present	2. Suitable	3. Operating	4. Effective	5. Excellence (New)
2	**SAFETY RISK MANAGEMENT COMPONENT**		On top of compliance with airworthiness rules + Quality standards, There is a standard process that defines how reactive and proactive hazard identification is conducted, how safety risk analysis and safety risk assessments are completed, and how to determine the need for and adequacy of safety risk controls. The organizational System Description is documented. There is a confidential employee reporting system to capture safety concerns	There is a standard safety risk management process that is applied to areas of the organization that could adversely impact product safety, as defined in the organizational System Description. There is an anonymous and confidential* employee reporting system to capture safety concerns	Hazards are identified and documented based on safety data from events that have occurred or in anticipation of potential events that could lead to an **unacceptable risk**.** Safety risk analysis and safety risk assessments are being routinely conducted. Safety risks are being mitigated and monitored to ensure the adequacy of implemented controls.	The organization identifies key hazards (operational***, Technical, Human and Organizational), both internal and external, and is actively managing them. Safety hazards and safety risks are documented and accessible as appropriate to the organization. There is effective interaction between SRM and SA. Safety Risk Management is proactive.	The organization is continuously identifying hazards (operational***, Technical, Human and Organizational) and is actively managing them; this is visible in safety performance. Data sources, hazard identification methods, risk analysis and risk assessment processes are continuously improved. Output from SRM is used to actively drive continuous improvement of the organization' SMS.
2.1	**HAZARD IDENTIFICATION ELEMENT**						

2.1.1	The service provider shall develop and maintain a process to identify hazards associated with its aviation products or services.	6.2.1	There is a process that defines how reactive and proactive hazard identification is gathered from multiple sources (internal and external). The methodology to define criteria for safety investigations is documented	Hazards are identified and documented in areas of the organization that could impact product safety, as defined in the organizational system description The criteria for safety investigations are identified and applied	The hazards are identified and documented. Internal and external factors such as Technical, Environmental, Human and Organizational related hazards are being considered, as appropriate. The criteria for safety investigations are consistently applied	The organization has processes and means that capture hazards (technical, environmental, human and organizational factors related), are maintained and reviewed to ensure they remain up-to-date. The organization is continuously and proactively identifying hazards (technical, environmental, human and organizational factors related) related to its activities and operational environment and involves all key personnel and appropriate stakeholders. Hazards are assessed in a systematic and timely manner. Personnel express confidence and trust in the organization's reporting policy and process The criteria for safety investigations are continuously updated to include internal and external sources as appropriate.	Hazard identification trend indicators are part of SMS performance monitoring, Identified hazards are assessed in a systematic and timely manner and are maintained and reviewed to ensure the mitigation strategy is accurate and current. The criteria for safety investigations are routinely updated taking into account key external stakeholder's inputs
2.1.2	Hazard identification shall be based on a combination of reactive and proactive methods.	6.2.1 App. 1-3					
2.1.3	Regulation 376/2014 and Annex 19 safety reporting procedures 1.1.1(c)	6.1.1 6.2.1	There are reporting system(s) to capture safety related issues that include a feedback system. There is a means for employees to submit confidential reports. The process identifies how reports are actioned.	The reporting system is accessible to all personnel involved in areas of the organization that could impact product safety, as defined in the organizational system description. The process identifies how reports are protected, actioned and appropriate timescales are specified.	People are aware and fulfil their responsibilities in respect of the reporting system The reporting system is being used by personnel. Reports are evaluated, processed, analyzed and stored. There is feedback to the reporter of actions taken (or not taken) and where appropriate to other relevant staff in the organization.	Personnel express confidence and trust in the organization's reporting policy and process. The reporting system is being used to influence management decisions and continuous improvement. There is a healthy reporting system based on the pertinence of reports received. Safety reports are acted on in a timely manner. There is a means to capture issues from third parties (partners, suppliers, contractors).	Actions taken in response to safety issues reported in one part of the organization are applied to other areas of the organization as appropriate. There is a mechanism to identify product safety related issues captured in other reporting systems. (i.e. - Security, Financial, Schedule, EHS, Quality, etc.). The organization proactively seeks feedback from employees and external stakeholders. (Roundtables, employee engagement, surveys, etc) to facilitate continuous improvement.
2.2	**RISK ASSESSMENT AND MITIGATION ELEMENT**						

2.2	The service provider shall develop and maintain a process that ensures analysis, assessment and control of the safety risks associated with identified hazards. Note: The process may include predictive methods of safety data analysis.	6.2.2 App. 1-4	There is a defined process for the analysis and assessment of safety risks and application of appropriate risk controls consistent with processes in place for COS / CAW. An organizational system description describing the areas of the organization that are subject to safety risk management is documented.	The level of risk the organization is willing to accept is defined in areas where product safety may be adversely impacted The risk matrix and acceptability criteria are clearly defined and usable. Responsibilities for accepting risks are clearly defined. Accountable and Senior management have visibility of medium and high-risk hazards and their mitigation and controls.	Risk analysis and assessments are carried out in a consistent manner based on the defined process. Appropriate risk controls are being applied to reduce safety risk to an acceptable level, including timelines and allocation of responsibilities. Operational, technical, human and organizational factors are considered as part of the development of risk controls. Senior management is actively involved in medium and high risk hazards and their mitigation and controls. Understanding of external inputs and outputs for SRM that should be addressed.	Appropriate risk controls are practical and sustainable, applied in a timely manner and do not create additional risks. Risk controls take into consideration both internal and external human and organizational factors. Risk acceptability criteria are used routinely and applied in management decision making processes considering ALARP* principles. Risk assessments are regularly reviewed to ensure they remain current. Risk analysis processes are reviewed for consistency and to identify improvements in the processes. Mechanism is in place to seek and implement appropriate external inputs and outputs for SRM. *Monitoring of SRM outcomes [outputs from SA] are actively being used in the SRM process*	Assessments are conducted to ensure compliance to policy / procedures and safety risk controls, performance of the SMS, and identification of hazards. Risks are consistently mitigated to ALARP. Output from SRM is used to actively drive continuous improvement of the organization's SMS. The organization utilizes a risk-based approach in organizational decision making, and is proactive and/or predictive in prevention or reduction of undesired events. There is recognition by the organization that errors are often systemic failures and that mitigation of identified risks leads to learning and continuous improvement. Process improvement, and changes to organizational strategies and systems proactively promote the prevention of undesired events.

3 SAFETY ASSURANCE

	ICAO Annex 19 text	Standard section	1. Present	2. Suitable	3. Operating	4. Effective	5. Excellence (New)
3	**SAFETY ASSURANCE COMPONENT**		On top of compliance with airworthiness rules + Quality standards (e.g. QMS), The relevant organization is defined and key SMS processes for monitoring are defined, including a documented process to assess whether the appropriate risk controls are applied and effective.	There is a documented process to assess whether the appropriate risk controls are applied and effective. Initial KPI/SPI are defined, and the method and triggers for change management are identified.	The safety performance of the organization is being measured and the SPIs are being continuously monitored and analyzed for trends at Senior management team level. Internal audits occurring on key SMS processes, including relevant interfacing stakeholders.	The safety performance of the organization is being measured, and trends are proactively acted upon by Senior management level including the Accountable Executive.	The safety performance of the organization (including organizational factors) is being measured and the SPIs are being continuously monitored and analyzed for trends at Accountable executive and Senior management level. Continuous improvement of the SMS is occurring and evident in performance monitoring.
3.1	**SAFETY PERFORMANCE MONITORING AND MEASUREMENT ELEMENT**						
3.1.1	The service provider shall develop and maintain the means to verify the safety performance of the organization and to validate the effectiveness of safety risk controls. *Note: An internal audit process is one means to assess the effectiveness of safety risk controls. Guidance on the scope of the internal audit process is contained in the* Safety Management Manual (SMM) *(Doc 9859).*	6.3.1	The organization has a documented internal audit program with a link to a management review process. There is a documented process to assess whether the appropriate risk controls are applied and effective with respect to SMS key processes. A person or group of persons with responsibilities for the monitoring function have been identified and they have direct access to the Accountable Executive.	Responsibilities and methods for internal assessment of and corrective action for key SMS processes are defined. Initial safety objectives are defined. Initial KPIs/SPIs, linked to Safety objectives, are defined, and being evaluated for appropriateness and effectiveness.	The interface between audits and the safety risk management processes is described. Appropriate Risk controls are being verified to assess whether they are applied and effective. Information from safety assurance and compliance monitoring activities feeds back into the safety risk management process; Responsibilities and timelines for determining, accepting, and following-up the corrective/preventive actions are defined. Audit results on key SMS processes are reported to the Accountable Executive and senior management.	Performance of the SRM system is assessed and actions taken to ensure the SRM process is effective. The Accountable Executive and senior management actively: - review the performance and achievement of safety goals - review the pro-active aspects of reporting and SRM processes; - seek feedback on the status of internal and external audit activities. - investigate and address all contributing factors, including systemic and organizational influences that impact the effectiveness of the SMS program. The influences and contributions of external interface organizations, including contracted organizations, are included in the safety assurance process.	There is comprehensive integration of external interface organizations, as appropriate, into organization's SRM and Safety Assurance processes. The organization' safety targets and SA process considers and provides feedback to the Authority (State) Safety Performance Programme [SSP].
3.1.2	The service provider's safety performance shall be verified in reference to the safety	6.3.1	There is a documented process in place to measure the safety	SPIs and targets are defined and linked to the identified risks, key safety processes and	SPIs are being continuously monitored and analyzed for trends.	SPIs are demonstrating the safety performance of the organization and the	Continuous improvement of the SMS is occurring and evident in SPI trends; as evidenced by

	performance indicators and safety performance targets of the SMS in support of the organization's safety objectives.		performance of the organization.	where established, an organization's safety objectives. Frequency of and responsibility for the trend monitoring of SPIs is defined. The safety performance of the organization is being measured.	The effectiveness of safety risk controls is being measured and supports actionable decisions. Frequency and responsibility for the trend monitoring of SPIs are appropriate and reliable.	effectiveness of risk controls based on reliable data. SPIs are reviewed with the Accountable Executive and regularly updated to ensure they remain relevant. Where the SPIs indicate a risk control is not effective, appropriate action is taken.	clear targets which drives/validates safety objectives and enables organization to reach an increasing level of safety performance, including the contribution of .key external interface organizations.
3.2	**THE MANAGEMENT OF CHANGE ELEMENT**						
3.2	The service provider shall develop and maintain a process to identify changes which may affect the level of safety risk associated with its aviation products or services and to identify and manage the safety risks that may arise from those changes.	6.3.2	N/A	N/A	There is a process used to assess the effectiveness of mitigations put in place to manage risks associated with substantive changes [Section 6.2.3] and fed back into the SRM process.	There is a process that proactively monitors and assesses the effectiveness of mitigations put in place to manage risks associated with substantive changes [6.2.3], that includes Senior Management level and the Accountable Executive.	Risk mitigation actions resulting from management of substantive change assessments are evident and consistent with positive performance monitoring trends.
3.3	**CONTINUOUS IMPROVEMENT OF THE SMS ELEMENT**						
3.3	The service provider shall monitor and assess its SMS processes to maintain or continuously improve the overall effectiveness of the SMS.	6.3.3 App. 2	There is a documented process to monitor and review the effectiveness of the SMS implementation using the available data and information.	The system is producing SMS data that is being periodically reviewed by the safety management organization to improve SMS implementation.	The SMS is being periodically reviewed by the senior management team to support the assessment of its effectiveness and that appropriate actions are being taken. The organization is using SMS and safety data to develop and assess effectiveness of performance metrics [SPIs] to enhance product safety and continuous improvement of SMS processes.	The SMS is being regularly reviewed by the senior management team including the Accountable Executive. The assessment of SMS effectiveness uses multiple internal sources of information including safety data analysis that supports decisions for measurable improvements. The contribution of SMS and safety data from key external interface organizations is taken into consideration.	There is a proactive exchange and analysis of SMS and safety data, and safety initiatives between internal and external stakeholders that contributes to continuous improvement of product safety. A robust and comprehensive set of SMS and safety data is developed [SMS Database] that supports the use of predictive data analysis. The organization shares best practices and lessons learned as a global leader in SMS.
3.3	The service provider shall monitor and assess its SMS processes to maintain or continuously improve the overall effectiveness of the SMS.	6.3.3 App. 2					

4 SAFETY PROMOTION

	ICAO Annex 19 text	Standard section	1. Present	2. Suitable	3. Operating	4. Effective	5. Excellence (New)
	SAFETY PROMOTION COMPONENT		On top of compliance with airworthiness rules + Quality standards, Safety critical information, and Just culture principles are communicated throughout the organization. There is a training program for SMS defined.	There is a process to communicate safety relevant information and a SMS training program in place	Training is reviewed and maintained as appropriate to the organization' SMS needs. Safety relevant information is being identified and communicated internally and externally, as appropriate.	SMS training is routinely reviewed and improved to take into consideration feedback from different sources. Safety communication is assessed to determine how it is being used and understood and to improve it where appropriate.	SMS training program is continuously improved and actively encouraged at Accountable and Senior management levels. Just culture and safety communication are part of day-to-day business
4.1	**TRAINING AND EDUCATION ELEMENT**		There is a training program for SMS defined that includes initial and recurrent training. 'A competency framework* is defined for relevant personnel, including trainers. * Definition CF	The training covers individual safety duties (including roles, responsibilities, and accountabilities) and how the organization's SMS operates. Training material and methodology are adapted to the audience All staff requiring training are identified. There is a process in place to periodically assess the competency of **relevant** personnel against the framework.	The SMS training program is delivering appropriate training to the different staff in the organization and is being delivered by competent personnel. There is evidence of the training being delivered. Training material and methodology include human factors.	SMS Training is evaluated for all aspects (learning objectives, content, delivery methods and styles, assessments) and is linked to the competency assessment. Training is routinely reviewed to take into consideration feedback from different sources. Competence management plan takes appropriate action when necessary and feeds into the training program.	SMS training program is continuously improved and actively encouraged at Accountable and Senior management levels.
4.1.2 to 4.1.5	The scope of the safety training programme shall be appropriate to each individual's involvement in the SMS.	6.4.1					
4.2	**SAFETY COMMUNICATION ELEMENT**						

4.2 to 4.2.1	The service provider shall develop and maintain a formal means for safety communication that: a) ensures personnel are aware of the SMS to a degree commensurate with their positions; b) conveys safety- critical information; c) explains why particular safety actions are taken; and d) explains why safety procedures are introduced or changed. *See also EU 376/2014 (Article 13(3))*	6.4.2	There is a process to communicate safety critical information and just culture principles.	There is a process to determine what safety information needs to be communicated to all relevant personnel. The means of communication are adapted to the audience and the significance of what is being communicated.	Safety relevant information is being identified and communicated internally and externally, as appropriate.	The organization analyzes and communicates safety information effectively internally and externally, through a variety of methods as appropriate to maximize it is being understood. Safety communication is assessed to determine how it is being used and understood and to improve it where appropriate.	Just culture and safety communication are part of day-to-day business and actively promoted at Accountable and Senior management levels.

Appendix 6 – Examples of Interfaces Management

The purpose of this Appendix is to provide examples of possible interfaces at different levels of development. Levels of development would be based on factors such as the risk assumed by each organization and the existing relationship between those organizations. In most cases, different and less comprehensive measures will be appropriate. A substantially simplified approach may be commensurate with the attributes of an organization's products or services, and the complexity of its existing relationships. The following cases are examples only and must not be considered as minimum compliance. The list of activities offered here is for consideration and inspiration and could be tailored to meet specific requirements on a case-by-case basis. Further examples may be considered and added in future revisions of the Standard.

6.1 Incremental Implementation of SMS interfaces

6.1.1 Introduction

Some organizations may decide to set up specific SMS interfaces to enhance collective outcomes. The safety risk posed by each interface should ideally be collaboratively assessed after collection and review of the various perspectives that support the most accurate perception of safety risks and their acceptability.

This acceptability may vary between the various interfacing organizations according to:

- Their knowledge of the operations of the ultimate product or services (e.g. supplier of raw materials);
- Their Quality culture (e.g. EN9100 or AS9100 certification);
- Their Safety culture;
- Their involvement in investigation of previous accidents or major incidents;
- Their own implementation of SMS and associated maturity;
- Applicable SSP;
- Etc.

In the context of certification and continued airworthiness activities, which are subject to regulatory requirements (e.g. Part 21, EU 376/2014), exchanges of typical data and information are governed by contractual requirements. They are the foundations of SMS interfaces that may be called "hard interfaces". This means that they are governed by mandatory requirements to commit, with a contract between both parties and applicable regulations.

To complement this "hard interface", some organizations may decide to set up "soft SMS interfaces" to encourage the following:

- Sharing of safety risks and associated proactive discussions about various perspectives between interfacing organizations. This will enhance mutual awareness of safety risks rather than ignorance or potentially one-sided risk management;
- Monitoring of relevant SPIs to encourage mutual awareness of safety risks and their impact on the safety of operations of the product or service (e.g. adverse trends of quality defects may be perceived as minor for one organization whereas they may be proactively assessed as not acceptable by the other organization);
- Collaborative improvement of the safety interface;

- Identification and/or nomination of key focal points (e.g. relevant SMS managers for both organizations) to share SMS discussions in both organizations;
- Speaking up and reporting to the "parent" organization through a "Just culture" channel that should be agreed between organizations (refer to the example of a Safety charter below);
- Sharing of lessons learnt and best practices for product/service safety related incidents;
- Benchmarking for safety governance or promotion activities;
- Co-development of safety promotion materials to develop a common language and understanding for a safety and risk management approach.

These various initiatives aim to reinforce a global and mutual understanding of safe operations of the final product or service, and the effectiveness of safety in both organizations.

This "soft SMS interface" enables organizations to strengthen their safety culture by implementing such a collaborative approach in specific areas. This will enhance safety initiatives in both organizations.

In addition, participation in safety information-sharing initiatives may provide insights regarding systemic issues as well as best practices that would otherwise not have been apparent to organizations individually.

6.1.2 An example of incremental implementation of SMS interfaces

In the following example of an approved organization labelled Organization A interfacing with the Supplier, Organization S, and the Customer, Organization C.

1) Before implementation of the SMS interface, Organization A would define and document the scope of its own SMS organization.
The purpose of this first step is to clarify internal interfaces in Organization A encompassed in the SMS approach, and the expected interactions and information sharing already in place (e.g. between the Quality Management System and the SMS).

By the end of this first step, Organization A should already have implemented the "hard interface" with Organization S to comply with Part 21 or Part 145 requirements, to ensure compliance with quality standards, and to participate in safety investigations as expected by Organization A.

This first step may be consistent with the first Maturity level called "Present" in the SMS Maturity Assessment tool in Appendix 5.

2) The second step for Organization A is to identify key suppliers for the safe operations of its products (or services).

The suppliers are key stakeholders to continuously enhance safety. At this stage, it is important to identify suppliers who may have a direct impact on the intrinsic safety of the products/services through:

- Their contribution to the Design or Manufacturing phase, and/or;
- Their contribution to the continued airworthiness of the ultimate products/services.

In this example it is assumed that Organization S is highly involved in the ultimate safety of Organization A's products.

At this stage, Organization A and Organization S could perform a mutual safety analysis to identify areas of improvement at the interface between A and S. This would:

- Optimize the response of A and S to in-service investigations, and therefore improve Continued Airworthiness legal duties (e.g., better prioritization of the events to be mitigated when A and S face a peak of potential safety events);
- Benefit from such optimization, when needed, to improve safety knowledge of the Supplier and associated reporting, in particular, regarding ultimate operations of the product;
- Improve the sharing of lessons learned between A and S (e.g., by sharing safety risks or hazards which are relevant for S) for prevention purposes;
- Push for more and more proactive safety risk management by better understanding the Safety objectives of A and associated expectations regarding the ultimate safe operations of the product.

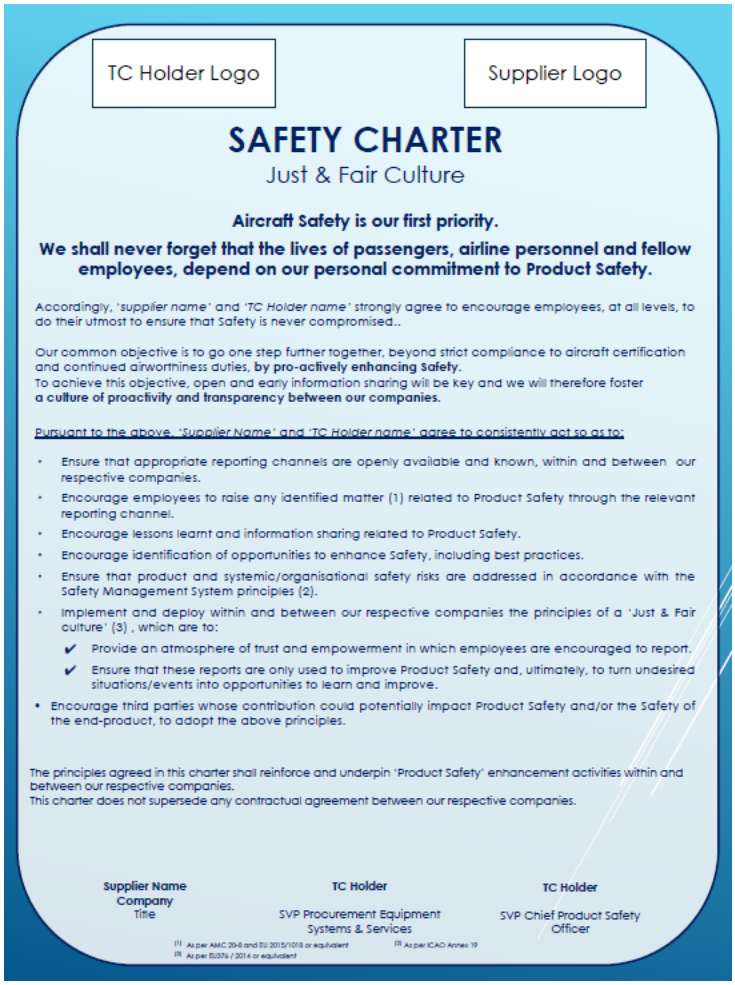
This second step of identifying key Suppliers is consistent with the second Maturity level “Suitable” in the SMS Maturity Assessment tool in Appendix 5.

3) The third step for Organization A is to set up and operate SMS interfaces for specific safety initiatives (e.g., Safety promotion, information sharing about identified risks, initiatives to encourage safety culture).
These initiatives allow both organizations to jointly assess and define the most relevant areas of improvement.
The following are examples of interactions agreed between both organizations A and S (not an exhaustive list):

- Nomination of respective representatives to communicate SMS topics (e.g., SMS managers could be nominated as focal points for the organization);
- Workshops to perform common and collaborative value stream mapping of the process of data exchange to investigate continued airworthiness and safety events;
- Agreed protocol between both organizations to encourage voluntary reporting reinforce speak-up and respective reporting (see example in Figure 1);
- Sharing of key and relevant safety hazards for each organization (e.g., safety hazards linked to the COVID-19 crisis which Organization A identified may be proactively shared with Organization S when relevant and applicable to them);
- Forums to disseminate best practices and safety awareness between both organizations;
- Joint development of safety awareness or safety culture key messages (for example, by common development of a safety charter to ease speak-up between both organizations);
- Initial reviews to agree on reporting criteria that may be relevant to perform a more proactive in safety risk management that goes beyond compliance with continued airworthiness requirements. This is in order to continuously enhance the safety of products and services, as outlined in the safety policy of Organization A.

This third step of operations at “soft SMS interface” level with key suppliers is consistent with the third Maturity level “Operational” in the SMS Maturity Assessment tool in Appendix 5.

Figure 1 Example of Safety Charter between two Organizations



TC Holder Logo

Supplier Logo

SAFETY CHARTER

Just & Fair Culture

Aircraft Safety is our first priority.

We shall never forget that the lives of passengers, airline personnel and fellow employees, depend on our personal commitment to Product Safety.

Accordingly, '*supplier name*' and '*TC Holder name*' strongly agree to encourage employees, at all levels, to do their utmost to ensure that Safety is never compromised..

Our common objective is to go one step further together, beyond strict compliance to aircraft certification and continued airworthiness duties, **by pro-actively enhancing Safety**.
To achieve this objective, open and early information sharing will be key and we will therefore foster **a culture of proactivity and transparency between our companies**.

Pursuant to the above, '*Supplier Name*' and '*TC Holder name*' agree to consistently act so as to:

- Ensure that appropriate reporting channels are openly available and known, within and between our respective companies.
- Encourage employees to raise any identified matter (1) related to Product Safety through the relevant reporting channel.
- Encourage lessons learnt and information sharing related to Product Safety.
- Encourage identification of opportunities to enhance Safety, including best practices.
- Ensure that product and systemic/organisational safety risks are addressed in accordance with the Safety Management System principles (2).
- Implement and deploy within and between our respective companies the principles of a 'Just & Fair culture' (3) , which are to:
  - ✔ Provide an atmosphere of trust and empowerment in which employees are encouraged to report.
  - ✔ Ensure that these reports are only used to improve Product Safety and, ultimately, to turn undesired situations/events into opportunities to learn and improve.
- Encourage third parties whose contribution could potentially impact Product Safety and/or the Safety of the end-product, to adopt the above principles.

The principles agreed in this charter shall reinforce and underpin 'Product Safety' enhancement activities within and between our respective companies.
This charter does not supersede any contractual agreement between our respective companies.

Supplier Name
Company
Title

TC Holder
SVP Procurement Equipment Systems & Services

TC Holder
SVP Chief Product Safety Officer

(1) As per AMC 20-8 and EU 2015/1018 or equivalent
(2) As per EU376 / 2014 or equivalent
(3) As per ICAO Annex 19

4) The fourth step for Organization A is to operate SMS interfaces through recurrent initiatives (e.g., Safety promotion, information sharing about identified risks, initiatives to encourage safety culture)

At this stage, Organization A and Organization S would regularly perform the following actions (this is not an exhaustive list):

- Operate the various initiatives jointly agreed in step 3;
- Continuously improve those initiatives to target safety enhancement (e.g., by regularly updating the agreed protocol for data exchange);
- Consider relevant key safety risk management and assurance outcomes from Organization A to continually prioritize targets for product or service safety;
- Take into account relevant key safety risk management and assurance outcomes from Organization S, if an SMS is in place;
- Take into account new identified safety hazards when relevant.

At this stage, Organization A and Organization S are operating and still improving their information and data exchange to proactively enhance product or service safety.

This fourth step of continuous improvement at "soft SMS interface" level with key suppliers would be consistent with the fourth Maturity level called "Effective" in the SMS Maturity Assessment tool in Appendix 5.
5) The fifth step for Organization A is to operate SMS interfaces as collaboratively agreed through recurrent initiatives with Organization S, but also integrating Organization C, the customer, and O, the National Aviation Authority.
At this stage, the "soft SMS interfaces", of Organization A and Organization S would be operating effectively and exchanging relevant safety information and data resulting from collaborative initiatives with customers or National Aviation Authorities as a cross fertilization task.

For example (this is not an exhaustive list):

- Proactively sharing safety risks identified by both organizations with C and O organizations (e.g., COVID-19 safety risks identified and shared with Suppliers or National Aviation Authorities);
- Proactively identifying new or emerging safety hazards for safe operations of the product experienced by C. This may be communicated to Organization S and/or O organizations when relevant, in order to update associated safety plans or SSP.

At this stage, Organization A and Organization S are operating and still improving their information and data exchange to proactively enhance product or service safety. However, this initiative is now integrated in an end-to-end approach from suppliers up to the customer operations of the product (or services) and finally the oversight National Aviation Authority.

This should be in both ways, to shorten the link between S-A-C-0 organizations and increase safety performance.

The key enablers for such an end-to-end approach may be, for example:

- Positive Safety Culture in A, S, and C organizations;
- Trust and empowerment of each organization to assess, manage, and share relevant safety risks;
- Regional data sharing.

This fifth step at "soft SMS interface" level with key suppliers would be consistent with the fifth Maturity level called "Excellence" in the SMS Maturity Assessment tool in Appendix 5.

6.2 An example of relationships between Organizations with SMS at the "Operational" level

6.2.1 Introduction

As previously stated, the interfaces shall respect the complexity of the organizations and significance of the existing relationship types. Especially in the initial phases of the SMS introduction, the usual and basic case will be represented by the relationships between "simple" SMS structures. This section assumes that both Organization A and Organization S have accomplished steps 1 and 2 of paragraph 8.1 and already operate at maturity level 3 (Re. level 3 of Safety Maturity Assessment Grid).

The purpose of this section is to give examples of a possible structure of data exchange with reference to the four components of the SMS.

For this kind of collaboration, specific interface guidance should be agreed to and shared between the two organizations, and it would be good practice to include these obligations in a contractual framework to clearly establish both parties' duties and expectations.

The goal of this collaboration should be a continuous improvement of the safety culture in the two organizations to enhance the maturity of the respective SMSs fostering system development.

6.2.2 Policy and Objectives

The parties would:

- Share their own safety policies and objectives to facilitate a better understanding of SMS approaches and basic principles. Those data are exchanged for information only to foster safety awareness and safety commitment between both organizations;
- Organize initial and recurrent meetings between safety managers and specialists to monitor the evolution of the SMS maturity and develop common good practices and improvements;
- Share any change in their organizations own policy and objectives in a timely manner;
- Etc.

6.2.3 Safety Management: Organization

The parties should:

- Commonly define interface procedures to manage the relationships and the contractual obligations;
- Assure that the principles, philosophies and organization structure of their reciprocal SMS are understood and known to the other company;
- Assure that the reciprocal focal points for any safety related units are clearly identified and communicated to the other company;
- Etc.

The Safety Managers are expected to be responsible and possibly the primary interfaces, for ensuring safety communications occur as needed between the two organizations.

6.2.4 Safety Management: Voluntary Occurrence Reporting (VOR)

- A common format for the transfer of voluntary reporting should be agreed upon and an open communication channel established;
- Communications would be managed by both organizations with their respective SMS internal processes;
- Feedback by the receiving company to the originator of the voluntary reporting would be compulsory;
- Mitigating and corrective actions would be discussed and agreed upon between the parties;
- Etc.

6.2.5 Risk Management

- A common risk management methodology would be highly desirable as a standard language to avoid any possible misinterpretation. In any case each party shall assure that its own SRM matrix will be updated with the commonly identified hazards to ensure that risks, consequences, priorities and mitigating actions are properly recorded and archived;
- This information would be periodically exchanged to ensure that a common understanding of the identified risks is shared;
- Agreement on reporting criteria may be relevant in creating a proactive approach to safety risk management that goes beyond compliance with continued airworthiness duties to continuously enhance the effectiveness of the respective SMSs, pursuant to the targeted products and services safety;

- A mutual evaluation of risks generated by “management of change” would be inside the scope of each SMS;
- Etc.

6.2.6 Safety Assurance (SA)

- The parties would establish a set of agreed SPIs to evaluate the efficacy and efficiency of their safety interface relationships and processes;
- The sharing of safety assurance tools and processes would be highly desirable to use as a common language and avoid any possible misinterpretation;
- The parties would arrange dedicated and periodic meetings in order to analyze SPI trends and performances;
- The two organizations would evaluate and implement reciprocal corrective actions to manage and improve any unsatisfactory trends that are identified;
- These specific tasks would be a reciprocal part of the contractual framework and thus mandatory requirements;
- The parties would share pertinent results of the periodic Safety Audits performed by the relevant authority;
- A good practice would be to dedicate specific “safety slots” in the agenda of periodic leadership meetings between the organizations;
- Etc.

6.2.7 Promotion

- Given the SMS maturity level of the two companies, a continuous improvement approach is required to achieve a higher level of efficiency. Common training courses, for all personnel involved in the safety organizations, conducted by an independent third-party service provider, could be developed and promoted with the goal of growing the collective safety culture;
- As for the above, common web based initial and recurrent training courses, for all personnel, would be made available to promote and foster a common safety culture.
- A reciprocal reference and direct link to each organizations’ safety websites would be mutually promoted to jointly develop safety awareness and safety culture key messages;
- A good practice is to organize periodic sessions of “Lessons Learned” and “What If? Analysis” for all personnel involved in the safety organization and safety related units of the interfacing companies;
- Etc.

6.3 An example of relationships between Organizations, where one has not implemented SMS

6.3.1 Introduction

A mature SMS Organization A may interface with Organization S, which is not subject to the obligation to establish a SMS. It therefore becomes the task of Organization A as lead SMS to define which aspects of the relationship can impact its own or their mutual safety processes.
For these identified organizations specific and dedicated interface guidance should be established by the lead, to communicate the requirements and expectations of the lead organization’s SMS obligations (Policy).
For this reason, and encompassing the four components of SMS, the lead organization should communicate good practices, requirements, explanatory material, etc., to organizations without an SMS. A good practice is to include these obligations in a contractual framework to clearly establish both parties’ duties and expectations.

6.3.2 Policy and Objectives

The lead organization should:

- Transfer its policy and objectives to the organizations without an SMS;
- Organize meetings/events to explain the concepts and link them to the good practices and benefits of SMS;
- Inform the organizations without an SMS of any change in its own policy and objectives in a timely manner;
- Etc.

6.3.3 Safety Management: Organization

The lead organization should:

- Communicate/Provide/Exchange the Safety Management Manual to the organization without an SMS;
- Assure that the principles, philosophies and organizational structure of its SMS are understood and known to the organizations without an SMS;
- Assure that focal points and entry points for safety related reporting are clearly identified and communicated to the organizations without an SMS.

A Safety Officer belonging to the organizations without an SMS could be identified to interface with the lead organization SMS. The lead organization may provide initial and recurring training of these specialists.

6.3.4 Safety Management: Voluntary Occurrence Reporting (VOR)

- The lead organization should transfer its own model/tool of voluntary reporting to the organization without an SMS establishing an open communication channel;
- These communications can be managed by the lead organization in the same way as its SMS internal data with the same priorities and process;
- Feedback would be given by the lead organization to the originator of the voluntary reporting;
- Etc.

6.3.5 Risk Management

- The lead organization, according to its internal processes, will establish critical organizations without an SMS for which a risk in its SRM library could be assigned.
- This information will be documented and shared with the organization without an SMS to ensure they understand the content;
- The lead organization will share risk management tools and processes with the organization without an SMS in order to use as a common language and avoid any possible misinterpretation;
- The lead organization and the organization without an SMS will proceed with a joint and shared evaluation of the hazards and risks created by their shared collaboration;
- The lead organization and the organization without an SMS will then evaluate and implement reciprocal actions to mitigate the identified hazards and risks. The results of these evaluations would be incorporated within the SRM library of the lead organization, communicated to the organization without an SMS and periodically reviewed;
- Etc.

6.3.6 Safety Assurance (SA)

- The lead organization, according to its internal processes, will establish the SPIs to manage the interfaces with the organization without an SMS;

- This information will be documented and shared with the organization without an SMS to ensure they understand the content;
- The lead organization will share safety assurance tools and processes with the organization without an SMS in order to use a common language and avoid any possible misinterpretation;
- The lead organization and the organization without an SMS will proceed with a joint and shared evaluation of common SPI in order to monitor the performance of their relationship;
- The lead organization will share tools and processes to the organization without an SMS in order to keep SPI continuously updated;
- The parties will arrange dedicated and periodical meetings in order to analyze SPI trends and performances;
- The lead organization and the organization without an SMS will then evaluate and implement reciprocal corrective actions to manage and improve any unsatisfactory identified trends;
- These specific tasks should be implemented by the lead organization in the contractual framework so that it will become a mandatory requirement;
- The lead organization will perform periodic Safety Audits within the organization without an SMS in order to verify and assess that safety objectives are regularly met;
- It would be good practice for the parties to dedicate specific “safety slots” in the agenda of periodical leadership meetings;
- Etc.

6.3.7 Promotion

- The lead organization may arrange initial and periodical training courses for all personnel involved in the safety organization of the organization without an SMS (i.e. nominated Safety Officers);
- The lead organization may permit access for all personnel involved in the safety organization of the organization without an SMS to its own safety explanatory material/documentation, including websites if applicable;
- The lead organization would provide access to the on-line initial and periodical training courses for all personnel of the organization without an SMS assuring that these local personnel are specifically involved in the safety organization and can act as “promoters” of these initiatives;
- A good practice is for the lead organization to organize periodic sessions of “Lessons Learned” and “What If? Analysis” for all personnel involved in the safety organization of the organization without an SMS;
- Etc.

Appendix 7 – Examples of Positive Safety Culture Enablers / Disablers

This Appendix provides examples of what a Positive Safety Culture looks like.

Working to foster as many of the enabling behaviours as possible will create an improved infrastructure that can help to improve the safety culture within your organizations, as discussed in section 5.0.

Exhibiting the behaviours in this appendix will help to ensure that the systems, tools, processes, attitudes, training, and other elements are present that can help foster the culture that will lead to improved safety outcomes.

The following table outlines examples of the enabling behaviours and barriers for various elements of a positive safety culture. The examples reflect behaviours both in an organization's system (s) and individually (i). Awareness of barriers, which are potential resistance to implementing new culture norms, can be used in establishing improvement initiatives.

Note: The terms "leaders" and "managers' are both used within the following table. Some organizations may define these differently, however, in this table they are used interchangeably.

Element	*General Description*	*Enabling Behaviours System (s) and Individual (i)*	*Barriers System (s) & Individual (i)*
1. Leadership Behaviours			
a.	A robust Safety Management System, including its foundational element of a Positive Safety Culture is possible only with a deep commitment on the part of those who are entrusted with the responsibility to lead their organizations. Top-level leaders, as well as leaders and managers throughout the organization, must ensure their leadership on safety, and safety culture, is visible in a number of ways, including by motivating employees to have a	(i) Leaders demonstrate a commitment to enabling a Positive Safety Culture through over-arching policy statements, procedural documents, systems, tools, training, working conditions, and consistent, visible modelling of Positive Safety Culture behaviours. (i) Leaders are able to listen to their teams, to accept mistakes as an opportunity to learn from it, and act appropriately by leading by example	(s) Competing organizational goals can prevent leaders from maintaining a sustained focus on safety and the need to nurture the culture. (s) Institutional momentum often makes change difficult, particularly when costs of training, tooling, etc. are part of the decision-making. (i) Leaders may not fully embrace a concept that can't be readily measured or that won't have an immediate impact on their business goals and objectives.

Element	*General Description*	*Enabling Behaviours* *System (s) and Individual (i)*	*Barriers* *System (s) & Individual (i)*
b.	positive attitude toward safety.	(s) All divisions within the organization have an executive safety champion with responsibilities that include promoting a Positive Safety Culture across the organization.	(i) Individuals with the appropriate level of influence might not be selected for these roles, which could lead to their safety culture messaging not being heard by the organization's leaders.
c.		(i) All new employees receive onboarding competency-based training about the importance of a Positive Safety Culture to the success of the Safety Management System and the organization as a whole. (s) Competency-based training is based on proven, adult-learning best practices to ensure its effectiveness.	(s) Training costs can be a significant burden to an organization, particularly when coupled with necessary assessments of the effectiveness of the training. (i) Some employees may be resistant to training on what may be perceived as not directly relevant to their job role.
d.		(i) All employees receive recurrent competency-based training about the importance of a Positive Safety Culture and behaviours expected of all employees to foster that culture. (s) Competency-based training is based on proven, adult-learning best practices to ensure its effectiveness.	(s) Training costs can be a significant burden to an organization, particularly when coupled with necessary assessments of the effectiveness of the training. (i) Some employees may be resistant to training on what may be perceived as not directly relevant to their job role.
e.		(i) Employees across the organization are engaged with the SMS as evidenced in day-to-day operations.	(s) Determining key performance indicators to assess engagement by employees can be difficult.

Element	*General Description*	*Enabling Behaviours System (s) and Individual (i)*	*Barriers System (s) & Individual (i)*
f.		(i) Leaders share safety-related information and data with employees.	(s) There may be a cultural reluctance to share potentially sensitive information broadly throughout the organization. (s) There may be no system in place to aggregate data to make it presentable and easily understood by employees.
g.		(i) Leaders and managers demonstrate the courage to stop operations to address high-risk issues.	(s) More immediate pressures, such as cost, schedule, stakeholder impact, or others (e.g. individual objectives versus the company interests) may play an outsized role in determining the actions of the organization's leaders.
2. Reporting Culture Behaviours			
a.	A reporting culture exists to support the organization in its goal to mitigate or eliminate safety risks by allowing individual employees to report the hazards they see. When hazards, or potential hazards are known to the organization, the SMS team can analyze those hazards to determine if they pose any safety risks.	(s) The organization maintains a system that allows employees to quickly and easily report the hazards and potential hazards they see in their daily work lives.	(i) There will be a natural reluctance by employees to report issues that involve teammates or others. (s) A lack of psychological safety within some teams could lead team members to keep important information to themselves due to a fear of retaliation.
b.		(s) The organization maintains a staff of appropriate size to manage the volume of employee reporting in a timely manner, including any investigations and actions.	(s) The necessary budget to maintain the appropriate staff size may be a challenge for some organizations. (s) It may be difficult to determine the number of the necessary staff.

Element	*General Description*	*Enabling Behaviours* *System (s) and Individual (i)*	*Barriers* *System (s) & Individual (i)*
c.		(s) Policies and procedures exist to sustain and manage the employee reporting system, including tracking of action items to closure and monitoring of closing actions to ensure their effectiveness.	(s) The approval process for policies and procedures may be challenging to complete in a timely manner, particularly when various different parts of the organization are involved. (s) Determining an effective procedural scheme that involves multiple groups within the organization can be challenging.
d.		(i) All employees receive competency-based training on how to use the reporting system and to foster understanding of the importance of a Reporting Culture within an effective Safety Management System?	(s) Training costs can be a significant burden to an organization, particularly when coupled with necessary assessments of the effectiveness of the training. (i) Some employees may be resistant to training on what may be perceived as not directly relevant to their job role.
e.		(i) All levels of management understand the importance of employee reporting and actively encourage and support it.	(i) Some may believe that an increased rate of reporting is a negative. Some may believe it is embarrassing to the organization or to individual leaders. These can cause a decreased focus on the importance of employee reporting.

Element	*General Description*	*Enabling Behaviours* *System (s) and Individual (i)*	*Barriers* *System (s) & Individual (i)*
f.		(i) All employees know that they can report hazards and potential hazards without fear of retribution.	(s) An organizational or cultural history of a more punitive type of environment may prevent employees from feeling comfortable reporting issues. (i) Individuals may not feel psychologically safe to report hazards or other concerns.
g.		(i) Employees demonstrate a willingness to report on the hazards and potential hazards they see.	(i) Individuals may not feel psychologically safe to report hazards or other concerns. (s) Business systems may not exist that can collect and track the data necessary to determine changes in the rates of employee reporting.
3. Just Culture Behaviours			

Element	*General Description*	*Enabling Behaviours System (s) and Individual (i)*	*Barriers System (s) & Individual (i)*
a.	In a Just Culture, the organization understands that employees are human beings, and that humans make errors and mistakes. It also knows that the overall system often contributes to employees not behaving as expected. In a Just Culture, learning from issues and events is usually more beneficial than punishment. However, in a Just Culture, there is a clear line between acceptable and unacceptable behaviour, and employees understand where that line is.	(i) Senior leaders demonstrate a commitment to fostering a Just Culture through various messaging to the organization and by modelling Just Culture behaviours. They have the courage to address the potential issues and to escalate them, if needed	(s) In some organizational or national cultures, punishment may play a larger role in the relationship between employees and their employers. (i) Blame is a natural human trait. For some leaders, the transition to a more just and fair culture may be very difficult. (i) Blaming individuals is often easier than resolving systemic issues. When the system is "blamed," that may be seen by some as an insult to the organization. (i) Leaders may not know how to model these behaviours, depending on cultural or organizational norms. (e.g. safety issues perceived as shop floor issues only).
b.		(i) Managers at all levels of the organization have received competency-based training on the importance of fostering a Just Culture.	(s) Training costs can be a significant burden to an organization, particularly when coupled with necessary assessments of the effectiveness of the training. (i) Just Culture training may be counter to a manager's cultural norms or expectations.
c.		(i) Managers/leaders at all levels of the organization exhibit behaviours that help enable a Just Culture to thrive.	(i) Managers/leaders may not know how to reshape their behaviours, depending on their background, experiences, etc.

Element	*General Description*	*Enabling Behaviours* *System (s) and Individual (i)*	*Barriers* *System (s) & Individual (i)*
d.		(s) The organization has published policies and procedures to operationalize the behaviours that will enable a Just Culture to flourish.	(s) Transitioning from a punitive culture to a more just and fair culture requires significant planning and buy-in from groups and leaders across the entire organization.
e.		(i) All employees understand the distinction between acceptable and unacceptable behaviours, and they know where the line is drawn between the two.	(s) It may be challenging to define the middle ground between an error on one end and sabotage on the other end. Intentional deviations from established policies and procedures may be more difficult to define and agree upon.
f.		(i) Managers understand that it is often the system that fails the employee, and that to learn from our issues may mean finding and resolving the root causes of systemic issues.	(i) There will be a natural tendency for managers and others to follow the easiest path, usually to the unfair blame of an individual in cases where the system itself is more at fault.
g.		(i) All employees have received competency-based training to foster awareness and understanding of the importance of a Just Culture to the Safety Management System and to the organization as a whole.	(s) Training costs can be a significant burden to an organization, particularly when coupled with necessary assessments of the effectiveness of the training. (i) Some employees may be resistant to training on what may be perceived as not directly relevant to their job role.
4. Informed Culture behaviours			

Element	*General Description*	*Enabling Behaviours System (s) and Individual (i)*	*Barriers System (s) & Individual (i)*
a.	Leaders in an informed culture help employees reframe their thinking about what hazards can look like and where they may come from. Key messages regarding complacency risks should be conveyed by the top executives	(i) Leaders at all levels demonstrate a commitment to helping employees identify hazards by publishing and discussing triggers for possible hazards (revised processes, location moves, new regulations, etc.).	(i) The greater the number of triggers that are identified, the more hazards that will have to be evaluated for their potential risks. This may lead leaders to minimize the number of identified triggers, which could cause some hazards to go unreported. (s) Organizations can be resistant to exposing possible defects in their systems. It may be embarrassing, and it takes work to correct them when they are discovered.
b.		(i) All employees have been trained to be aware of the types of hazards that may be present within their work areas and what to do when they become aware of them.	(s) Training costs can be a significant burden to an organization, particularly when coupled with necessary assessments of the effectiveness of the training. (i) Some employees may be resistant to training on what may be perceived as not directly relevant to their job role.
c.		(i) All employees have been trained to understand the importance of an Informed Culture to the success of an effective Safety Management System and their roles within that system.	(s) Training costs can be a significant burden to an organization, particularly when coupled with necessary assessments of the effectiveness of the training. (i) Some employees may be resistant to training on what may be perceived as not directly relevant to their job role.

Element	*General Description*	*Enabling Behaviours System (s) and Individual (i)*	*Barriers System (s) & Individual (i)*
d.		(i) Leaders welcome information about product safety hazards.	(i) Maintaining a focus on safety is challenging, especially as the time since the last incident increases. This may result in a decrease of messaging from leaders about the importance of identifying hazards.
5. Learning Culture Behaviours			
a.	The Safety Management System will produce information that enables leaders to make meaning of the data, thus enabling decision-making that can help improve safety.	(i) All employees receive competency-based training to understand the importance of a Learning Culture to the success of an effective Safety Management System and their roles within that system.	(s) Training costs can be a significant burden to an organization, particularly when coupled with necessary assessments of the effectiveness of the training. (i) Some employees may be resistant to training on what may be perceived as not directly relevant to their job role.
b.		(i) All employees understand that learning from safety data and information may require changing how they perform their work in order to improve safety outcomes.	(i) There will frequently be a resistance to change of any kind. While people generally may understand that change is necessary, it is often difficult to get people to change their behaviours.
c.		(s) Systems, tools, and other resources are readily available to all employees where they can learn more about Positive Safety Culture and its role in a successful Safety Management System	(s) Developing these resources can be a significant cost burden to an organization.
d.		(i) Leaders within the organization are able to draw conclusions from the safety data available to them and then make decisions on how to change the system to improve safety outcomes.	(i) When data suggests a course of action that is difficult or costly, there will be a tendency to look for cheaper or easier solutions, and these alternatives may not actually resolve the issue.

Element	*General Description*	*Enabling Behaviours* *System (s) and Individual (i)*	*Barriers* *System (s) & Individual (i)*
e.		(s) The organization demonstrates a willingness, competence, and curiosity to draw appropriate conclusions from its safety data.	(s) Drawing appropriate conclusions may drive changes to systems or behaviours that can be difficult to understand or embrace.
6. Flexible Culture behaviours			
a.	Adapting to new hazards or the changing environment is a hallmark of a Positive Safety Culture.	(i) Employees have been trained to understand the importance of a Flexible Culture to the success of an effective Safety Management System (i) Leaders are trained to steer change/transformation	(s) Training costs can be a significant burden to an organization, particularly when coupled with necessary assessments of the effectiveness of the training. (i) Some employees may be resistant to training on what may be perceived as not directly relevant to their job role.
b.		(s) The organization demonstrates a capability to adapt its systems, tools, and command media based on information reported by employees on the risks and hazards in the organization	(s) An organization's resources such as tools, systems, training, processes, etc. can be difficult to revise, either individually or when many or all of them are affected by a proposed change effort. The costs and efforts to revise them can be high. (i) Leadership may be hesitant to make safety-related decisions in a high-tempo environment.
7. Recognition Behaviours			
a.	Recognition is an important component of any change effort. Those individuals and teams that demonstrate the willingness to adopt new behaviours in the interest of safety	(i) When employees report the hazards they see, [regardless of any risks those hazards may or may not pose], the Leaders use the existing employee recognition systems to praise them.	(s) Anonymous reporting systems will not allow the identification, and therefore recognition, of employees who report issues. Confidential reporting systems may also present identification challenges.

Element	*General Description*	*Enabling Behaviours System (s) and Individual (i)*	*Barriers System (s) & Individual (i)*
b.	should be praised for their efforts and be held up as examples to the rest of the organization.	(i) Managers who create a psychologically safe environment for their people, as evidenced by their group's reporting of hazards, are recognized publicly by leadership. (s) Trust and transparency are encouraged and recognised.	(s) Operating rhythms may overcome the practice of recognizing managers before it can become a part of the culture. (s) The reporting system may not provide the necessary level of detail to recognize managers at the team level.
c.		(i) Managers whose teams have low rates of hazard reporting are identified and coached on how to improve psychological safety on their teams and how to message the importance of hazard reporting.	(s) The reporting system may not provide the necessary level of detail to identify the managers of teams and groups with low reporting rates. (s) There may not be tools and resources available to coach managers on how to improve psychological safety within their teams.
d.		(i) Employees recognize and encourage each other when their teammates report issues and hazards in their work areas.	(s) Until a medium to high level of trust is built, there may be a reluctance to self-identify as a person who submitted a report due to low psychological safety within the team.

Appendix 8 – Compliance with Authorities' SMS regulation

FAA

Although section 6 of this standard provides a means of compliance with ICAO Annex 19 (second Edition) Appendix 2, to use it for mandatory compliance of design and manufacturing organizations and voluntary compliance of maintenance organizations with 14 CFR part 5, the following specific requirements must be met:

1. For Design and Manufacturing organizations which are required by Part 5 to develop and maintain an organizational system description, it must include a summary of the following information about the safety of the aviation products or services provided by the organization (5.17):
   a) The aviation-related processes, procedures, and activities;
   b) The function and purpose of the aviation products or services;
   c) The operating environment;
   d) The personnel, equipment, and facilities necessary for operation.

2. Analyze the systems when applying safety risk management per § 5.51. & 5.53. In conducting the system analysis, the following information must be considered:
   1) Function and purpose of the system;
   2) The system's operating environment;
   3) An outline of the system's processes and procedures;
   4) The personnel, equipment, and facilities necessary for operation of the system;
   5) The interfaces of the system.

3. Provide notice of an identified hazard to any interfacing organization that, to the best of the organization's knowledge, could address the hazard or mitigate the risk (5.57). Interfacing organizations are those that contribute to the safety of the certificate or Letter of Authorization holder's aviation-related products and services.

4. Manage the SMS records as per part 5.97 (SMS documentation and Recordkeeping):
   a) Maintain records of outputs of safety risk management processes. Such records must be retained for as long as the control remains relevant to the operation;
   b) Maintain records of outputs of safety assurance processes. Such records must be retained for a minimum of 5 years;
   c) Maintain a record of all training provided under § 5.91 for each individual. Such records must be retained for as long as the individual is employed by the person;
   d) Retain records of all communications provided under § 5.93 for a minimum of 24 consecutive calendar months.

5. Implement Safety performance monitoring and measurement process as per 14 CFR part 5.71 (Safety performance monitoring and measurement) & 5.73 (safety performance assessment).

6. For an organization that holds both a TC and a PC, provide the FAA Administrator with a summary of confidential employee reports (related to product safety) every six months (5.71c).

7. The safety policy needs to call out a code of ethics that is applicable to all employees, including management personnel and officers, which clarifies that safety is the organization's highest priority.

EASA

Although section 6 of this standard provides a means of compliance with ICAO Annex 19 (second Edition) Appendix 2, to use it for mandatory compliance of design and manufacturing and maintenance organizations, the following specific requirement(s) must be met:

EU regulation No 376/2014, Article 6
"Collection and storage of information
1. Each organisation established in a Member State shall designate one or more persons to handle independently the collection, evaluation, processing, analysis and storage of details of occurrences reported pursuant to Articles 4 and 5.
The handling of the reports shall be done with a view to preventing the use of information for purposes other than safety, and shall appropriately safeguard the confidentiality of the identity of the reporter and of the persons mentioned in occurrence reports, with a view to promoting a 'just culture"

The minimum initial competencies for the key safety personnel (as mentioned in section 6.1.3) should be as follows:
- Relevant knowledge of Human Factors (HF), the EU management system, the organisation's Safety Policy and SMS documentation, as well as applicable regulations;
- A good knowledge and understanding of the organization's processes, activities and interfaces that need to be assessed for hazard identification and safety risk assessment
- Practical experience and expertise in the application of aviation safety standards and safe operating practices;
- Adequate language proficiency and communication skills.

Appendix 9 – Correlation between ICAO Annex 19 app. 2, FAA 14 CFR part 5, EASA Part 21, EASA Part 145 and SM-0001 and link to IAQG 9100:2016 & IAQG 9110:2016

The following table shows the correlation between ICAO Annex 19 App. 2, the present SMS Standard, FAA 14 CFR part 5, EASA Part 21 and Part 145.

A full Safety Management System (SMS) as defined in ICAO (International Civil Aviation Organization) Annex 19 Appendix 2 is not required by QMS (Quality Management System) Standards IAQG 9100-series (1), but the introduction of Product Safety in these QMS standards contributes to the SMS approach.

Within these IAQG 9100-series, the scope of Product Safety requirements is limited to the most appropriate areas of the standards so as to be applicable to all stakeholders. Requirements remain high level to allow bridging existing regulatory requirements from Aviation Authorities.

IAQG Supply Chain Management Handbook (SCMH ref. 7.22) provides some guidance allows leveraging an existing QMS for supporting SMS related activities (refer to https://scmh.iaqg.org website).

(1) Note:
IAQG 9100 - Quality Management Systems - Requirements for Aviation, Space and Defence Organizations
IAQG 9110 - Quality Management Systems - Requirements for Aviation Maintenance Organizations

ICAO Annex 19 app.2	SM-0001 Standard	FAA 14 CFR part 5	EASA Part 21	EASA Part 145		
1. Safety policy and objectives 1.1 Management commitment 1.2 Safety accountability and responsibilities 1.3 Appointment of key safety personnel 1.4 Coordination of emergency response planning 1.5 SMS documentation	6. UNDERSTANDING & MEANS OF COMPLIANCE WITH SMS REQUIREMENTS 6.1 Safety Policy and Objectives 6.1.1 Management commitment 6.1.2 Safety Accountability and Responsibilities 6.1.3 Appointment of Key Safety Personnel 6.1.4 Coordination of Emergency Response Planning 6.1.5 SMS Documentation 7. INTERFACES BETWEEN ORGANIZATIONS 7.3 Type of information exchanged 7.5 Interface documentation	Subpart B – Safety Policy § 5.21 – Safety Policy § 5.21 (a) (1) – Safety Objectives § 5.21 (a) (2) – Commitment to Fulfil Safety Objectives § 5.23 – Safety Accountability and Authority § 5.25 – Designation and Responsibilities of Required Safety Management Personnel § 5.21 (6) & § 5.27 – Coordination of Emergency Response Planning Subpart F – Documentation and Recordkeeping § 5.95 SMS Documentation	21.A.139/239(c)1 Safety Policy and related safety objectives. 21.A.139/239(b)2 Accountability of a single manager appointed pursuant to point 21.A.145(c)1/245(a) 21.A.239(c)2 and 21.A.145245(b) key safety personnel.	145.A.200(a)(2) Safety policy and related safety objectives 145.A.200(a)(1) accountability and lines of responsibility throughout the organization 145.A.70 Maintenance organization exposition 145.A.200(a)(5) Management System Documentation 145.A.30 (a) Appointment of Accountable Manager 145.A.30 (ca) Appointment of person or persons with responsibility on SMS 145.A.55 (c)(i) Record-keeping 145.A.155 immediate		

		§ 5.97 SMS Records		reaction to a safety problem 145.A.200 (a) (3) - Immediate safety action and coordination with the operator's Emergency Response Plan (ERP) 145.A.205 Contracting and Subcontracting		
2. Safety risk management 2.1 Hazard identification 2.2 Safety risk assessment and mitigation	6. UNDERSTANDING & MEANS OF COMPLIANCE WITH SMS REQUIREMENTS 6.2 Safety Risk Management 6.2.1 Hazard Identification 6.2.2 Safety Risk Assessment and Mitigation 7. INTERFACES BETWEEN ORGANIZATIONS 7.3.2 Safety Risk Management	Subpart C – Safety Risk Management § 5.51 - Safety Risk Management Applicability § 5.53 - System Analysis and Hazard Identification § 5.55 - Safety Risk Assessment and Control	21.A.139/239(c)3 Safety risk management process 21.A.139/239(c)6 occurrence reporting system in accordance with point 21.A.3A contributing to continuous improvement of safety.	145.A.60 (a) establish and maintain an occurrence-reporting system, including mandatory and voluntary reporting 145.A.45 (c) inaccurate, incomplete or ambiguous procedure, practice, information or maintenance instruction 145.A.47 (b) human performance limitations,		

				including the threat of fatigue for maintenance personnel. 145.A.200(a)(3) identification of aviation safety hazards, their evaluation and the management of the associated risks. Interfaces between organizations 145.A.202 internal reporting scheme 145.A.205 (a) (2) aviation safety hazard associated with such contracting or subcontracting		
3. Safety assurance 3.1 Safety performance monitoring and measurement 3.2 The management of change 3.3 Continuous improvement of the SMS	6. UNDERSTANDING & MEANS OF COMPLIANCE WITH SMS REQUIREMENTS 6.3 Safety Assurance 6.3.1 Safety Performance Monitoring and Measurement 6.2.3 & 6.3.2 The Management of Change	Subpart D – Safety Assurance § 5.71 - Safety Performance Monitoring and Measurement § 5.73 - Safety Performance Assessment § 5.73 (4) - Identify Changes in the Operational Environment	21.A.139/239(c)4 Safety Assurance process: - monitoring of the organization's safety performance - management of changes in accordance with points 21.A.243(c) and 21.A.147/247	145.A.200(a)(3) - - Management of changes. Continuous - Improvement of the safety performance - Monitoring of the organization's safety performance		

	6.3.3 Continuous Improvement of the SMS 7. INTERFACES BETWEEN ORGANIZATIONS 7.3.3 Safety Assurance 7.7 Supplier SMS Interface Approach	§ 5.75 – Continuous Improvement	- principles for the continuous improvement of the SMS			
4. Safety promotion 4.1 Training and education 4.2 Safety communication	6. UNDERSTANDING & MEANS OF COMPLIANCE WITH SMS REQUIREMENTS 6.4 Safety Promotion 6.4.1 Training and Education 6.4.2 Safety Communication 7. INTERFACES BETWEEN ORGANIZATIONS 7.3.4 Safety Promotion	Subpart E – Safety Promotion § 5.91 - Competencies and Training § 5.95 - Safety Communication	21.A.139/239(c)5 Promote safety: - training and education - communication	145.A.30 (e) Training 145.A.200(a)(4) Safety promotion, communication on safety. Personnel trained and competent to perform their tasks. 145.A.202 (c) (2) circulate the information relating to errors, near misses, hazards and the inability to follow procedures		

Appendix 10 – Acronyms

AIA	Aerospace Industries Association
AIAB	Associação das Indústrias Aeroespaciais do Brasil
AIAC	Aerospace Industries Association of Canada
AMO	Approved Maintenance Organization
ANAC	Agência Nacional de Aviação Civil
AO	Approved Organization
AOC	Air Operator Certificate
ASD	Aerospace Security and Defence Industries Association of Europe
ATM	Air Traffic Management
ATO	Approved Training Organization
ATS	Air Transport System
BMS	Business Management System
CAA	Civil Aviation Authority
CAMO	Continuing Airworthiness Management Organization
CEO	Chief Executive Officer
DAO	Design Approval Organization
DMM	Design, Manufacturing and Maintenance
DO	Design Organization
DOA	Design Organization Approval
EASA	European Union Aviation Safety Agency
EHS	Environmental, Health & Safety
ERP	Emergency Response Plan
EU	European Union
FAA	Federal Aviation Administration
GAMA	General Aviation Manufacturers Association
HF	Human Factors
Ho	Head of
ICAO	International Civil Aviation Organization
KPI	Key Performance Indicator
LOI	Level of Involvement
MO	Maintenance Organization
MOA	Maintenance Organization Approval
MRO	Maintenance and Repair Organization
MTO	Maintenance Training Organization
N/A	Not Applicable
NAA	National Aviation Authority
NAS	National Aerospace Standard
NPA	Notices of Proposed Amendment
OCC	Occurrence
ODA	Organization Designation Authorization

PC	Production Certificate
PMA	Parts Manufacturer Approval
PO	Production Organization
POA	Production Organization Approval
QMS	Quality Management System
RO	Reported Occurrence
SA	Safety Assurance
SARPs	Standards And Recommended Practices (ICAO)
SMART	Specific, measurable, achievable, realistic, time bound
SMICG	Safety Management International Collaboration Group
SMM	Safety Management Manual
SMS	Safety Management System
SOPs	Standard Operating Procedures
SPI	Safety Performance Indicator
SRM	Safety Risk Management
TC	Type Certificate
TCCA	Transport Canada
ToR	Terms of Reference
UE	Unsafe/Unwanted Event
VOR	Voluntary Occurrence Reporting
WG	Working Group