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AVIATION SAFETY MANAGEMENT SYSTEMS

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NOTES

1. All changes are indicated by the use of a ‘sidebar’ in the margin. This can be readily cross-referenced using the table at the end of the document which details each change.
2. For the purpose of this document, the State (when referred nationally) is the United Arab Emirates, and the State authority is the United Arab Emirates Military Airworthiness Authority (UAE MAA). Note that States (in plural) or international State can also relate to third countries outside the UAE.
3. References to Civil Aviation are also applicable and valid here to Military Aviation.

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AVIATION SAFETY MANAGEMENT SYSTEMS

1.0 INTRODUCTION

1.1 This chapter provides guidance for service providers on the implementation of an SMS framework in accordance with ICAO Annex 19 and guidance for States on the oversight of SMS.

1.2 The purpose of an SMS is to provide service providers with a systematic approach to managing safety. It is designed to continuously improve safety performance through: the identification of hazards, the collection and analysis of safety data and safety information, and the continuous assessment of safety risks. The SMS seeks to proactively mitigate safety risks before they result in aviation accidents and incidents. It allows service providers to effectively manage their activities, safety performance and resources, while gaining a greater understanding of their contribution to aviation safety. An effective SMS demonstrates to States the service provider's ability to manage safety risks and provides for effective management of safety at the State level.

1.3 International general aviation operators should determine the SMS criteria for the aircraft they are operating, as established by the State of Registry, and ensure their SMS is acceptable to the State of Registry. To facilitate the acceptability of the SMS, international general aviation operators should ask the State of Registry if the use of an industry code of practice is permitted.

1.4 Operators of large or turbojet aeroplanes under multiple States of Registry with an AOC issued in accordance with ICAO Annex 6, Part I, are considered to be service providers, therefore, the SMS must be made acceptable to the State of the Operator.

2.0 SMS FRAMEWORK

2.1 ICAO Annex 19 specifies the framework for the implementation and maintenance of an SMS. Regardless of the service provider's size and complexity, all elements of the SMS framework apply. The implementation should be tailored to the organisation and its activities.

2.2 The ICAO SMS framework is made up of the following four components and twelve elements:

<i>COMPONENT</i>	<i>ELEMENT</i>
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

Table 1. Components and elements of the ICAO SMS framework

3.0 COMPONENT 1: SAFETY POLICY AND OBJECTIVES

3.1 The first component of the SMS framework focuses on creating an environment where safety management can be effective. It is founded on a safety policy and objectives that set out senior management's commitment to safety, its goals and the supporting organisational structure.

3.2 Management commitment and safety leadership is key to the implementation of an effective SMS and is asserted through the safety policy and the establishment of safety objectives. Management commitment to safety is demonstrated through management decision-making and allocation of resources; these decisions and actions should always be consistent with the safety policy and objectives to cultivate a positive safety culture.

3.3 The safety policy should be developed and endorsed by senior management, and is to be signed by the accountable executive. Key safety personnel, and where appropriate, staff representative bodies (employee forums, trade unions) should be consulted in the development of the safety policy and safety objectives to promote a sense of shared responsibility.

3.4 Management commitment

Safety policy

3.4.1 The safety policy should be visibly endorsed by senior management and the accountable executive. "Visible endorsement" refers to making management's active support of the safety policy visible to the rest of the organisation. This can be done via any means of communication and through the alignment of activities to the safety policy.

3.4.2 It is the responsibility of management to communicate the safety policy throughout the organisation to ensure all personnel understand and work in accordance with the safety policy.

3.4.3 To reflect the organisation's commitment to safety, the safety policy should include a commitment to:

- a) continuously improve the level of safety performance;
- b) promote and maintain a positive safety culture within the organisation;
- c) comply with all applicable regulatory requirements;
- d) provide the necessary resources to deliver a safe product or service;
- e) ensure safety is a primary responsibility of all managers; and
- f) ensure it is understood, implemented and maintained at all levels.

3.4.4 The safety policy should also make reference to the safety reporting system to encourage the reporting of safety issues and inform personnel of the disciplinary policy applied in the case of safety events or safety issues that are reported.

3.4.5 The disciplinary policy is used to determine whether an error or rule breaking has occurred so that the organisation can establish whether any disciplinary action should be taken. To ensure the fair treatment of persons involved, it is essential that those responsible for making that determination have the necessary technical expertise so that the context of the event may be fully considered.

3.4.6 A policy on the protection of safety data and safety information, as well as reporters, can have a positive effect on the reporting culture. The service provider and the State should allow for the de-identification and aggregation of reports to allow meaningful safety analyses to be conducted without having to implicate personnel or specific service providers. Because major occurrences may invoke processes and procedures outside of the service provider's SMS, the relevant State authority may not permit the early de-identification of reports in all circumstances. Nonetheless, a policy allowing for the appropriate de-identification of reports can improve the quality of data collected.

Safety objectives

3.4.7 Taking into consideration its safety policy, the service provider should also establish safety objectives to define what it aims to achieve in respect of safety outcomes. Safety objectives should be short, high-level statements of the organisation's safety priorities and should address its most significant safety risks. Safety objectives may be included in the safety policy (or documented separately), and defines what the organisation intends to achieve in terms of safety. Safety performance indicators (SPIs) and safety performance targets (SPTs) are needed to monitor the achievement of these safety objectives and are further elaborated on later under COMPONENT 3: SAFETY ASSURANCE.

3.4.8 The safety policy and safety objectives should be periodically reviewed to ensure they remain current (a change in the accountable executive would require its review for instance).

3.5 Safety accountability and responsibilities

Accountable executive

3.5.1 The accountable executive, typically the chief executive officer, is the person who has ultimate authority over the safe operation of the organisation. The accountable executive establishes and promotes the safety policy and safety objectives that instil safety as a core organisational value. They should: have the authority to make decisions on behalf of the organisation, have control of resources, both financial and human, be responsible for ensuring appropriate actions are taken to address safety issues and safety risks, and they should be responsible for responding to accidents and incidents.

3.5.2 There might be challenges for the service provider to identify the most appropriate person to be the accountable executive, especially in large complex organisations with multiple entities and multiple certificates, authorisations or approvals. It is important the person selected is organisationally situated at the highest level of the organisation, thus ensuring the right strategic safety decisions are made.

3.5.3 The service provider is required to identify the accountable executive, placing the responsibility for the overall safety performance at a level in the organisation with the authority to take action to ensure the SMS is effective. Specific safety accountabilities of all members of management should be defined and their role in relation to the SMS should reflect how they can contribute towards a positive safety culture. The safety responsibilities, accountabilities and authorities should be documented and communicated throughout the organisation. The safety accountabilities of managers should include the allocation of the human, technical, financial or other resources necessary for the effective and efficient performance of the SMS.

Note. — The term “accountability” refers to obligations which cannot be delegated. The term “responsibilities” refers to functions and activities which may be delegated.

3.5.4 In the case where an SMS applies to several different certificates, authorisations or approvals that are all part of the same legal entity, there should be a single accountable executive. Where this is not possible, individual accountable executives should be identified for each organisational certificate, authorisation or approval and clear lines of accountability defined; it is also important to identify how their safety accountabilities will be coordinated.

3.5.5 One of the most effective ways the accountable executive can be visibly involved, is by leading regular executive safety meetings. As they are ultimately responsible for the safety of the organisation, being actively involved in these meetings allows the accountable executive to:

- a) review safety objectives;
- b) monitor safety performance and the achievement of safety targets;
- c) make timely safety decisions;
- d) allocate appropriate resources;
- e) hold managers accountable for safety responsibilities, performance and implementation timelines; and
- f) be seen by all personnel as an executive who is interested in, and in charge of, safety.

3.5.6 The accountable executive is not usually involved in the day-to-day activities of the organisation or the problems faced in the workplace and should ensure there is an appropriate organisational structure to manage and operate the SMS. Safety management responsibility is often delegated to the senior management team and other key safety personnel. Although responsibility for the day-to-day operation of the SMS can be delegated, the accountable executive cannot delegate accountability for the system nor can decisions regarding safety risks be delegated. For example, the following safety accountabilities cannot be delegated:

- a) ensuring safety policies are appropriate and communicated;
- b) ensuring necessary allocation of resources (financing, personnel, training, acquisition); and
- c) setting of the acceptable safety risk limits and resourcing of necessary controls.

3.5.7 It is appropriate for the accountable executive to have the following safety accountabilities:

- a) provide enough financial and human resources for the proper implementation of an effective SMS;
- b) promote a positive safety culture;
- c) establish and promote the safety policy;
- d) establish the organisation's safety objectives;
- e) ensure the SMS is properly implemented and performing to requirements; and
- f) see to the continuous improvement of the SMS.

3.5.8 The accountable executive's authorities include, but are not limited to, having final authority:

- a) for the resolution of all safety issues; and
- b) over operations under the certificate, authorisation or approval of the organisation, including the authority to stop the operation or activity.

3.5.9 The authority to make decisions regarding safety risk tolerability should be defined. This includes who can make decisions on the acceptability of risks as well as the authority to agree that a change can be implemented. The authority may be assigned to an individual, a management position or a committee.

3.5.10 Authority to make safety risk tolerability decisions should be commensurate with the manager's general decision-making and resource allocation authority. A lower level manager (or management group) may be authorised to make tolerability decisions up to a certain level. Risk levels that exceed the manager's authority must be escalated for consideration to a higher management level with greater authority.

Accountability and responsibilities

3.5.11 Accountabilities and responsibilities of all personnel, management and staff, involved in safety-related duties supporting the delivery of safe products and operations should be clearly defined. The safety responsibilities should focus on the staff member's contribution to the safety performance of the organisation (the organisational safety outcomes). The management of safety is a core function; as such every senior manager has a degree of involvement in the operation of the SMS.

3.5.12 All defined accountabilities, responsibilities and authorities should be stated in the service provider's SMS documentation and should be communicated throughout the organisation. The safety accountabilities and responsibilities of each senior manager are integral components of their job descriptions. This should also capture the different safety management functions between line managers and the safety manager (see 3.6 for further details).

3.5.13 Lines of safety accountability throughout the organisation and how they are defined will depend on the type and complexity of the organisation, and their preferred communication methods. Typically, the safety accountabilities and responsibilities will be reflected in organisational charts, documents defining departmental responsibilities, and personnel job or role descriptions.

3.5.14 The service provider should aim to avoid conflicts of interest between staff members' safety responsibilities and their other organisational responsibilities. They should allocate their SMS accountabilities and responsibilities, in a way that minimises any overlaps and/or gaps.

Accountability and responsibilities and in respect to external organisations

3.5.15 A service provider is responsible for the safety performance of external organisations where there is an SMS interface. The service provider may be held accountable for the safety performance of products or services provided by external organisations supporting its activities even if the external organisations are not required to have an SMS. It is essential for the service provider's SMS to interface with the safety systems of any external organisations that contribute to the safe delivery of their product or services.

3.6 Appointment of key safety personnel

3.6.1 Appointment of a competent person or persons to fulfil the role of safety manager is essential to an effectively implemented and functioning SMS. The safety manager may be identified by different titles. For the purposes of this manual, the generic term “safety manager” is used and refers to the function, not necessarily to the individual. The person carrying out the safety manager function is responsible to the accountable executive for the performance of the SMS and for the delivery of safety services to the other departments in the organisation.

3.6.2 The safety manager advises the accountable executive and line managers on safety management matters, and is responsible for coordinating and communicating safety issues within the organisation as well as with external members of the aviation community. Functions of the safety manager include, but are not limited to:

- a) manage the SMS implementation plan on behalf of the accountable executive (upon initial implementation);
- b) perform/facilitate hazard identification and safety risk analysis;
- c) monitor corrective actions and evaluate their results;
- d) provide periodic reports on the organisation’s safety performance;
- e) maintain SMS documentation and records;
- f) plan and facilitate staff safety training;
- g) provide independent advice on safety matters;
- h) monitor safety concerns in the aviation industry and their perceived impact on the organisation’s operations aimed at product and service delivery; and
- i) coordinate and communicate (on behalf of the accountable executive) with the MAA and other State authorities as necessary on issues relating to safety.

3.6.3 In most organisations, an individual is appointed as the safety manager. Depending on the size, nature and complexity of the organisation, the safety manager role may be an exclusive function or it may be combined with other duties. Moreover, some organisations may need to allocate the role to a group of persons. The organisation must ensure that the option chosen does not result in any conflicts of interest. Where possible, the safety manager should not be directly involved in the product or service delivery but should have a working knowledge of these. The appointment should also consider potential conflicts of interest with other tasks and functions. Such conflicts of interest could include:

- a) competition for funding (e.g. financial manager being the safety manager);
- b) conflicting priorities for resources; and
- c) where the safety manager has an operational role and the ability to assess the SMS effectiveness of the operational activities the safety manager is involved in.

3.6.4 In cases where the function is allocated to a group of persons, (e.g. when service providers extend their SMS across multiple activities) one of the persons should be

designated as “lead” safety manager, to maintain a direct and unequivocal reporting line to the accountable executive.

3.6.5 The competencies for a safety manager should include, but not be limited to, the following:

- a) safety/quality management experience;
- b) operational experience related to the product or service provided by the organisation;
- c) technical background to understand the systems that support operations or the product/service provided;
- d) interpersonal skills;
- e) analytical and problem-solving skills;
- f) project management skills;
- g) oral and written communications skills; and
- h) an understanding of human factors.

3.6.6 Depending on the size, nature and complexity of the organisation, additional staff may support the safety manager. The safety manager and supporting staff are responsible for ensuring the prompt collection and analysis of safety data and appropriate distribution within the organisation of related safety information such that safety risk decisions and controls, as necessary, can be made.

3.6.7 Service providers should establish appropriate safety committees that support the SMS functions across the organisation. This should include determining who should be involved in the safety committee and frequency of the meetings.

3.6.8 The highest-level safety committee, sometimes referred to as a safety review board (SRB), includes the accountable executive and senior managers with the safety manager participating in an advisory capacity. The SRB is strategic and deals with high-level issues related to safety policies, resource allocation and organisational performance.

The SRB monitors the:

- a) effectiveness of the SMS;
- b) timely response in implementing necessary safety risk control actions;
- c) safety performance against the organisation’s safety policy and objectives;
- d) overall effectiveness of safety risk mitigation strategies;
- e) effectiveness of the organisation’s safety management processes which support:
 - 1) the declared organisational priority of safety management; and
 - 2) promotion of safety across the organisation.

3.6.9 Once a strategic direction has been developed by the highest-level safety committee, implementation of safety strategies should be coordinated throughout the organisation. This

may be accomplished by creating safety action groups (SAGs) that are more operationally focused. SAGs are normally composed of managers and front-line personnel and are chaired by a designated manager. SAGs are tactical entities that deal with specific implementation issues in accordance with the strategies developed by the SRB. The SAGs:

- a) monitor operational safety performance within their functional areas of the organisation and ensure that appropriate SRM activities are carried out;
- b) review available safety data and identify the implementation of appropriate safety risk control strategies and ensure employee feedback is provided;
- c) assess the safety impact related to the introduction of operational changes or new technologies;
- d) coordinate the implementation of any actions related to safety risk controls and ensure that actions are taken promptly; and
- e) review the effectiveness of specific safety risk controls.

3.7 Coordination of emergency response planning

3.7.1 By definition, an emergency is a sudden, unplanned situation or event requiring immediate action. Coordination of emergency response planning refers to planning for activities that take place within a limited period of time during an unplanned aviation operational emergency situation. An emergency response plan (ERP) is an integral component of a service provider's SRM process to address aviation-related emergencies, crises or events. Where there is a possibility of a service provider's aviation operations or activities being compromised by emergencies such as a public health emergency/pandemic, these scenarios should also be addressed in its ERP as appropriate. The ERP should address foreseeable emergencies as identified through the SMS and include mitigating actions, processes and controls to effectively manage aviation-related emergencies.

3.7.2 The overall objective of the ERP is the safe continuation of operations and the return to normal operations as soon as possible. This should ensure an orderly and efficient transition from normal to emergency operations, including assignment of emergency responsibilities and delegation of authority. It includes the period of time required to re-establish "normal" operations following the emergency. The ERP identifies actions to be taken by responsible personnel during an emergency. Most emergencies will require coordinated action between different organisations, possibly with other service providers and with other external organisations such as non-aviation-related emergency services. The ERP should be easily accessible to the appropriate key personnel as well as to the coordinating external organisations.

3.7.3 Coordination of emergency response planning applies only to those service providers required to establish and maintain an ERP. ICAO Annex 19 does not require the creation or development of an ERP; emergency response planning is applicable only to specific service providers as established in the relevant ICAO Annexes (different terms for provisions related to dealing with emergency situations may be used in other Annexes). This coordination should be exercised as part of the periodic testing of the ERP.

3.8 SMS Documentation

3.8.1 The SMS documentation should include a top-level "SMS manual", which describes the service provider's SMS policies, processes and procedures to facilitate the organisation's internal administration, communication and maintenance of the SMS. It

should help personnel to understand how the organisation's SMS functions, and how the safety policy and objectives will be met. The documentation should include a system description that provides the boundaries of the SMS. It should also help clarify the relationship between the various policies, processes, procedures and practices, and define how these link to the service provider's safety policy and objectives. The documentation should be adapted and written to address the day-to-day safety management activities that can be easily understood by personnel throughout the organisation.

3.8.2 The SMS manual also serves as a primary safety communication tool between the service provider and key safety stakeholders (e.g. MAA for the purpose of regulatory acceptance, assessment and subsequent monitoring of the SMS). The SMS manual may be a stand-alone document, or it may be integrated with other organisational documents (or documentation) maintained by the service provider. Where details of the organisation's SMS processes are already addressed in existing documents, appropriate cross-referencing to such documents is enough. This SMS document must be kept up to date. MAA agreement may be required before significant amendments are made to the SMS manual, as it is a controlled manual.

3.8.3 The SMS manual should include a detailed description of the service provider's policies, processes and procedures including:

- a) safety policy and safety objectives;
- b) reference to any applicable regulatory SMS requirements;
- c) system description;
- d) safety accountabilities and key safety personnel;
- e) voluntary and mandatory safety reporting system processes and procedures;
- f) hazard identification and safety risk assessment processes and procedures;
- g) safety investigation procedures;
- h) procedures for establishing and monitoring safety performance indicators;
- i) SMS training processes and procedures and communication;
- j) safety communication processes and procedures;
- k) internal audit procedures;
- l) management of change procedures;
- m) SMS documentation management procedures; and
- n) where applicable, coordination of emergency response planning.

3.8.4 SMS documentation also includes the compilation and maintenance of operational records substantiating the existence and ongoing operation of the SMS. Operational records are the outputs of the SMS processes and procedures such as the SRM and safety assurance activities. SMS operational records should be stored and kept in accordance with existing retention periods. Typical SMS operational records should include:

- a) hazards register and hazard/safety reports;

- b) SPIs and related charts;
- c) record of completed safety risk assessments;
- d) SMS internal review or audit records;
- e) internal audit records;
- f) records of SMS/safety training records;
- g) SMS/safety committee meeting minutes;
- h) SMS implementation plan (during the initial implementation); and
- i) gap analysis to support implementation plan.

4.0 COMPONENT 2: SAFETY RISK MANAGEMENT

4.1 Service providers should ensure they are managing their safety risks. This process is known as safety risk management (SRM), which includes hazard identification, safety risk assessment and safety risk mitigation.

4.2 The SRM process systematically identifies hazards that exist within the context of the delivery of its products or services. Hazards may be the result of systems that are deficient in their design, technical function, human interface or interactions with other processes and systems. They may also result from a failure of existing processes or systems to adapt to changes in the service provider's operating environment. Careful analysis of these factors can often identify potential hazards at any point in the operation or activity life cycle.

4.3 Understanding the system and its operating environment is essential for the achievement of high safety performance. Having a detailed system description that defines the system and its interfaces will help. Hazards may be identified throughout the operational life cycle from internal and external sources. Safety risk assessments and safety risk mitigations will need to be continuously reviewed to ensure they remain effective. Figure 1 provides an overview of the hazard identification and safety risk management process for a service provider.

Note.— Detailed guidance on hazard identification and safety risk assessment procedures is addressed in ICAO Annex 19 Chapter 2 (4th Edition).

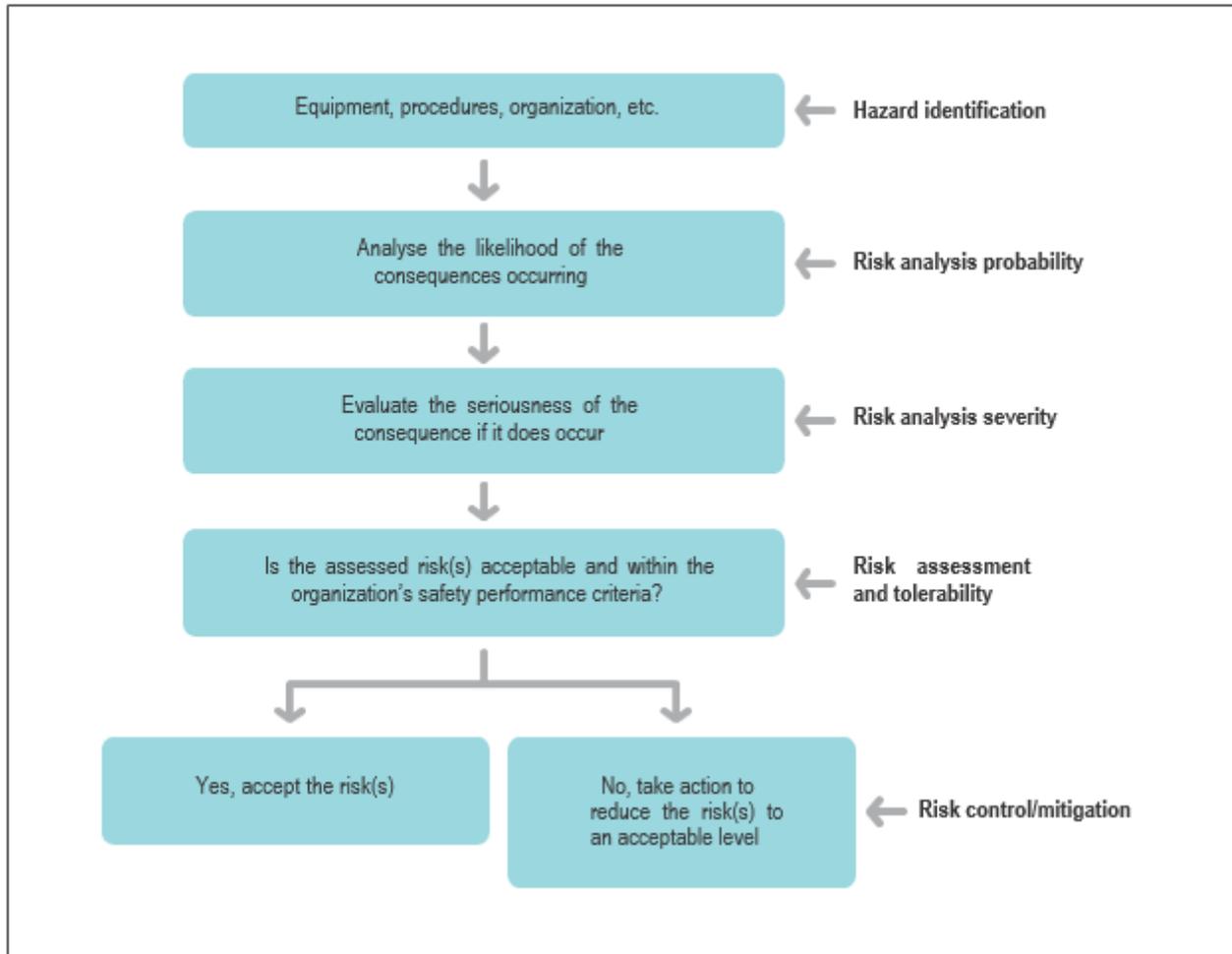


Figure 1. Hazard identification and risk management process

4.4 Hazard identification

Hazard identification is the first step in the SRM process. The service provider should develop and maintain a formal process to identify hazards that could impact aviation safety in all areas of operation and activities. This includes equipment, facilities and systems. Any aviation safety-related hazard identified and controlled is beneficial for the safety of the operation. It is important to also consider hazards that may exist as a result of the SMS interfaces with external organisations.

Sources for hazard identification

4.4.1 There are a variety of sources for hazard identification, internal or external to the organisation. Some internal sources include:

- a) *Normal operations monitoring*; this uses observational techniques to monitor the day-to-day operations and activities such as line operations safety audit (LOSA).
- b) *Automated monitoring systems*; this uses automated recording systems to monitor parameters that can be analysed such as flight data monitoring (FDM).

- c) *Voluntary and mandatory safety reporting systems*; this provides everyone, including staff from external organisations, with opportunities to report hazards and other safety issues to the organisation.
- d) *Audits*; these can be used to identify hazards in the task or process being audited. These should also be coordinated with organisational changes to identify hazards related to the implementation of the change.
- e) *Feedback from training*; training that is interactive (two way) can facilitate identification of new hazards from participants.
- f) *Service provider safety investigations*; hazards identified in internal safety investigation and follow-up reports on accidents/incidents.

4.4.2 Examples of external sources for hazard identification include:

- a) *Aviation accident reports*; reviewing accident reports; this may be related to accidents in the same State or to a similar aircraft type, region or operational environment.
- b) *State mandatory and voluntary safety reporting systems*; some States provide summaries of the safety reports received from service providers.
- c) *State oversight audits and third-party audits*; external audits can sometimes identify hazards. These may be documented as an unidentified hazard or captured less obviously within an audit finding.
- d) *Trade associations and information exchange systems*; many trade associations and industry groups are able to share safety data that may include identified hazards.

Safety reporting system

4.4.3 One of the main sources for identifying hazards is the safety reporting system, especially the voluntary safety reporting system. Whereas the mandatory system is normally used for incidents that have occurred, the voluntary system provides an additional reporting channel for potential safety issues such as hazards, near misses or errors. They can provide valuable information to the State and service provider on lower consequence events.

4.4.4 It is important that service providers provide appropriate protections to encourage people to report what they see or experience. For example, enforcement action may be waived for reports of errors, or in some circumstances, rule-breaking. It should be clearly stated that reported information will be used solely to support the enhancement of safety. The intent is to promote an effective reporting culture and proactive identification of potential safety deficiencies.

4.4.5 Voluntary safety reporting systems should be confidential, requiring that any identifying information about the reporter is known only to the custodian to allow for follow-up action. The role of custodian should be kept to a few individuals, typically restricted to the safety manager and personnel involved in the safety investigation. Maintaining confidentiality will help facilitate the disclosure of hazards leading to human error, without fear of retribution or embarrassment. Voluntary safety reports may be de-identified and archived once necessary follow-up actions are taken.

De-identified reports can support future trending analyses to track the effectiveness of risk mitigation and to identify emerging hazards.

4.4.6 Personnel at all levels and across all disciplines are encouraged to identify and report hazards and other safety issues through their safety reporting systems. To be effective, safety reporting systems should be readily accessible to all personnel. Depending on the situation, a paper-based, web-based or desktop form can be used. Having multiple entry methods available maximises the likelihood of staff engagement. Everyone should be made aware of the benefits of safety reporting and what should be reported.

4.4.7 Anybody who submits a safety report should receive feedback on what decisions or actions have been taken. The alignment of reporting system requirements, analysis tools and methods can facilitate exchange of safety information as well as comparisons of certain safety performance indicators. Feedback to reporters in voluntary reporting schemes also serves to demonstrate that such reports are considered seriously. This helps to promote a positive safety culture and encourage future reporting.

4.4.8 There may be a need to filter reports on entry when there are a large number of safety reports. This may involve an initial safety risk assessment to determine whether further investigation is necessary and what level of investigation is required.

4.4.9 Safety reports are often filtered through the use of a taxonomy, or a classification system. Filtering information using a taxonomy can make it easier to identify common issues and trends. The service provider should develop taxonomies that cover their type(s) of operation. The disadvantage of using a taxonomy is that sometimes the identified hazard does not fit cleanly into any of the defined categories. The challenge then is to use taxonomies with the appropriate degree of detail; specific enough that hazards are easy to allocate, yet generic enough that the hazards are valuable for analysis. Some States and international trade associations have developed taxonomies that could be used. ICAO Annex 19 Chapter 5 (4th Edition) contains additional information on taxonomies.

4.4.10 Other methods of hazard identification include workshops or meetings in which subject matter experts conduct detailed analysis scenarios. These sessions benefit from the contributions of a range of experienced operational and technical personnel. Existing safety committee meetings (SRB, SAG, etc.) could be used for such activities; the same group may also be used to assess associated safety risks.

4.4.11 Identified hazards and their potential consequences should be documented. This will be used for safety risk assessment processes.

4.4.12 The hazard identification process considers all possible hazards that may exist within the scope of the service provider's aviation activities including interfaces with other systems, both within and external to the organisation. Once hazards are identified, their consequences (i.e. any specific events or outcomes) should be determined.

Investigation of hazards

4.4.13 Hazard identification should be continuous and part of the service provider's ongoing activities. Some conditions may merit more detailed investigation. These may include:

- a) instances where the organisation experiences an unexplained increase in aviation safety-related events or regulatory non-compliance; or
- b) significant changes to the organisation or its activities.

4.5 Service provider safety investigation

4.5.1 Effective safety management depends on quality investigations to analyse safety occurrences and safety hazards, and report findings and recommendations to improve safety in the operating environment.

4.5.2 There is a clear distinction between accident and incident investigations under ICAO Annex 13 and service provider safety investigations. Investigation of accidents and serious incidents under Annex 13 are the responsibility of the State, as defined in Annex 13. This type of information is essential to disseminate lessons learnt from accidents and incidents. Service provider safety investigations are conducted by service providers as part of their SMS to support hazard identification and risk assessment processes. There are many safety occurrences that fall outside of Annex 13 that could provide a valuable source of hazard identification or identify weaknesses in risk controls. These problems might be revealed and remedied by a safety investigation led by the service provider.

4.5.3 The primary objective of the service provider safety investigation is to understand what happened, and how to prevent similar situations from occurring in the future by eliminating or mitigating safety deficiencies. This is achieved through careful and methodical examination of the event and by applying the lessons learnt to reduce the probability and/or consequence of future recurrences. Service provider safety investigations are an integral part of the service provider's SMS.

4.5.4 Service provider investigations of safety occurrences and hazards are an essential activity of the overall risk management process in aviation. The benefits of conducting a safety investigation include:

- a) gaining a better understanding of the events leading up to the occurrence;
- b) identifying contributing human, technical and organisational factors;
- c) identifying hazards and conducting risk assessments;
- d) making recommendations to reduce or eliminate unacceptable risks; and
- e) identifying lessons learnt that should be shared with the appropriate members of the aviation community.

Investigation triggers

4.5.5 A service provider safety investigation is usually triggered by a notification (report) submitted through the safety reporting system. Figure 2 outlines the safety investigation decision process and the distinction between when a service provider safety investigation should take place and when an investigation under ICAO Annex 13 provisions should be initiated.

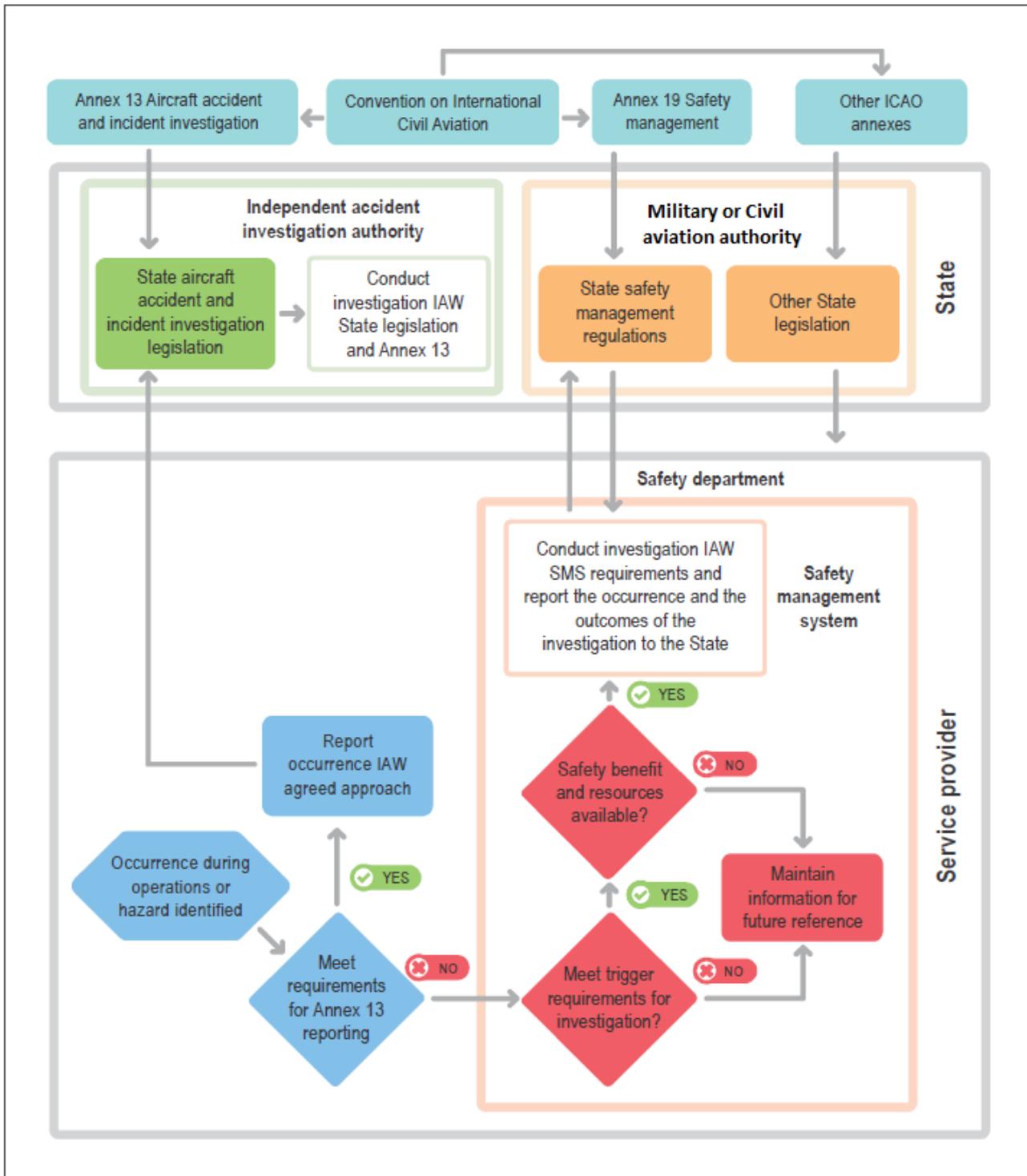


Figure 2. Safety investigation decision process

4.5.6 Not all occurrences or hazards can or should be investigated; the decision to conduct an investigation and its depth should depend on the actual or potential consequences of the occurrence or hazard. Occurrences and hazards considered to have a high-risk potential are more likely to be investigated and should be investigated in greater depth than those with lower risk potential. Service providers should use a structured decision-making approach with defined trigger points. These will guide the safety investigation decisions: what to investigate and the scope of the investigation.

This could include:

- a) the severity or potential severity of the outcome;
- b) regulatory or organisational requirements to carry out an investigation;
- c) safety value to be gained;
- d) opportunity for safety action to be taken;
- e) risks associated with not investigating;
- f) contribution to targeted safety programmes;
- g) identified trends;
- h) training benefit; and
- i) resources availability.

Assigning an investigator

4.5.7 If an investigation is to commence, the first action will be to appoint an investigator or where the resources are available, an investigation team with the required skills and expertise. The size of the team and the expertise profile of its members depend on the nature and severity of the occurrence being investigated. The investigating team may require the assistance of other specialists. Often, a single person is assigned to carry out an internal investigation, with support from operations and safety office experts.

4.5.8 Service provider safety investigators are ideally organisationally independent from the area associated with the occurrence or identified hazard. Better results will be obtained if the investigator(s) are knowledgeable (trained) and skilled (experienced) in service provider safety investigations. The investigators would ideally be chosen for the role because of their knowledge, skills and character traits, which should include: integrity, objectivity, logical thinking, pragmatism, and lateral thinking.

The investigation process

4.5.9 The investigation should identify what happened and why it happened and this may require root cause analysis to be applied as part of the investigation. Ideally, the people involved in the event should be interviewed as soon as possible after the event. The investigation should include:

- a) establishing timelines of key events, including the actions of the people involved;
- b) review of any policies and procedures related to the activities;
- c) review of any decisions made related to the event;
- d) identifying any risk controls that were in place that should have prevented the event occurring; and
- e) reviewing safety data for any previous or similar events.

4.5.10 The safety investigation should focus on the identified hazards and safety risks and opportunities for improvement, not on blame or punishment. The way the investigation is conducted, and most importantly, how the report is written, will influence the likely safety impact, the future safety culture of the organisation, and the effectiveness of future safety initiatives.

4.5.11 The investigation should conclude with clearly defined findings and recommendations that eliminate or mitigate safety deficiencies.

4.6 Safety risk assessment and mitigation

4.6.1 The service provider must develop a safety risk assessment model and procedures which will allow a consistent and systematic approach for the assessment of safety risks. This should include a method that will help determine what safety risks are acceptable or unacceptable and to prioritise actions.

4.6.2 The SRM tools used may need to be reviewed and customised periodically to ensure they are suitable for the service provider's operating environment. The service provider may find more sophisticated approaches that better reflect the needs of their operation as their SMS matures. The service provider and MAA should agree on a methodology.

4.6.3 More sophisticated approaches to safety risk classification are available. These may be more suitable if the service provider is experienced with safety management or operating in a high-risk environment.

4.6.4 The safety risk assessment process should use whatever safety data and safety information is available. Once safety risks have been assessed, the service provider will engage in a data-driven decision-making process to determine what safety risk controls are needed.

4.6.5 Safety risk assessments sometimes have to use qualitative information (expert judgement) rather than quantitative data due to unavailability of data. Using the safety risk matrix allows the user to express the safety risk(s) associated with the identified hazard in a quantitative format. This enables direct magnitude comparison between identified safety risks. A qualitative safety risk assessment criterion such as "likely to occur" or "improbable" may be assigned to each identified safety risk where quantitative data is not available.

4.6.6 For service providers that have operations in multiple locations with specific operating environments, it may be more effective to establish local safety committees to conduct safety risk assessments and safety risk control identification. Advice is often sought from a specialist in the operational area (internal or external to the service provider). Final decisions or control acceptance may be required from higher authorities so that the appropriate resources are provided.

4.6.7 How service providers go about prioritising their safety risk assessments and adopting safety risk controls is their decision. As a guide, the service provider should find the prioritisation process:

- a) assesses and controls highest safety risk;
- b) allocates resources to highest safety risks;
- c) effectively maintains or improves safety;
- d) achieves the stated and agreed safety objectives and SPTs; and

- e) satisfies the requirements of the State's regulations with regard to control of safety risks.

4.6.8 After safety risks have been assessed, appropriate safety risk controls can be implemented. It is important to involve the “end users” and subject matter experts in determining appropriate safety risk controls. Ensuring the right people are involved will maximise the practicality of safety risk chosen mitigations. A determination of any unintended consequences, particularly the introduction of new hazards, should be made prior to the implementation of any safety risk controls.

4.6.9 Once the safety risk control has been agreed and implemented, the safety performance should be monitored to assure the effectiveness of the safety risk control. This is necessary to verify the integrity, efficiency and effectiveness of the new safety risk controls under operational conditions.

4.6.10 The SRM outputs should be documented. This should include the hazard and any consequences, the safety risk assessment and any safety risk control actions taken. These are often captured in a register so they can be tracked and monitored. This SRM documentation becomes a historical source of organisational safety knowledge which can be used as reference when making safety decisions and for safety information exchange. This safety knowledge provides material for safety trend analyses and safety training and communication. It is also useful for internal audits to assess whether safety risk controls and actions have been implemented and are effective.

5.0 COMPONENT 3: SAFETY ASSURANCE

5.1 ICAO Annex 19, Appendix 2, 3.1.1 requires that service providers develop and maintain the means to verify the safety performance of the organisation and to validate the effectiveness of safety risk controls. The safety assurance component of the service provider's SMS provides these capabilities.

5.2 Safety assurance consists of processes and activities undertaken to determine whether the SMS is operating according to expectations and requirements. This involves continuously monitoring its processes as well as its operating environment to detect changes or deviations that may introduce emerging safety risks or the degradation of existing safety risk controls. Such changes or deviations may then be addressed through the SRM process.

5.3 Safety assurance activities should include the development and implementation of actions taken in response to any identified issues having a potential safety impact. These actions continuously improve the performance of the service provider's SMS.

5.4 Safety performance monitoring and measurement

To verify the safety performance and validate the effectiveness of safety risk controls requires the use of a combination of internal audits and the establishment and monitoring of SPIs. Assessing the effectiveness of the safety risk controls is important as their application does not always achieve the results intended. This will help identify whether the right safety risk control was selected and may result in the application of a different safety risk control strategy.

Internal audit

5.4.1 Internal audits are performed to assess the effectiveness of the SMS and identify areas for potential improvement. Most aviation safety regulations are generic safety risk

controls that have been established by the State. Ensuring compliance with the regulations through the internal audit is a principle aspect of safety assurance.

5.4.2 It is also necessary to ensure that any safety risk controls are effectively implemented and monitored. The causes and contributing factors should be investigated and analysed where non-conformances and other issues are identified. The main focus of the internal audit is on the policies, processes and procedures that provide the safety risk controls.

5.4.3 Internal audits are most effective when conducted by persons or departments independent of the functions being audited. Such audits should provide the accountable executive and senior management with feedback on the status of:

- a) compliance with regulations;
- b) compliance with policies, processes and procedures;
- c) the effectiveness of safety risk controls;
- d) the effectiveness of corrective actions; and
- e) the effectiveness of the SMS.

5.4.4 Some organisations cannot ensure appropriate independence of an internal audit, in such cases, the service provider should consider engaging external auditors (e.g. independent auditors or auditors from another organisation).

5.4.5 Planning of internal audits should take into account the safety criticality of the processes, the results of previous audits and assessments (from all sources), and the implemented safety risk controls. Internal audits should identify non-compliance with regulations and policies, processes and procedures. They should also identify system deficiencies, lack of effectiveness of safety risk controls and opportunities for improvement.

5.4.6 Assessing for compliance and effectiveness are both essential to achieving safety performance. The internal audit process can be used to determine both compliance and effectiveness. The following questions can be asked to assess compliance and effectiveness of each process or procedure:

- a) Determining compliance
 - 1) Does the required process or procedure exist?
 - 2) Is the process or procedure documented (inputs, activities, interfaces and outputs defined)?
 - 3) Does the process or procedure meet requirements (criteria)?
 - 4) Is the process or procedure being used?
 - 5) Are all affected personnel following the process or procedure consistently?
 - 6) Are the defined outputs being produced?
 - 7) Has a process or procedure change been documented and implemented?
- b) Assessing effectiveness

- 1) Do users understand the process or procedure?
- 2) Is the purpose of the process or procedure being achieved consistently?
- 3) Are the results of the process or procedure what the “customer” asked for?
- 4) Is the process or procedure regularly reviewed?
- 5) Is a safety risk assessment conducted when there are changes to the process or procedure?
- 6) Have process or procedure improvements resulted in the expected benefits?

5.4.7 In addition, internal audits should monitor progress in closing previously identified non-compliances. These should have been addressed through root cause analysis and the development and implementation of corrective and preventive action plans. The results from analysis of cause(s) and contributing factors for any non-compliance should feed into the service provider’s SRM processes.

5.4.8 The results of the internal audit process become one of the various inputs to the SRM and safety assurance functions. Internal audits inform the service provider’s management of the level of compliance within the organisation, the degree to which safety risk controls are effective and where corrective or preventive action is required.

5.4.9 MAAs may provide additional feedback on the status of compliance with regulations, and the effectiveness of the SMS and industry associations or other third parties selected by the service provider to audit their organisation and processes. Results of such second- and third-party audits are inputs to the safety assurance function, providing the service provider with indications of the effectiveness of their internal audit processes and opportunities to improve their SMS.

Safety performance monitoring

5.4.10 Safety performance monitoring is conducted through the collection of safety data and safety information from a variety of sources typically available to an organisation. Data availability to support informed decision-making is one of the most important aspects of the SMS. Using this data for safety performance monitoring and measurement are essential activities that generate the information necessary for safety risk decision-making.

5.4.11 Safety performance monitoring and measurement should be conducted observing some basic principles. The safety performance achieved is an indication of organisational behaviour and is also a measure of the effectiveness of the SMS. This requires the organisation to define:

- a) Safety objectives, which should be established first to reflect the strategic achievements or desired outcomes related to safety concerns specific to the organisation’s operational context;
- b) SPIs, which are tactical parameters related to the safety objectives and therefore are the reference for data collection; and
- c) SPTs, which are also tactical parameters used to monitor progress towards the achievement of the safety objectives.

5.4.12 A more complete and realistic picture of the service provider’s safety performance will be achieved if SPIs encompass a wide spectrum of indicators. This should include:

- a) low probability/high severity events (e.g. accidents and serious incidents);
- b) high probability/low severity events (e.g. uneventful operational events, non-conformance reports, deviations etc.); and
- c) process performance (e.g. training, system improvements and report processing).

5.4.13 SPIs are used to measure operational safety performance of the service provider and the performance of their SMS. SPIs rely on the monitoring of data and information from various sources including the safety reporting system. They should be specific to the individual service provider and be linked to the safety objectives already established.

5.4.14 When establishing SPIs service providers should consider:

- a) *Measuring the right things*: Determine the best SPIs that will show the organisation is on track to achieving its safety objectives. Also consider what are the biggest safety issues and safety risks faced by the organisation, and identify SPIs which will show effective control of these.
- b) *Availability of data*: Is there data available which aligns with what the organisation wants to measure? If there isn't, there may be a need to establish additional data collection sources. For small organisations with limited amounts of data, the pooling of data sets may also help to identify trends. This may be supported by industry associations who can collate safety data from multiple organisations.
- c) *Reliability of the data*: Data may be unreliable either because of its subjectivity or because it is incomplete.
- d) *Common industry SPIs*: It may be useful to agree on common SPIs with similar organisations so that comparisons can be made between organisations. The regulator or industry associations may enable these.

5.4.15 Once SPIs have been established the service provider should consider whether it appropriate to identify SPTs and alert levels. SPTs are useful in driving safety improvements but, implemented poorly, they have been known to lead to undesirable behaviours - that is, individuals and departments becoming too focused on achieving the target and perhaps losing sight of what the target was intended to achieve - rather than an improvement in organisational safety performance. In such cases it may be more appropriate to monitor the SPI for trends.

5.4.16 The following activities can provide sources to monitor and measure safety performance:

- a) *Safety studies* are analyses to gain a deeper understanding of safety issues or better understand a trend in safety performance.
- b) *Safety data analysis* uses the safety reporting data to uncover common issues or trends that might warrant further investigation.
- c) *Safety surveys* examine procedures or processes related to a specific operation. Safety surveys may involve the use of checklists, questionnaires and informal confidential interviews. Safety surveys generally provide qualitative information. This may require validation via data collection to determine if corrective action is

required. Nonetheless, surveys may provide an inexpensive and valuable source of safety information.

- d) *Safety audits* focus on assessing the integrity of the service provider's SMS and supporting systems. Safety audits can also be used to evaluate the effectiveness of installed safety risk controls or to monitor compliance with safety regulations. Ensuring independence and objectivity is a challenge for safety audits. Independence and objectivity can be achieved by engaging external entities or internal audits with protections in place - policies, procedures, roles, communication protocols.
- e) *Findings and recommendations from safety investigations* can provide useful safety information that can be analysed against other collected safety data.
- f) *Operational data collection systems* such as Flight Data Analysis (FDA), radar information can provide useful data of events and operational performance.

5.4.17 The development of SPIs should be linked to the safety objectives and be based on the analysis of data that is available or obtainable. The monitoring and measurement process involves the use of selected safety performance indicators, corresponding SPTs and safety triggers.

5.4.18 The organisation should monitor the performance of established SPIs and SPTs to identify abnormal changes in safety performance. SPTs should be realistic, context specific and achievable when considering the resources available to the organisation and the associated aviation sector.

5.4.19 Primarily, safety performance monitoring and measurement provides a means to verify the effectiveness of safety risk controls. In addition, they provide a measure of the integrity and effectiveness of SMS processes and activities.

5.4.20 The State may have specific processes for the acceptance of SPIs and SPTs that will need to be followed. Therefore, during development of SPIs and SPTs, the service provider should consult with the organisation's regulatory authority or any related information that the State has published.

5.4.21 For more information about safety performance management, refer to ICAO Annex 19 Chapter 4 (4th Edition).

5.5 The management of change

5.5.1 Service providers experience change due to a number of factors including, but not limited to:

- a) organisational expansion or contraction;
- b) business improvements that impact safety; these may result in changes to internal systems, processes or procedures that support the safe delivery of the products and services;
- c) changes to the organisation's operating environment;
- d) changes to the SMS interfaces with external organisations; and
- e) external regulatory changes, economic changes and emerging risks.

5.5.2 Change may affect the effectiveness of existing safety risk controls. In addition, new hazards and related safety risks may be inadvertently introduced into an operation when change occurs. Hazards should be identified and related safety risks assessed and controlled as defined in the organisation's existing hazard identification or SRM procedures.

5.5.3 The organisation's management of change process should take into account the following considerations:

- a) Criticality. How critical is the change? The service provider should consider the impact on their organisation's activities, and the impact on other organisations and the aviation system.
- b) Availability of subject matter experts. It is important that key members of the aviation community are involved in the change management activities; this may include individuals from external organisations.
- c) Availability of safety performance data and information. What data and information is available that can be used to give information on the situation and enable analysis of the change?

5.5.4 Small incremental changes often go unnoticed, but the cumulative effect can be considerable. Changes, large and small, might affect the organisation's system description, and may lead to the need for its revision. Therefore, the system description should be regularly reviewed to determine its continued validity, given that most service providers experience regular, or even continuous, change.

5.5.5 The service provider should define the trigger for the formal change process. Changes that are likely to trigger formal change management include:

- a) introduction of new technology or equipment;
- b) changes in the operating environment;
- c) changes in key personnel;
- d) significant changes in staffing levels;
- e) changes in safety regulatory requirements;
- f) significant restructuring of the organisation; and
- g) physical changes (new facility or base, aerodrome layout changes etc.).

5.5.6 The service provider should also consider the impact of the change on personnel. This could affect the way the change is accepted by those affected. Early communication and engagement will normally improve the way the change is perceived and implemented.

5.5.7 The change management process should include the following activities:

- a) *understand and define the change*; this should include a description of the change and why it is being implemented;
- b) *understand and define who and what it will affect*; this may be individuals within the organisation, other departments or external people or organisations. Equipment,

systems and processes may also be impacted. A review of the system description and organisations' interfaces may be needed. This is an opportunity to determine who should be involved in the change. Changes might affect risk controls already in place to mitigate other risks, and therefore change could increase risks in areas that are not immediately obvious;

- c) *identify hazards related to the change and carry out a safety risk assessment*; this should identify any hazards directly related to the change. The impact on existing hazards and safety risk controls that may be affected by the change should also be reviewed. This step should use the existing organisation's SRM processes;
- d) *develop an action plan*; this should define what is to be done, by whom and by when. There should be a clear plan describing how the change will be implemented and who will be responsible for which actions, and the sequencing and scheduling of each task;
- e) *sign off on the change*; this is to confirm that the change is safe to implement. The individual with overall responsibility and authority for implementing the change should sign the change plan; and
- f) *assurance plan*; this is to determine what follow-up action is needed. Consider how the change will be communicated and whether additional activities (such as audits) are needed during or after the change. Any assumptions made need to be tested.

5.6 Continuous improvement of the SMS

5.6.1 ICAO Annex 19, Appendix 2, 3.3 requires that “the service provider monitor and assess its SMS processes to maintain or continuously improve the overall effectiveness of the SMS.” Maintenance and continuous improvement of the service provider's SMS effectiveness is supported by safety assurance activities that include the verification and follow up of actions and the internal audit processes. It should be recognised that maintaining and continuously improving the SMS is an ongoing journey as the organisation itself and the operational environment will be constantly changing.

5.6.2 Internal audits involve assessment of the service provider's aviation activities that can provide information useful to the organisation's decision-making processes. The internal audit function includes evaluation of all of the safety management functions throughout the organisation.

5.6.3 SMS effectiveness should not be based solely on SPIs; service providers should aim to implement a variety of methods to determine its effectiveness, measure outputs as well as outcomes of the processes, and assess the information gathered through these activities. Such methods may include:

- a) *Audits*; this includes internal audits and audits carried out by other organisations.
- b) *Assessments*; includes assessments of safety culture and SMS effectiveness.
- c) *Monitoring of occurrences*: monitor the recurrence of safety events including accidents and incidents as well as errors and rule-breaking situations.
- d) *Safety surveys*; including cultural surveys providing useful feedback on staff engagement with the SMS. It may also provide an indicator of the safety culture of the organisation.

- e) *Management reviews*; examine whether the safety objectives are being achieved by the organisation and are an opportunity to look at all the available safety performance information to identify overall trends. It is important that senior management review the effectiveness of the SMS. This may be carried out as one of the functions of the highest-level safety committee.
- f) *Evaluation of SPIs and SPTs*; possibly as part of the management review. It considers trends and, when appropriate data is available, can be compared to other service providers or State or global data.
- g) *Addressing lessons learnt*; from safety reporting systems and service provider safety investigations.

These should lead to safety improvements being implemented.

5.6.4 In summary, the monitoring of the safety performance and internal audit processes contributes to the service provider's ability to continuously improve its safety performance. Ongoing monitoring of the SMS, its related safety risk controls and support systems assures the service provider and the State that the safety management processes are achieving their desired safety performance objectives.

6.0 COMPONENT 4: SAFETY PROMOTION

6.1 Safety promotion encourages a positive safety culture and helps achieve the service provider's safety objectives through the combination of technical competence that is continually enhanced through training and education, effective communication, and information-sharing. Senior management provides the leadership to promote the safety culture throughout an organisation.

6.2 Effective safety management cannot be achieved solely by mandate or strict adherence to policies and procedures. Safety promotion affects both individual and organisational behaviour, and supplements the organisation's policies, procedures and processes, providing a value system that supports safety efforts.

6.3 The service provider should establish and implement processes and procedures that facilitate effective two-way communication throughout all levels of the organisation. This should include clear strategic direction from the top of the organisation and the enabling of "bottom-up" communication that encourages open and constructive feedback from all personnel.

6.4 Training and education

6.4.1 ICAO Annex 19 requires that "the service provider shall develop and maintain a safety training programme that ensures that personnel are trained and competent to perform their SMS duties." It also requires that "the scope of the safety training programme be appropriate to each individual's involvement in the SMS." The safety manager is responsible for ensuring there is a suitable safety training programme in place. This includes providing appropriate safety information relevant to specific safety issues met by the organisation. Personnel who are trained and competent to perform their SMS duties, regardless of their level in the organisation, is an indication of management's commitment to an effective SMS. The training programme should include initial and recurrent training requirements to maintain competencies. Initial safety training should consider, as a minimum, the following:

- a) organisational safety policies and safety objectives;

- b) organisational roles and responsibilities related to safety;
- c) basic SRM principles;
- d) safety reporting systems;
- e) the organisation's SMS processes and procedures; and
- f) human factors.

6.4.2 Recurrent safety training should focus on changes to the SMS policies, processes and procedures, and should highlight any specific safety issues relevant to the organisation or lessons learnt.

6.4.3 The training programme should be tailored to the needs of the individual's role within the SMS. For example, the level and depth of training for managers involved in the organisation's safety committees will be more extensive than for personnel directly involved with delivery of the organisation's product or services. Personnel not directly involved in the operations may require only a high level overview of the organisation's SMS.

Training needs analysis

6.4.4 For most organisations, a formal training needs analysis (TNA) is necessary to ensure there is a clear understanding of the operation, the safety duties of the personnel and the available training. A typical TNA will normally start by conducting an audience analysis, which usually includes the following steps:

- a) Every one of the service provider's staff will be affected by the implementation of the SMS, but not in the same ways or to the same degree. Identify each staff grouping and in what ways they will interact with the safety management processes, inputs and outputs - in particular with safety duties. This information should be available from the position/role descriptions. Normally groupings of individuals will start to emerge that have similar learning needs. The service provider should consider whether it is valuable to extend the analysis to staff in external interfacing organisations.
- b) Identify the knowledge and competencies needed to perform each safety duty and required by each staff grouping.
- c) Conduct an analysis to identify the gap between the current safety skill and knowledge across the workforce and those needed to effectively perform the allocated safety duties.
- d) Identify the most appropriate skills and knowledge development approach for each group with the aim of developing a training programme appropriate to each individual or group's involvement in safety management. The training programme should also consider the staff's ongoing safety knowledge and competency needs; these needs will typically be met through a recurrent training programme.

6.4.5 It is also important to identify the appropriate method for training delivery. The main objective is that, on completion of the training, personnel are competent to perform their SMS duties. Competent trainers are usually the single most important consideration; their commitment, teaching skills and safety management expertise will have a significant impact on the effectiveness of the training delivered. The safety training

programme should also specify responsibilities for development of training content and scheduling as well as training and competency records management.

6.4.6 The organisation should determine who should be trained and to what depth, and this will depend on their involvement in the SMS. Most people working in the organisation have some direct or indirect relationship with aviation safety, and therefore have some SMS duties. This applies to any personnel directly involved in the delivery of products and services, and personnel involved in the organisation's safety committees. Some administrative and support personnel will have limited SMS duties and will need some SMS training, as their work may still have an indirect impact on aviation safety.

6.4.7 The service provider should identify the SMS duties of personnel and use the information to examine the safety training programme and ensure each individual receives training aligned with their involvement with SMS. The safety training programme should specify the content of safety training for support staff, operational personnel, managers and supervisors, senior managers and the accountable executive.

6.4.8 There should be specific safety training for the accountable executive and senior managers that includes the following topics:

- a) specific awareness training for new accountable executives and post holders on their SMS accountabilities and responsibilities;
- b) importance of compliance with national and organisational safety requirements;
- c) management commitment;
- d) allocation of resources;
- e) promotion of the safety policy and the SMS;
- f) promotion of a positive safety culture;
- g) effective interdepartmental safety communication;
- h) safety objective, SPTs and alert levels; and
- i) disciplinary policy.

6.4.9 The main purpose of the safety training programme is to ensure that personnel, at all levels of the organisation, maintain their competence to fulfil their safety roles; therefore, competencies of personnel should be reviewed on a regular basis.

6.5 Safety communication

6.5.1 The service provider should communicate the organisation's SMS objectives and procedures to all appropriate personnel. There should be a communication strategy that enables safety communication to be delivered by the most appropriate method based on the individual's role and need to receive safety related information. This may be done through safety newsletters, notices, bulletins, briefings or training courses. The safety manager should also ensure that lessons learnt from investigations and case histories or experiences, both internally and from other organisations, are distributed widely. Safety communication therefore aims to:

- a) *ensure that staff are fully aware of the SMS*; this is a good way of promoting the organisation's safety policy and safety objectives.

- b) *convey safety-critical information*; Safety critical information is specific information related to safety issues and safety risks that could expose the organisation to safety risk. This could be from safety information gathered from internal or external sources such as lessons learnt or related to safety risk controls. The service provider determines what information is considered safety critical and the timeliness of its communication.
- c) *raise awareness of new safety risk controls and corrective actions*; The safety risks faced by the service provider will change over time, and whether this is a new safety risk that has been identified or changes to safety risk controls, these changes will need to be communicated to the appropriate personnel.
- d) *provide information on new or amended safety procedures*; when safety procedures are updated it is important that the appropriate people are made aware of these changes.
- e) *promote a positive safety culture and encourage personnel to identify and report hazards*; safety communication is two-way. It is important that all personnel communicate safety issues to the organisation through the safety reporting system.
- f) *provide feedback*; provide feedback to personnel submitting safety reports on what actions have been taken to address any concerns identified.

6.5.2 Service providers should consider whether any of the safety information listed above needs to be communicated to external organisations.

6.5.3 Service providers should assess the effectiveness of their safety communication by checking personnel have received and understood any safety critical information that has been distributed. This can be done as part of the internal audit activities or when assessing the SMS effectiveness.

6.5.4 Safety promotion activities should be carried out throughout the life cycle of the SMS, not only at the beginning.

7.0 IMPLEMENTATION PLANNING

7.1 System description

7.1.1 A system description helps to identify the organisational processes, including any interfaces, to define the scope of the SMS. This provides an opportunity to identify any gaps related to the service provider's SMS components and elements and may serve as a starting point to identify organisational and operational hazards. A system description serves to identify the features of the product, the service or the activity so that SRM and safety assurance can be effective.

7.1.2 Most organisations are made up of a complex network of interfaces and interactions involving different internal departments as well as different external organisations that all contribute to the safe operation of the organisation. The use of a system description enables the organisation to have a clearer picture of its many interactions and interfaces. This will enable better management of safety risk and safety risk controls if they are described, and help in understanding the impact of changes to the SMS processes and procedures.

7.1.3 When considering a system description, it is important to understand that a “system” is a set of things working together as parts of an interconnecting network. In an SMS, it is any of an organisation’s products, people, processes, procedures, facilities, services, and other aspects (including external factors), which are related to, and can affect, the organisation’s aviation safety activities. Often, a “system” is a collection of systems, which may also be viewed as a system with subsystems. These systems and their interactions with one another make up the sources of hazards and contribute to the control of safety risks. The important systems include both those which could directly impact aviation safety and those which affect the ability or capacity of an organisation to perform effective safety management.

7.1.4 An overview of the system description and the SMS interfaces should be included in the SMS documentation. A system description may include a bulleted list with references to policies and procedures. A graphic depiction, such as a process flow chart or annotated organisation chart, may be enough for some organisations. An organisation should use a method and format that works for that organisation.

7.1.5 Because each organisation is unique, there is no “one size fits all” method for SMS implementation. It is expected that each organisation will implement an SMS that works for its unique situation. Each organisation should define for itself how it intends to go about fulfilling the fundamental requirements. To accomplish this, it is important that each organisation prepare a system description that identifies its organisational structures, processes, and business arrangements that it considers important to safety management functions. Based on the system description, the organisation should identify or develop policy, processes, and procedures that establish its own safety management requirements.

7.1.6 When an organisation elects to make a significant or substantive change to the processes identified in the system description, the changes should be viewed as potentially affecting its baseline safety risk assessment. Thus, the system description should be reviewed as part of the management of change processes.

7.2 Interface management

7.2.1 Safety risks faced by service providers are affected by interfaces. Interfaces can be either internal (e.g. between departments) or external (e.g. other service providers or contracted services,). By identifying and managing these interfaces the service provider will have more control over any safety risks related to the interfaces. These interfaces should be defined within the system description.

7.3 Identification of SMS interfaces

7.3.1 Initially service providers should concentrate on interfaces in relation to its business activities. The identification of these interfaces should be detailed in the system description that sets out the scope of the SMS and should include internal and external interfaces.

7.3.2 Figure 3 is an example of how a service provider could map out the different organisations it interacts with to identify any SMS interfaces. The objective of this review is to produce a comprehensive list of all interfaces. The rationale for this exercise is that there may be SMS interfaces which an organisation is not necessarily fully aware of. There may be interfaces where there are no formal agreements in place, such as with the power supply or building maintenance companies.

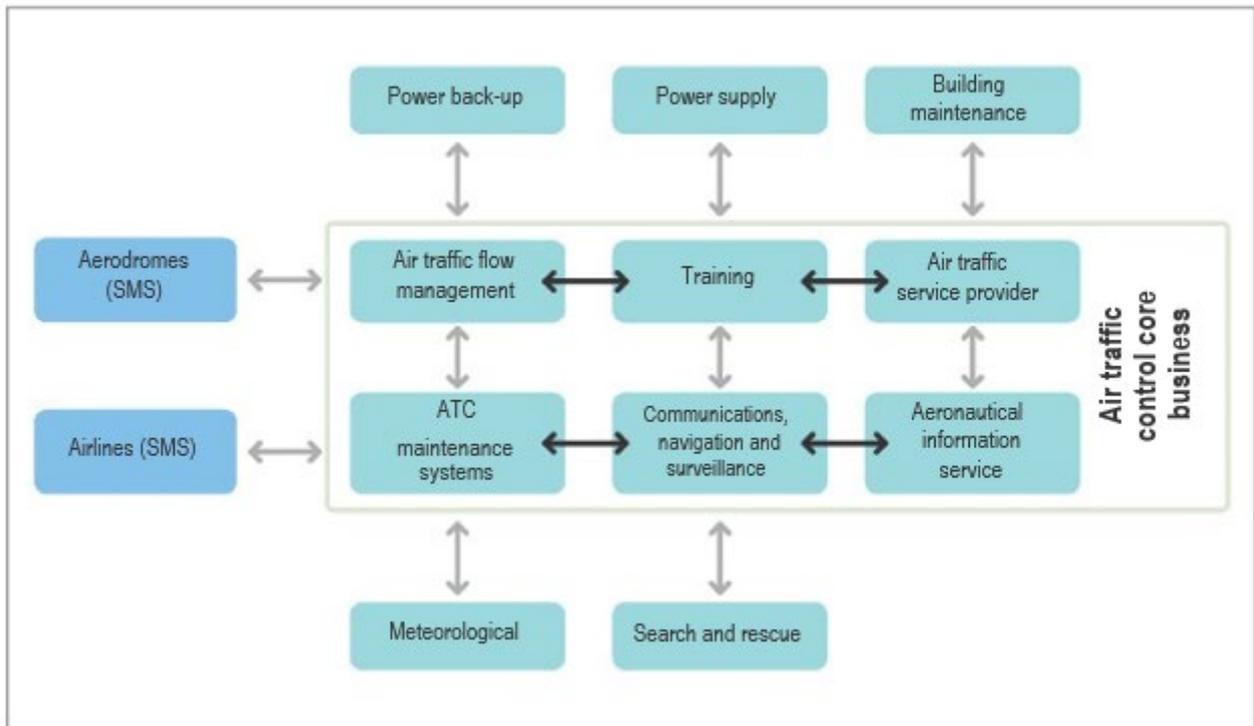


Figure 3. Example of air traffic service provider SMS interfaces

7.3.3 Some of the internal interfaces may be with business areas not directly associated with safety, such as marketing, finance, legal and human resources. These areas can impact safety through their decisions which impact on internal resources and investment, as well as through agreements and contracts with external organisations, and may not necessarily address safety.

7.3.4 Once the SMS interfaces have been identified, the service provider should consider their relative criticality. This enables the service provider to prioritise the management of the more critical interfaces, and their potential safety risks. Things to consider are:

- a) what is being provided;
- b) why it is needed;
- c) whether the organisations involved has an SMS or another management system in place; and
- d) whether the interface involves the sharing of safety data / information.

Assessing safety impact of interfaces

7.3.5 The service provider should then identify any hazards related to the interfaces and carry out a safety risk assessment using its existing hazard identification and safety risk assessment processes.

7.3.6 Based on the safety risks identified, the service provider may consider working with the other organisation to determine and define an appropriate safety risk control strategy. By involving the other organisation, they may be able to contribute to identifying hazards, assessing the safety risk as well as determining the appropriate safety risk control. This

collaborative effort is needed because the perception of safety risks may not be the same for each organisation. The risk control could be carried out by either the service provider or the external organisation.

7.3.7 It is also important to recognise that each organisation involved has the responsibility to identify and manage hazards that affect their own organisation. This may mean the critical nature of the interface is different for each organisation as they may apply different safety risk classifications and have different safety risk priorities (in term of safety performance, resources, time, etc.).

Managing and monitoring interfaces

7.3.8 The service provider is responsible for managing and monitoring the interfaces to ensure the safe provision of their services and products. This will ensure the interfaces are managed effectively and remain current and relevant. Formal agreements are an effective way to accomplish this as the interfaces and associated responsibilities can be clearly defined. Any changes in the interfaces and associated impacts should be communicated to the relevant organisations.

7.3.9 Challenges associated with the service provider's ability to manage interface safety risks include:

- a) one organisation's safety risk controls are not compatible with the other organisations';
- b) willingness of both organisations to accept changes to their own processes and procedures;
- c) insufficient resources or technical expertise available to manage and monitor the interface; and
- d) number and location of interfaces.

7.3.10 It is important to recognise the need for coordination between the organisations involved in the interface. Effective coordination should include:

- a) clarification of each organisation's roles and responsibilities;
- b) agreement of decisions on the actions to be taken (e.g. safety risk control actions and timescales);
- c) identification of what safety information needs to be shared and communicated;
- d) how and when coordination should take place (task force, regular meetings, ad hoc or dedicated meetings); and
- e) agreeing on solutions that benefit both organisations but that do not impair the effectiveness of the SMS.

7.3.11 All safety issues or safety risks related to the interfaces should be documented and made accessible to each organisation for sharing and review. This will allow the sharing of lessons learnt and the pooling of safety data that will be valuable for both organisations. Operational safety benefits may be achieved through an enhancement of safety reached by each organisation as the result of shared ownership of safety risks and responsibility.

7.4 SMS Scalability

7.4.1 The organisation's SMS, including the policies, processes and procedures, should reflect the size and complexity of the organisation and its activities. It should consider:

- a) the organisational structure and availability of resources;
- b) size and complexity of the organisation (including multiple sites and bases); and
- c) complexity of the activities and the interfaces with external organisations.

7.4.2 The service provider should carry out an analysis of its activities to determine the right level of resources to manage the SMS. This should include the determination of the organisational structure needed to manage the SMS. This would include considerations of who will be responsible for managing and maintaining the SMS, what safety committees are needed, if any, and the need for specific safety specialists.

Safety risk considerations

7.4.3 Regardless of the size of the service provider, scalability should also be a function of the inherent safety risk of the service provider's activities. Even small organisations may be involved in activities that may entail significant aviation safety risks. Therefore, safety management capability should be commensurate with the safety risk to be managed.

Safety data and safety information and its analysis

7.4.4 For small organisations, the low volume of data may mean that it is more difficult to identify trends or changes in the safety performance. This may require meetings to raise and discuss safety issues with appropriate experts. This may be more qualitative than quantitative but will help identify hazards and risks for the service provider. Collaborating with other service providers or industry associations can be helpful, since these may have data that the service provider does not have. For example, smaller service providers can exchange with similar organisations/operations to share safety risk information and identify safety performance trends. Service providers should adequately analyse and process their internal data even though it may be limited.

7.4.5 Service providers with many interactions and interfaces will need to consider how they gather safety data and safety information from multiple organisations. This may result in large volumes of data being collected to be collated and analysed later. These service providers should utilise an appropriate method of managing such data. Consideration should also be given to the quality of the data collected and the use of taxonomies to help with the analysis of the data.

7.5 Integration of management systems

7.5.1 Safety management should be considered as part of a management system (and not in isolation). Therefore, a service provider may implement an integrated management system that includes the SMS. An integrated management system may be used to capture multiple certificates, authorisations or approvals or to cover other business management systems such as quality, security, occupational health and environmental management systems. This is done to remove duplication and exploit synergies by managing safety risks across multiple activities. For example, where a service provider holds multiple certificates it may choose to implement a single management system to cover all of its activities. The service provider should decide the best means to integrate or segregate its SMS to suit its business or organisational needs.

7.5.2 A typical integrated management system may include a:

- a) quality management system (QMS);
- b) safety management system (SMS);
- c) security management system (SeMS), further guidance may be found in the *Aviation Security Manual* (Doc 8973 — Restricted);
- d) environmental management system (EMS);
- e) occupational health and safety management system (OHSMS);
- f) financial management system (FMS);
- g) documentation management system (DMS); and
- h) fatigue risk management system (FRMS).

7.5.3 A service provider may choose to integrate these management systems based on their unique needs. Risk management processes and internal audit processes are essential features of most of these management systems. It should be recognised that the risks and risk controls developed in any of these systems could have an impact on other systems. In addition, there may be other operational systems associated with the business activities that may also be integrated, such as supplier management, facilities management, etc.

7.5.4 A service provider may also consider applying the SMS to other areas that do not have a current regulatory requirement for an SMS. Service providers should determine the most suitable means to integrate or segregate their management system to suit their business model, operating environment, regulatory, and statutory requirements as well as the expectations of the aviation community. Whichever option is taken, it should still ensure that it meets the SMS requirements.

Benefits and challenges of management system integration

7.5.5 Integrating the different areas under a single management system will improve efficiency by:

- a) reducing duplication and overlapping of processes and resources;
- b) reducing potentially conflicting responsibilities and relationships;
- c) considering the wider impacts of risks and opportunities across all activities; and
- d) allowing effective monitoring and management of performance across all activities.

7.5.6 Possible challenges of management system integration include:

- a) existing systems may have different functional managers who resist the integration; this could result in conflict;
- b) there may be resistance to change for personnel impacted by the integration as this will require greater cooperation and coordination;

- c) impact on the overall safety culture within the organisation as there may be different cultures in respect of each system; this could create conflicts;
- d) regulations may prevent such an integration or the different regulators and standards bodies may have diverging expectations on how their requirements should be met; and
- e) integrating different management systems (such as QMS and SMS) may create additional work to be able to demonstrate that the separate requirements are being met.

7.5.7 To maximise the benefits of integration and address the related challenges, senior management commitment and leadership is essential to manage the change effectively. It is important to identify the person who has overall responsibility for the integrated management system.

7.6 SMS and QMS integration

7.6.1 Some service providers have both an SMS and QMS. These sometimes are integrated into a single management system. The QMS is generally defined as the organisational structure and associated accountabilities, resources, processes and procedures necessary to establish and promote a system of continuous quality assurance and improvement while delivering a product or service.

7.6.2 Both systems are complementary; the SMS focuses on managing safety risks and safety performance while the QMS focuses on compliance with prescriptive regulations and requirements to meet customer expectations and contractual obligations. The objectives of an SMS are to identify hazards, assess the associated safety risk and implement effective safety risk controls. In contrast, the QMS focuses on the consistent delivery of products and services that meet relevant specifications. Nonetheless, both the SMS and the QMS:

- a) should be planned and managed;
- b) involve all organisational functions related to the delivery of aviation products and services;
- c) identify ineffective processes and procedures;
- d) strive for continuous improvement; and
- e) have the same goal of providing safe and reliable products and services to customers.

7.6.3 The SMS focuses on:

- a) identification of safety-related hazards facing the organisation;
- b) assessment of the associated safety risk;
- c) implementation of effective safety risk controls to mitigate safety risks;
- d) measuring safety performance; and
- e) maintaining an appropriate resource allocation to meet safety performance requirements.

7.6.4 The QMS focuses on:

- a) compliance with regulations and requirements;
- b) consistency in the delivery of products and services;
- c) meeting the specified performance standards; and
- d) delivery of products and services that are “fit for purpose” and free of defects or errors.

7.6.5 Monitoring compliance with regulations is necessary to ensure that safety risk controls, applied in the form of regulations, are effectively implemented and monitored by the service provider. The causes and contributing factors of any non-compliance should also be analysed and addressed.

7.6.6 Given the complementary aspects of SMS and QMS, it is possible to integrate both systems without compromising each function. This can be summarised as follows:

- a) an SMS is supported by QMS processes such as auditing, inspection, investigation, root cause analysis, process design, and preventive actions;
- b) a QMS may identify safety issues or weaknesses in safety risk controls;
- c) a QMS may foresee safety issues that exist despite the organisation’s compliance with standards and specifications;
- d) quality principles, policies and practices should be aligned with the objectives of safety management; and
- e) QMS activities should consider identified hazards and safety risk controls for the planning and performance of internal audits.

7.6.7 In conclusion, in an integrated management system with unified goals and decision-making that considers the wider impacts across all activities, quality management and safety management processes will be highly complementary and will support the achievement of the overall safety goals.

7.7 SMS gap analysis and implementation

7.7.1 Before implementing an SMS, the service provider should carry out a gap analysis (see the APPENDIX I – SMS GAP ANALYSIS CHECKLIST). This compares the service provider’s existing safety management processes and procedures with the SMS requirements as determined by the State. It is likely that the service provider already has some of the SMS functions in place. The development of an SMS should build upon existing organisational policies and processes. The gap analysis identifies the gaps that should be addressed through an SMS implementation plan that defines the actions needed to implement a fully functioning and effective SMS.

7.7.2 The SMS implementation plan should provide a clear picture of the resources, tasks and processes required to implement the SMS. The timing and sequencing of the implementation plan may depend on a variety of factors that will be specific to each organisation, such as:

- a) regulatory, customer and statutory requirements;

- b) multiple certificates held (with possibly different regulatory implementation dates);
- c) the extent to which the SMS may build upon existing structures and processes;
- d) the availability of resources and budgets;
- e) interdependencies between different steps (a reporting system should be implemented before establishing a data analysis system); and
- f) the existing safety culture.

7.7.3 The SMS implementation plan should be developed in consultation with the accountable executive and other senior managers, and should include who is responsible for the actions along with timelines. The plan should address coordination with external organisations or contractors where applicable.

7.7.4 The SMS implementation plan may be documented in different forms, varying from a simple spread sheet to specialised project management software. The plan should be monitored regularly and updated as necessary. It should also clarify when a specific element can be considered successfully implemented.

7.7.5 Both the State and the service provider should recognise that achieving an effective SMS may take several years. Service providers should refer to their State as there may be requirements for a phased approach for SMS implementation.

APPENDIX I – SMS GAP ANALYSIS CHECKLIST

Reference: ICAO Safety Management Manual (SMM) 3rd Edition, Appendix 7 to Chapter 5.

1. INITIAL GAP ANALYSIS CHECKLIST

1.1 The initial gap analysis checklist in Table 2 can be used as a template to conduct the first step of an SMS gap analysis. This format with its overall “Yes/No/Partial” responses will provide an initial indication of the broad scope of gaps and hence overall workload to be expected. The questionnaire may be adjusted to suit the needs of the organisation and the nature of the product or service provided. This initial information should be useful to senior management in anticipating the scale of the SMS implementation effort and hence the resources to be provided.

1.2. A “Yes” answer indicates that the organisation meets or exceeds the expectation of the question concerned. A “No” answer indicates a substantial gap in the existing system with respect to the question’s expectation. A “Partial” answer indicates that further enhancement or development work is required to an existing process in order to meet the question’s expectations.

Note. – The State Safety Program references in square [] brackets refer to guidance material in the ICAO Safety Management Manual relevant to the gap analysis question.

Table 2. Gap analysis checklist

No.	Aspect to be analysed or question to be answered	Answer	Status of implementation
Component 1 — SAFETY POLICY AND OBJECTIVES			
Element 1.1 — Management commitment and responsibility			
1.1-1	Is there a safety policy in place? [5.3.7 to 5.3.15; 5.5.3]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.1-2	Does the safety policy reflect senior management’s commitment regarding safety management? [5.3.7 to 5.3.15]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.1-3	Is the safety policy appropriate to the size, nature and complexity of the organisation? [5.3.7 to 5.3.15]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.1-4	Is the safety policy relevant to aviation safety? [5.3.7 to 5.3.15]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	

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No.	Aspect to be analysed or question to be answered	Answer	Status of implementation
1.1-5	Is the safety policy signed by the accountable executive? [5.3.7 to 5.3.15; 5.5.3]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.1-6	Is the safety policy communicated, with visible endorsement, throughout the [Organisation]? [5.5.3]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.1-7	Is the safety policy periodically reviewed to ensure it remains relevant and appropriate to the [Organisation]? [5.5.3]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
Element 1.2 — Safety accountabilities			
1.2-1	Has [Organisation] identified an accountable executive who, irrespective of other functions, shall have ultimate responsibility and accountability, on behalf of the [Organisation], for the implementation and maintenance of the SMS? [5.3.16 to 5.3.26; 5.5.2]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.2-2	Does the accountable executive have full control of the financial and human resources required for the operations authorised to be conducted under the operations certificate? [5.3.16 to 5.3.26]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.2-3	Does the Accountable Executive have final authority over all aviation activities of his organisation? [5.3.16 to 5.3.26]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.2-4	Has [Organisation] identified and documented the safety accountabilities of management as well as operational personnel, with respect to the SMS? [5.3.16 to 5.3.26]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.2-5	Is there a safety committee or review board for the purpose of reviewing SMS and safety performance? [5.3.27 to 5.3.33; Appendix 4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.2-6	Is the safety committee chaired by the accountable executive or by an appropriately assigned deputy, duly substantiated in the SMS manual? [5.3.27 to 5.3.33; Appendix 4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.2-7	Does the safety committee include relevant operational or departmental heads as applicable? [5.3.27 to 5.3.33; Appendix 4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.2-8	Are there safety action groups that work in conjunction with the safety committee (especially for large/complex organisations)? [5.3.27 to 5.3.33; Appendix 4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	

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No.	Aspect to be analysed or question to be answered	Answer	Status of implementation
Element 1.3 — Appointment of key safety personnel			
1.3-1	Has [Organisation] appointed a qualified person to manage and oversee the day-to-day operation of the SMS? [5.3.27 to 5.3.33; 5.5.2; Appendix 2]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.3-2	Does the qualified person have direct access or reporting to the accountable executive concerning the implementation and operation of the SMS? [5.3.27 to 5.3.33; 5.5.2; Appendix 2, 6.1]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.3-3	Does the manager responsible for administering the SMS hold other responsibilities that may conflict or impair his role as SMS manager? [Appendix 2, 6.4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.3-4	Is the SMS manager's position a senior management position not lower than or subservient to other operational or production positions? [Appendix 2, 6.4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
Element 1.4 — Coordination of emergency response planning			
1.4-1	Does [Organisation] have an emergency response/contingency plan appropriate to the size, nature and complexity of the organisation? [Appendix 3]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.4-2	Does the emergency/contingency plan address all possible or likely emergency/crisis scenarios relating to the organisation's aviation product or service deliveries? [Appendix 3, 4 f)]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.4-3	Does the ERP include procedures for the continuing safe production, delivery or support of its aviation products or services during such emergencies or contingencies? [Appendix 3, 4 e)]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.4-4	Is there a plan and record for drills or exercises with respect to the ERP? [Appendix 3, 5 c)]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.4-5	Does the ERP address the necessary coordination of its emergency response/contingency procedures with the emergency/response contingency procedures of other organisations where applicable? [Appendix 3, 4 d)]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.4-6	Does [Organisation] have a process to distribute and communicate the ERP to all relevant personnel, including relevant external organisations? [Appendix 3, 5 d)]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	

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No.	Aspect to be analysed or question to be answered	Answer	Status of implementation
1.4-7	Is there a procedure for periodic review of the ERP to ensure its continuing relevance and effectiveness? [Appendix 3, 5 f)]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
Element 1.5 — SMS documentation			
1.5-1	Is there a top-level SMS summary or exposition document which is approved by the accountable manager and accepted by the MAA? [5.3.36 to 5.3.38]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.5-2	Does the SMS documentation address the organisation's SMS and its associated components and elements? [5.3.36 to 5.3.38; 5.4.1; Appendix 4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.5-3	Is [Organisation] SMS framework in alignment with the regulatory SMS framework? [5.3.36 to 5.3.38; 5.4.1; Appendix 4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.5-4	Does [Organisation] maintain a record of relevant supporting documentation pertinent to the implementation and operation of the SMS? [5.3.36 to 5.3.38; 5.5.5]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.5-5	Does [Organisation] have an SMS implementation plan to establish its SMS implementation process, including specific tasks and their relevant implementation milestones? [5.4.4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.5-6	Does the SMS implementation plan address the coordination between the service provider's SMS and the SMS of external organisations where applicable? [5.4.4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
1.5-7	Is the SMS implementation plan endorsed by the accountable executive? [5.4.4; 5.5.2]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
Component 2 — SAFETY RISK MANAGEMENT			
Element 2.1 — Hazard identification			
2.1-1	Is there a process for voluntary hazards/threats reporting by all employees? [5.3.42 to 5.3.52; 5.5.4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
2.1-2	Is the voluntary hazard/threats reporting simple, available to all personnel involved in safety-related duties and commensurate with the size of the service provider? [5.3.42 to 5.3.52]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	

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<i>No.</i>	<i>Aspect to be analysed or question to be answered</i>	<i>Answer</i>	<i>Status of implementation</i>
2.1-3	Does [Organisation] Safety Data Collection and Processing Systems (SDCPS) include procedures for incident/accident reporting by operational or production personnel? [5.3.42 to 5.3.52; 5.5.4; Chapter 4, Appendix 3]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
2.1-4	Is incident/accident reporting simple, accessible to all personnel involved in safety-related duties and commensurate with the size of the service provider? [5.3.42 to 5.3.52; 5.5.4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
2.1-5	Does [Organisation] have procedures for investigation of all reported incident/accidents? [5.3.42 to 5.3.52; 5.5.4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
2.1-6	Are there procedures to ensure that hazards/threats identified or uncovered during incident/accident investigation processes are appropriately accounted for and integrated into the organisation's hazard collection and risk mitigation procedure? [2.13.9; 5.3.50 f); 5.5.5]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
2.1-7	Are there procedures to review hazards/threats from relevant industry reports for follow-up actions or risk evaluation where applicable? [5.3.5.1]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
Element 2.2 — Safety risk assessment and mitigation			
2.2-1	Is there a documented hazard identification and risk mitigation (HIRM) procedure involving the use of objective risk analysis tools? [2.13; 2.14; 5.3.53 to 5.3.61]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
2.2-2	Is the risk assessment reports approved by departmental managers or at a higher level where appropriate? [2.15.5; 5.3.53 to 5.3.61]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
2.2-3	Is there a procedure for periodic review of existing risk mitigation records? [5.5.4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
2.2-4	Is there a procedure to account for mitigation actions whenever unacceptable risk levels are identified? [5.5.4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
2.2-5	Is there a procedure to prioritise identified hazards for risk mitigation actions? [5.5.4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
2.2-6	Is there a programme for systematic and progressive review of all aviation safety-related operations, processes, facilities and equipment subject to the HIRM process as identified by the organisation? [5.5.4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	

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No.	<i>Aspect to be analysed or question to be answered</i>	<i>Answer</i>	<i>Status of implementation</i>
Component 3 — SAFETY ASSURANCE			
Element 3.1 — Safety performance monitoring and measurement			
3.1-1	Are there identified safety performance indicators for measuring and monitoring the safety performance of the organisation's aviation activities? [5.3.66 to 5.3.73; 5.4.5; 5.5.4; 5.5.5; Appendix 6]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
3.1-2	Are the safety performance indicators relevant to the organisation's safety policy as well as management's high-level safety objectives/goals? [5.3.66 to 5.3.73; 5.4.5; Appendix 6]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
3.1-3	Do the safety performance indicators include alert/target settings to define unacceptable performance regions and planned improvement goals? [5.3.66 to 5.3.73; 5.4.5; 5.5.4; 5.5.5; Appendix 6]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
3.1-4	Is the setting of alert levels or out-of-control criteria based on objective safety metrics principles? [5.3.66 to 5.3.73; 5.4.5; Appendix 6]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
3.1-5	Do the safety performance indicators include quantitative monitoring of high-consequence safety outcomes (e.g. accident and serious incident rates) as well as lower-consequence events (e.g. rate of non-compliance, deviations)? [5.3.66 to 5.3.73; 5.4.5; 5.5.4; 5.5.5; Appendix 6]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
3.1-6	Are safety performance indicators and their associated performance settings developed in consultation with, and subject to, the MAA's agreement? [5.3.66 to 5.3.73; 5.4.5.2; 5.5.4; 5.5.5]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
3.1-7	Is there a procedure for corrective or follow-up action to be taken when targets are not achieved and alert levels are exceeded/breached? [5.4.5; Appendix 6, Table 5-A6-5 b)]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
3.1-8	Are the safety performance indicators periodically reviewed? [5.4.5; Appendix 6]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
Element 3.2 — The management of change			
3.2-1	Is there a procedure for review of relevant existing aviation safety-related facilities and equipment (including HIRM records) whenever there are pertinent changes to those facilities or equipment? [5.3.74 to 5.3.77; 5.5.4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	

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No.	<i>Aspect to be analysed or question to be answered</i>	<i>Answer</i>	<i>Status of implementation</i>
3.2-2	Is there a procedure for review of relevant existing aviation safety-related operations and processes (including any HIRM records) whenever there are pertinent changes to those operations or processes? [5.3.74 to 5.3.77; 5.5.4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
3.2-3	Is there a procedure for review of new aviation safety-related operations and processes for hazards/risks before they are commissioned? [5.5.4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
3.2-4	Is there a procedure for review of relevant existing facilities, equipment, operations or processes (including HIRM records) whenever there are pertinent changes external to the organisation such as regulatory/industry standards, best practices or technology? [5.5.4]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
Element 3.3 — Continuous improvement of the SMS			
3.3-1	Is there a procedure for periodic internal audit/assessment of the SMS? [5.3.78 to 5.3.82; 5.5.4; 5.5.5]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
3.3-2	Is there a current internal SMS audit/assessment plan? [5.3.78 to 5.3.82; 5.5.4; 5.5.5]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
3.3-3	Does the SMS audit plan include the sampling of completed/existing safety risk assessments? [5.5.5]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
3.3-4	Does the SMS audit plan include the sampling of safety performance indicators for data currency and their target/alert settings performance? [5.4.5; 5.5.5]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
3.3-5	Does the SMS audit plan cover the SMS interface with subcontractors or customers where applicable? [5.4.1; 5.5.5]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
3.3-6	Is there a process for SMS audit/assessment reports to be submitted or highlighted for the accountable manager's attention where appropriate? [5.3.80; 5.5.5]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	

UAEMAR SMS – AVIATION SAFETY MANAGEMENT SYSTEMS

<i>No.</i>	<i>Aspect to be analysed or question to be answered</i>	<i>Answer</i>	<i>Status of implementation</i>
Component 4 — SAFETY PROMOTION			
Element 4.1 — Training and education			
4.1-1	Is there a programme to provide SMS training/familiarisation to personnel involved in the implementation or operation of the SMS? [5.3.86 to 5.3.91; 5.5.5]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
4.1-2	Has the accountable executive undergone appropriate SMS familiarisation, briefing or training? [5.3.86 to 5.3.91; 5.5.5]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
4.1-3	Are personnel involved in conducting risk mitigation provided with appropriate risk management training or familiarisation? [5.3.86 to 5.3.91; 5.5.5]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
4.1-4	Is there evidence of organisation-wide SMS education or awareness efforts? [5.3.86 to 5.3.91; 5.5.5]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
Element 4.2 — Safety communication			
4.2-1	Does [Organisation] participate in sharing safety information with relevant external industry product and service providers or organisations, including the relevant aviation regulatory organisations? [5.3.92; 5.3.93; 5.5.5]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
4.2-2	Is there evidence of a safety (SMS) publication, circular or channel for communicating safety (SMS) matters to employees? [5.3.92; 5.3.93; 5.5.5]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	
4.2-3	Are [Organisation] SMS manual and related guidance material accessible or disseminated to all relevant personnel? [5.3.92; 5.3.93; 5.5.5]	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Partial	

TABLE OF CHANGES

All amended paragraphs are indicated by the use of a ‘sidebar’ in the margin. This can be readily cross-referenced using this table which details each change.

Nomenclature Used:

Additions to the text are tabulated below in green. Deletions of text are indicated by the use of ►◄. In both cases, the reason for the difference is clarified in the ‘notes’ column’.

If a paragraph is not included on the table, then no amendments have been made.

Paragraph	Sub-paragraph	UAEMAR SMS Edition 1.0 wording	UAEMAR SMS Edition 1.1 wording	Notes