CIVIL AVIATION AUTHORITY OF FIJI

STANDARDS DOCUMENT

Safety Management Systems

3rd Edition
July 2018
SD-SMS

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Safety Management Systems

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PREFACE

General

Fiji's National Aviation Law consists of a three tier or triple system regulatory system, comprising Acts, Regulations and Standards Documents; the purpose of which is to ensure, where deemed appropriate, compliance and conformance with ICAO Standards and Recommended Practices (SARPS).

The 'three tier' or 'triple system' regulatory system represents Fiji's Primary Legislation System and Specific Operating Regulations to meet Critical Elements CE1 and CE2 of ICAO's Eight Critical Element of a safety oversight system

Standards Documents (SD) are issued by the Civil Aviation Authority of Fiji under the provision of Section 14 (3) (b) of the Civil Aviation Authority Act 1979 (CAP 174A)

Where appropriate, the SD also contains technical guidance (Critical Element CE5) on standards, practices, and procedures that are acceptable to the Authority.

Notwithstanding the above, and where specifically indicated in this Standards Document that such a provision is available, consideration may be given to other methods of compliance that may be presented to the Authority provided they have compensating factors that can demonstrate a level of safety equivalent to or better than those prescribed herein. Accordingly, the Authority will consider each case based on its own merits holistically in the context of and relevancy of the alternative methods to the individual applicant.

When new standards, practices, or procedures are determined to be acceptable, they will be added to this document.

Purpose

This Standards Document, in accordance with ANR 146(1)(4), on Safety Management Systems is hereby published pursuant to Section 14 (3) (b) of the Civil Aviation Authority Act 1979, as amended by the Civil Aviation (Reform) Act of 1999 and to:

	ICAO REFERENCE	ANR REFERENCE	SD REFERENCE	IN-FORCE DATE CAAF
Air Operators	Annex 6 - Operation of Aircraft PANS – Ops Doc 8168 Annex 13 - Accident Investigation	ANR 34, 43	SD – AOC	Nov 2006
ATS providers	Annex 11 Section 2.26 PANS – ATM Doc 4444	ANR145A	SD-ATS	Nov 2006
Training Institutions	ICAO requires QA system as of 24th November 2005 Annex 13 - Accident Investigation	ANR145B	SD – Certification of Approved Training Institution	1 July 2004
Approved Maintenance Organisation	ICAO requires QA system – Annex 6 Section 8.7 Annex 13 Accident Investigation	ANR145C	SD Airworthiness of Aircraft requires QA	Nov 2006
Telecoms	Annex 10 – no specific requirement Annex 11	ANR145C	SD - Telecom	
International Aerodromes	Annex 14 - Section 1.5 Doc 9774 - Certification of Aerodromes Annex 13 - Accident Investigation	CA Reform Act 1999 -10.3(a)	SD – Aerodromes	1 July 2008

Domestic Aerodromes	Not mandated	CA Reform Act 1999 - 10(3)(b)(c) and 10(5)	SD – Aerodromes	1 July 2008
Aviation Security Service Providers		Security Reg 1994 (LN14/2006) 19(a)	National Security Program SD - Security	Requires compliance now
Ground Handlers		Security Reg 1994 (LN14/2006) 19(b)	National Security Program SD - Security	Requires compliance now
International Air Cargo Operators		Security Reg 1994 (LN14/2006) 5(a) and 19(a)	National Security Program SD - Security	Requires compliance now

	ICAO REFERENCE	**ANR REFERENCE**	**SD REFERENCE**	**IN-FORCE DATE CAAF**
Regulated Agent		Security Reg 1994 (LN14/2006) 19(b)	National Security Program SD - Security	Requires compliance now
Rescue Fire				
Screening Personnel		Security Reg 1994 (LN14/2006) 19(a) and ANR 34, 43	National Security Program SD - Security	Requires compliance now
Aircraft Catering Service Providers		Security Reg 1994 (LN14/2006) 19(c)	National Security Program SD - Security	Requires compliance now

Change Notice

This Standards Document has been developed to support ICAO Annex 19 Safety Management, and Document 9859 Safety Management Manual (SMM), in reference to the obligation of an aircraft operator, maintenance organization, aviation training institution, air traffic service provider, air navigation service provider, aerodrome operator, aircraft handling service provider, aviation security provider, aircraft catering service provider, and international air cargo handling service provider as applicable, to comply with standards for Safety Management Systems notified by the Authority and is the means by which such notification is given.

THERESA LEVESTAM
CHIEF EXECUTIVE

AMENDMENT RECORD

The following space is provided to keep a record of all amendments to 3rd Edition.

Amendment No.	Effective Date	Entered By	Date Entered
1	31/7/18	FOI (RW)	2/7/18
2	20/08/19	FT	20/08/19
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CONTENTS

1. Statutory basis

1.1 This standard is promulgated under the statutory authority in the Republic of the Fiji *applicable* civil aviation legislations and standards.

2. Scope and applicability

2.1 Scope

2.1.1 This standard describes the requirements for a service provider safety management system (SMS) operating in accordance with [ICAO Annex 1 – Personel Licensing, Annex 6 — *Operation of Aircraft, Part I — International Commercial Air Transport — Aeroplanes, and Part III — International Operations — Helicopters*, Annex 8 – Airworthiness of Aircraft, Annex 11 — *Air Traffic Services, Annex 13 — Aircraft Accident and Incident Investigation*, and ICAO Annex 14 — *Aerodromes, Volume I — Aerodrome Design and Operations*].

2.1.2 Within the context of this standard the term “service provider” must be understood to designate any organization providing aviation related services. The term includes organisations that are exposed to operational safety risks during the provision of their services and encompasses, but is not limited to, aircraft operators, maintenance organizations, aviation training institutions, air traffic service providers, air navigation service providers, aerodrome operators, aircraft handling service providers, aviation security providers, aircraft catering service providers, and international air cargo handling service providers as applicable.

2.1.3 This standard address aviation safety related processes and activities rather than occupational safety, environmental protection, or customer service quality.

2.1.4 The service provider is responsible for the safety of services or products contracted to or purchased from other organizations.

2.1.5 This standard establishes the minimum acceptable requirements; the service provider can establish more stringent requirements.

2.2 Applicability and acceptance

2.2.1 Effective 31st November 2006, a service provider shall have in place a safety management system (SMS) that is acceptable to the Civil Aviation Authority of Fiji, that, as a minimum:

2.2.1.1 identifies safety hazards and assesses and mitigates risks;

2.2.1.2 ensures the implementation of remedial action necessary to maintain agreed safety performance

2.2.1.3 provides for continuous monitoring and regular assessment of the safety performance; and

2.2.1.4 aims at a continuous improvement of the overall performance of the safety management system.

2.3 In order to be acceptable to the State, a service provider SMS shall meet the requirements set forth in this standard.

Information note. *– Information regarding the acceptance process for the SMS can be found in the SMS Implementation Guide published by the Authority.*

3. References

3.1 This standard is in accordance with [ICAO Annex 1 – Personnel Licensing, Annex 6 — *Operation of Aircraft, Part I — International Commercial Air Transport — Aeroplanes,*

and Part III — International Operations — Helicopters, ICAO Annex 11 — *Air Traffic Services*, Annex 8 – Airworthiness of Aircraft, Annex 13 — Aircraft Accident and Incident Investigation, Annex 14 — *Aerodromes, Volume I — Aerodrome Design and Operations*], the *ICAO Safety Management Manual* (Doc 9859), and the ICAO Document 9734, Safety Oversight Manual.

3.2 This standard is in accordance with Civil Aviation Reform Act, Aerodrome Certification Regulation, Security Regulation 1994, Air Navigation Regulations 34, 43, 145 ABC and SD-Issuance of AOC of Competency, SD-ATS, SD-Certification of Approved Training Institution, SD-Airworthiness of Aircraft, SD-ATELCOM, SD-Aerodromes and SD- Security, or any document or requirement replacing these documents.

4. Definitions

- ***Note**. - List intended as guidance only.* ***Accident***

An occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:

a) a person is fatally or seriously injured as a result of:

1) being in the aircraft, or

2) direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or

3) direct exposure to jet blast,

except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

b) the aircraft sustains damage or structural failure which:

1) adversely affects the structural strength, performance or flight characteristics of the aircraft, and

2) would normally require major repair or replacement of the affected component,

except for engine failure or damage, when the damage is limited to a single engine, (including its cowlings or accessories), to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes), or for minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike (including holes in the radome); or

c) the aircraft is missing or is completely inaccessible.

- ***Acceptable level of safety***

Expresses the safety goals of an organisation. It provides an objective in terms of the safety performance operators/service providers should achieve while conducting their core business functions, as a minimum acceptable to the oversight authority. It is a reference against which the oversight authority can measure safety performance. In determining an acceptable level of safety, it is necessary to consider such factors as the level of risk that applies; the cost/benefits of improvements to the system; and public expectations on the safety of the aviation industry. In the case of an airline operator SMS – the oversight authority and an airline operator agree on an acceptable level of safety to be achieved, one measure of which – but not the only one- is 0.5 fatal accidents per 100 000 departures (safety indicator); a 40 per cent reduction in five years (safety target) and – among others – the development of GPS approaches for airfields without ILS approaches (safety requirement).

- ***Accountable Executive***

A single, identifiable person who has the full responsibility for the organisation's SMS, the full authority for human resource issues, the authority for major financial issues, direct responsibility for the conduct of the organisation's affairs, final authority over operations under the certificate, and final responsibility for all safety issues.

- ***Aerodrome - Airport***

  A defined area on land or water [including any buildings, installations and equipment] intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

- ***Aerodrome Operator***

  The person that operates an aerodrome

- ***Analysis***

  The process of identifying a question or issue to be addressed, modelling the issue, investigating model results, interpreting the results, and possibly making a recommendation. Analysis typically involves using scientific or mathematical methods of evaluation.

- ***Assessment***

  A process of measuring or judging the value or level of something

- ***Audit***

  Scheduled, formal reviews and verifications to evaluate compliance with policy, standards and/or contractual requirements. The starting point for an audit is the management and operations of the organisation, and it moves outward to the organisation's activities and products/services. (See also internal and external audit)

- ***Authority***

  Means the Civil Aviation Authority of Fiji established under the Civil Aviation Authority of the Fiji Act (as amended).

- ***Aviation system***

  The functional operation/production system used by the service provider to produce the product/service

- ***Continuous monitoring***

  Uninterrupted watchfulness over the system

- ***Documentation***

  Information or meaningful data and its supporting medium (e.g. paper, electronic etc). In this context it is distinct from records because it is the written description of policies, processes, procedures, objectives, requirements, authorities, responsibilities, or work instructions.

- ***Evaluation***

  A functionally independent review of company policies, procedures, and systems. If accomplished by the company itself, the evaluation should be done by an element of the company other than the one performing the function being evaluated. The evaluation process builds on the concepts of auditing and inspection. An evaluation is an anticipatory process, and is designed to identify and correct potential findings before they occur. An evaluation is synonymous with the term systems audit.

- ***Explicit***

  Means that all safety management activities should be documented, visible and performed independently from other management activities.

- ***External audit***

  An audit conducted by an entity outside of the organisation being audited.

- ***Gap analysis***

  An analysis of safety arrangements existing within an organisation, which includes the necessary organisational structures and the potential challenges in the implementation, develop plans to address challenges

- ***Hazard***

  A condition, object or activity with the potential to cause injury to persons, damage to equipment or structures, loss of material, or reduction of ability to perform a prescribed function. A hazard is a condition that is a prerequisite to an accident or incident.

- ***Incident***

  Means an occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation. A serious incident is an incident involving circumstances indicating that an accident nearly occurred.

- **Industry codes of practice.**

  Guidance material developed by an industry body, for a particular sector of the aviation industry to comply with the requirements of the International Civil Aviation Organization's Standards and Recommended Practices, other aviation safety requirements and the best practices deemed appropriate.

- ***Internal audit***

  An audit conducted by, or on behalf of, the organisation being audited

- ***Internal safety investigations***

  Means an analysis of those occurrences which do not warrant investigation by either the State investigative or regulatory authorities. Nevertheless, such incidents may be indicative of potentially serious hazards – perhaps systemic problems that will not be revealed unless the occurrence is properly investigated.

- ***Investigation***

  In this document any reference to investigation refers to a safety investigation.

- ***Mitigation***

  Means a measure which modifies the potential hazard in order to reduce the risk's probability or severity. The adequacy of proposed mitigation measures should be tested by re-evaluating what the risk would be with the mitigation measures in place.

- ***Oversight***

  A function that ensures the effective promulgation and implementation of the safety- related standards, requirements, regulations, and associated procedures. Safety oversight also ensures that the acceptable level of safety risk is not exceeded in the air transportation system.

- ***Predictive***

  Identify changes from trend analysis of risks being reported, safe work practices being updated, or additions to the Safety Program. Risk management is predictive and provides foresight. Monitoring is proactive and provides oversight, and safety reporting and investigation is reactive and provides hindsight.

- ***Proactive***

  Means the adoption of an approach which emphasizes prevention, through the identification of hazards and the introduction of risk mitigation measures before the risk- bearing event occurs and adversely affects safety performance.

- ***Probability***

  The chance that a situation of danger might occur

- ***Procedure***

  Specified way to carry out an activity or a process

- ***Process***

  Set of interrelated or interrelating activities which transforms inputs into outputs

- ***Reactive***

  Means the organisation's processes which are brought into play when an incident report or investigation is required. Safety reporting and investigation is reactive and provides hindsight.

- ***Records***

  Evidence of results achieved or activities performed. In this context it is distinct from documentation because records are the documentation of SMS outputs.

- ***Risk***

  Means the assessed potential for adverse consequences resulting from a hazard. It is the likelihood that the hazards 'potential to cause harm' will be realised. The chance of a loss or injury, measured in terms of severity and probability. The chance that something is going to happen, and the consequences if it does.

- ***Risk Control***

  Refers to steps taken to eliminate hazards or to mitigate their effects by reducing severity and/or likelihood of risk associated with those hazards. Same meaning as risk management.

- ***Risk Management***

  Means the identification, analysis and elimination (and/or mitigation to an acceptable or tolerable level) of those hazards, as well as the subsequent risks, that threaten the viability of an organisation.

- ***Safety***

  The state in which the risk of harm to persons or of property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and risk management.

- ***Safety assessment***

  Means a process undertaken prior to the implementation of any major change potentially affecting the safety of operations in order to demonstrate that the change meets an acceptable level of safety. The scope of a safety assessment must be wide enough to cover all aspects of the system that may be affected by the change, either directly or indirectly, and should include human, equipment and procedural elements. The process of safety assessment aims to answer the following three fundamental questions: what could go wrong, what would be the consequences, how often is it likely to occur?

- ***Safety assurance***

  SMS process management function that systematically provides confidence that organisational products/services meet or exceed safety requirements.

- ***Safety audit***

A core activity of SMS. May be performed by an external audit authority, or carried out internally as part of an SMS. Safety audits are used to ensure that : the structure of the SMS is sound in terms of appropriate levels of staff; compliance with approved procedures and instructions; that a satisfactory level of competency and training has been achieved; equipment performance is adequate for the safety levels of the service provide; effective arrangements exist for promoting safety, monitoring safety performance and processing safety issues; and adequate arrangements exist to handle foreseeable emergencies.

- ***Safety Culture***

  The product of individual and group values, attitudes, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, the organistion's management of safety. Organisations with a positive safety culture are characterised by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventive measures.

- ***Safety Investigation***

  Means a process conducted for the purpose of accident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of causes and, when appropriate, the making of safety recommendations.

- ***Safety management system (SMS)***

  An organised approach to managing safety, including the necessary organisational structures, accountabilities, policies and procedures.

- ***Safety manager***

  Is the focal point for the development and maintenance of an effective SMS. Having the SM report directly to the CEO demonstrates that safety has an equivalent level of importance in the decision-making process as other major organisational functions. Irregardless of the size of the organisation, a formal statement of responsibilities and accountabilities is advisable. This statement clarifies the formal and informal reporting lines of the organisational chart and specifies accountabilities for particular activities.

- ***Safety objectives***

  Something sought or aimed for, related to safety. Note 1: Safety objectives are generally based on the organisation's safety policy. Note 2: Safety objectives are generally specified for relevant functions and levels in the organisation.

- ***Safety performance indicator***

  A measure (or metric) used to express the level of safety performance achieved in a system. Safety indicators should be easy to measure and be linked to the major components of a State's safety programme, or an operator's/service provider's SMS. Safety indicators will therefore differ between segments of the aviation industry, such as aircraft operators, aerodrome operators or ATS providers.

- ***Safety performance target***

  Means the required level of safety performance for a system. A safety performance target comprises one or more safety performance indicators, together with desired outcomes expressed in terms of those indicators. (Also referred to as goals or objectives). Determined by considering what safety performance levels are desirable and realistic for individual operators/service providers. Safety targets should be measurable, acceptable to stakeholders, and consistent with the State's safety programme.

- ***Safety policy***

  Means the organisations philosophy of safety management and becomes the foundation on which the SMS is built. The safety policy outlines the methods and processes that the

organisation will use to achieve desired safety outcomes, and it serves as a reminder of "how we do business around here".

- ***Safety programme***

  Means an integrated set of regulations and activities aimed at improving safety. States are responsible for establishing a safety programme.

- ***Safety promotion***

  A combination of safety culture, training, and data sharing activate that support the implementation and operation of an SMS in an organisation.

- ***Safety Risk Management***

  A formal process within the SMS composed of describing the system, identifying the hazards, assessing the risk, analyzing the risk, and controlling the risk. The SMS process is embedded in the processes used to provide the product/service; it is not a separate/distinct process.

- ***Safety requirement***

  Needed to achieve the safety performance targets. They include the operational procedures, technology, systems and programmes to which measures of reliability, availability, performance and/or accuracy can be specified. An example of a safety requirement is: deployment of a CNS system in the State's five busiest airports from ground up within the next 24 months, with a 98 per cent availability of critical equipment, and CNS coverage in low flying areas from 500 to 5000 ft.

- ***Safety survey***

  Offer a flexible and cost-effective method of identifying hazards by sampling expert opinion. They may be used to review a particular area of safety concern where hazards appear or are suspected, or as a monitoring tool to confirm that an existing situation is satisfactory.

- ***Severity***

  The possible consequences of a situation of danger, taking as reference the worst foreseeable situation

- ***System***

  An integrated set of constituent elements that are combined in an operational or support environment to accomplish a defined objective. These elements include people, hardware, software, information, procedures, facilities, services, and other support facets.

- ***System description***

  Describes the aviation system and the interaction of its different components including the required human performance considerations of the system operation, hardware components and software components of the system, operational environment, the system interactions with other systems in the air transportation system, and contracted and purchased products and services.

- ***Systematic***

  Means that safety management activities will be conducted in accordance with a predetermined plan and applied in a consistent manner throughout the organisation.

- ***Top management or senior management***

  The person or group of people who direct and control an organisation.

5. General

5.1 The service provider shall establish, maintain and adhere to a safety management system (SMS) that is appropriate to the size, nature and complexity of the operations

authorized to be conducted under its operations certificate and the safety hazards and risks related to the operations.

6. Safety policy and objectives

6.1 General requirements

6.1.1 A service provider shall define the organization's safety policy.

6.1.2 The safety policy shall be signed by the Accountable Manager of the organization.

6.1.3 The safety policy shall include the responsibilities of management and employees with respect to the safety performance of the SMS

6.1.4 The safety policy shall include a clear statement about the provision of the necessary human and financial resources for its implementation.

6.1.5 The safety policy shall be communicated, with visible endorsement, throughout the organisation

6.1.6 The safety policy shall, *inter alia*, include the following objectives:

6.1.6.1 commitment to continual improvement in the level of safety;

6.1.6.2 the hazard reporting procedures; and

6.1.6.3 the conditions under which disciplinary action would not be applicable following hazard reporting by employees

6.1.7 The safety policy shall be in accordance with all applicable legal requirements, international standards, and best industry practices and shall reflect organisational commitments regarding safety

6.1.8 The safety policy shall be reviewed periodically to ensure it remains relevant and appropriate to the organization.

6.1.9 A service provider shall establish safety objectives for the SMS.

6.1.10 The safety objectives should be linked to the safety performance indicators, safety performance targets and safety requirements of the service provider SMS.

6.2 SMS organisational arrangements and safety accountabilities and responsibilities

6.2.1 A service provider shall identify an Accountable Manager to be responsible and accountable on behalf of the service provider for meeting the requirements of this standard, and shall notify the Authority of the name of the person.

6.2.2 The Accountable Manager shall be a single, identifiable person who, irrespective of other functions, shall have the ultimate responsibility and accountability, for the implementation and maintenance of the SMS.

6.2.3 The Accountable Manager shall have:

6.2.3.1 full control of the human resources required for the operations authorized to be conducted under the operations certificate;

6.2.3.2 full control of the financial resources required for the operations authorized to be conducted under the operations certificate;

6.2.3.3 final authority over operations authorized to be conducted under the operations certificate;

6.2.3.4 direct responsibility for the conduct of the organization 's affairs; and

6.2.3.5 final responsibility for all safety issues.

6.2.4 A service provider shall establish the safety structure necessary for the implementation and maintenance of the organization's SMS.

6.2.5 A service provider shall identify the safety accountabilities, responsibilities and authorities of all members of management as well as of all employees, irrespective of other responsibilities

6.2.6 Safety-related accountabilities, responsibilities and authorities shall be defined, documented and communicated throughout the organization.

6.2.7 A service provider shall identify a Safety Manager to be the member of management who shall be the responsible individual and focal point for the implementation and maintenance of an effective SMS.

6.2.8 The Safety Manager shall *inter alia*:

6.2.8.1 endeavour to ensure that processes needed for the SMS are developed, implemented, adhered to and maintained;

6.2.8.2 report to the Accountable Manager on the performance of the SMS and on any need for improvement; and

6.2.8.3 ensure safety promotion throughout the organization.

6.2.8.4 have appropriate auditing and investigation skills

6.3 Coordination of emergency response planning

6.3.1 A service provider shall ensure its emergency response plan is properly coordinated with the emergency response plans of those organisations it must interface with during the provision of its services

6.3.2 The coordination of the emergency response planning shall ensure the orderly and efficient transition from normal to emergency operations and the return to normal operations

6.3.3 The coordination of emergency response plan shall include, inter alia:

6.3.3.1 the designation of emergency authority;

6.3.3.2 the assignment of emergency responsibilities during the coordinated activities;

6.3.3.3 the coordination of efforts to cope with the emergency; and

6.3.3.4 the compatibility with other emergency response plans of other organisations

6.4 Documentation

6.4.1 A service provider shall develop and maintain SMS documentation, in paper or electronic form, to describe the following:

6.4.1.1 safety policy and objectives;

6.4.1.2 SMS requirements,

6.4.1.3 the SMS processes and procedures

6.4.1.4 the accountabilities, responsibilities and authorities for procedures and processes; and

6.4.1.5 the SMS outputs.

6.4.2 A service provider shall, as part of the SMS documentation, complete a system description

6.4.3 The system description shall include the following:

6.4.3.1 the system interactions with other systems in the air transportation system;

6.4.3.2 the system functions

6.4.3.3 required human performance considerations of the system operation

6.4.3.4 hardware components of the system;

6.4.3.5 software components of the system

6.4.3.6 related procedures that define guidance for the operation and use of the system;

6.4.3.7 operational environment; and

6.4.3.8 contracted, subcontracted and purchased products and/or services

6.4.4 A service provider shall, as part of the SMS documentation, complete a gap analysis, in order to:

6.4.4. 1 identify the safety arrangements and structure that may already exist throughout the organisation; and

6.4.4.2 determine additional safety arrangements required to implmenet and maintain the organisation's SMS.

6.4.5 The service provider shall, as part of the SMS documentation, develop, adhere to and maintain an SMS implementation plan.

6.4.6 The SMS implementation plan shall be the definition of the approach the organisation will adopt for managing safety in a manner that will meet the organisation's safety objectives.

6.4.7 The SMS implementation plan shall explicitly address the coordination between the SMS of the service provider and the SMS of other organisations the service provider must interface with during the provision of services.

6.4.8 The SMS implementation plan shall include the following:

6.4.8.1 safety policy ad objectives

6.4.8.2 system description

6.4.8.3 gap analysis;

6.4.8.4 SMS components;

6.4.8. 5 safety roles and responsibilities

6.4.8.6 hazard reporting policy;

6.4.8.7 means of employee involvement;

6.4.8.8 safety performance measurement;

6.4.8.9 safety training;

6.4.8.10 safety communication; and

6.4.8.11 management review of safety performance

6.4.9 The SMS implementation plan shall be endorsed by senior management of the organisation

6.4.10 A service provider shall, as part of the SMS documentation, develop and maintain a safety management system manual (SMSM), to communicate the organization's approach to safety throughout the organization.

6.4.11 The SMSM shall document all aspects of the SMS, and its contents shall include the following:

6.5.4.1 scope of the safety management system;

6.5.4.2 safety policy and objectives;

6.5.4.3 safety accountabilities;

6.5.4.4 key safety personnel;

6.5.4.5 documentation control procedures;

6.5.4.6 coordination of emergency response planning

6.5.4.7 hazard identification and risk management schemes;

6.5.4.8 safety performance monitoring;

6.5.4.9 safety auditing

6.5.4.10 procedures for the management of change;

6.5.4.11 safety promotion; and

6.5.4.12 control of contracted activities

Information note. – *Generic guidelines for SMS documentation development and maintenance can be found in Attachment H to ICAO Annex 6, Part I, and Attachment G to ICAO Annex 6, Part III, Operator's Flight Safety Documents System ICAO Annex 19, and ICAO SMM Doc 9859.7*.

Safety risk

7.1 General.

7.1.1 A service provider shall develop and maintain a formal process that ensures that hazards in operations are identified

7.1.2 A service provider shall develop and maintain safety data collection and processing systems (SDCPS) that provide for the identification of hazards and the analysis, assessment and mitigation of safety risks.

7.1.3 A service provider's SDCPS shall include reactive, proactive and predictive methods of safety data collection.

7.2 Hazard identification

7.2.1 A service provider shall develop and maintain formal means for effectively collecting, recording, acting on and generating feedback about hazards in operations, which combine reactive, proactive and predictive methods of safety data collection. Formal means of safety data collection shall include mandatory, voluntary and confidential reporting systems.

7.2.2 The hazard identification process shall include the following steps:

7.2.2.1 reporting of hazards, events or safety concerns;

7.2.2.2 collection and storing the safety data;

7.2.2.3 analysis of the safety data; and

7.2.2.4 distribution of the safety information distilled from the safety data.

7.3 Safety risk assessment and mitigation

7.3.1 A service provider shall develop and maintain a formal process that ensures the analysis, assessment and control of the safety risks of the consequence of hazards during the provision of its services

7.3.2 The safety risks of the consequences of each hazard identified through the hazard identification processes described in section 7.1 of this standard shall be analysed in terms of probability and severity of occurrence, and assessed for their tolerability.

7.3.3 The organization shall define the levels of management with authority to make safety risk tolerability decisions.

7.3.4 The organization shall define safety controls for each safety risk assessed as tolerable.

7.4 Safety risk management.

7.4.1 Safety risk management encompasses the assessment and mitigation of safety risks. The objective of safety risk management is to assess the risks associated with identified hazards and develop and implement effective and appropriate mitigations. Safety risk management is therefore a key component of the safety management process at product / service provider level.

7.4.2 Safety risks are conceptually assessed as acceptable, tolerable or intolerable. Risks assessed as initially falling in the intolerable region are unacceptable under any circumstances. The probability and/or severity of the consequences of the hazards are of such a magnitude, and the damaging potential of the hazard poses such a threat to safety, that immediate mitigation action is required.

7.4.3 Safety risks assessed in the tolerable region are acceptable provided that appropriate mitigation strategies are implemented by the organization. A safety risk initially assessed as intolerable may be mitigated and subsequently moved into the tolerable region provided that such risks remain controlled by appropriate mitigation strategies. In both cases, a supplementary cost-benefit analysis may be performed if deemed appropriate.

7.4.4 Safety risks assessed as initially falling in the acceptable region are acceptable as they currently stand and require no action to bring or keep the probability and/or severity of the consequences of hazards under organizational control.

7.4.5 The term safety risk management is meant to differentiate this function from the management of financial risk, legal risk, economic risk and so forth. This section presents the fundamentals of safety risk and includes the following topics:

7.4.5.1 A definition of safety risk;

A Safety risk is the projected likelihood and severity of the consequence or outcome from an existing hazard or situation. While the outcome may be an accident, an

intermediate unsafe event/consequencell may be identified as the most credible outcome.

7.4.5.2 Safety risk probability;

The process of controlling safety risks starts by assessing the probability that the consequences of hazards will materialize during aviation activities performed by the organization. Safety risk probability is defined as the likelihood or frequency that a safety consequence or outcome might occur. Table 7-1 presents a typical safety risk probability table, in this case, a five-point table. The table includes five categories to denote the probability related to an unsafe event or condition, the description of each category, and an assignment of a value to each category.

Table 7**.1** – Guide for Determining Likelihood

Risk Likelihood	Meaning	Value
Frequent	Likely to occur many times. Has already occurred in the company (Freq. > 1 times per year), or has occurred frequently in the history of the aviation industry.	5
Occasional	Likely to occur sometimes. Has already occurred in the company (Freq. < 1 times per year), or has occurred infrequently in the history of the aviation industry.	4
Remote	Unlikely to occur, but possible. Has already occurred in the company at least once or has seldom occurred in the history of the aviation industry.	3
Improbable	Very unlikely to occur. Not known to have occurred in the company but has already occurred at least once in the history of the aviation industry.	2
Extremely Improbable	Almost inconceivable that the event will occur, or it has NEVER occurred in the history of the aviation industry.	1

It must be stressed that this is an example only and that the level of detail and complexity of tables and matrices should be adapted to be commensurate with the particular needs and complexities of different organizations.

7.4.5.3 Safety risk severity;

Once the probability assessment has been completed, the next step is to assess the safety risk severity, taking into account the potential consequences related to the hazard. Safety risk severity is defined as the extent of harm that might reasonably occur as a consequence or outcome of the identified hazard.

The severity assessment should consider all possible consequences related to an unsafe condition or object, taking into account the worst foreseeable situation. Table 7- 2 presents a typical safety risk severity table. It includes five categories to denote the level of severity, the description of each category, and the assignment of a value to each category. As with the safety risk probability table, this table is an example only.

Table 7.2 – Guide for Determining Severity						
Ser		Meaning / Definition				
-	Severity of Occurrence	Personnel	Environment	Material Assets and Values	Reputation	Score
5	CATASTROPHIC	Multiple Fatalities	Enormous effects (pollution, destruction, etc.)	Catastrophic financial loss Damage > …. M$	International impact	5
4	HAZARDOUS	Fatality	Effects difficult to repair	Severe financial loss with long term effects Damage < …. M$	National impact	4
3	MAJOR	Serious Injury	Noteworthy local effects	Substantial financial loss Damage < …. K$	Regional impact	3
2	MINOR	Light injuries	Little impact	Financial loss with little impact Damage < …. K$	Limited impact	2
1	INSIGNIFICANT	Superficial or no injuries	Negligible or no effects	Financial loss with negligible impact Damage < …. K$	Light or no impact	1

7.4.5.4 Safety risk tolerability; and

The safety risk probability and severity assessment process can be used to derive a safety risk index. The index created through the methodology described above consists of an alphanumeric designator, indicating the combined results of the probability and severity assessments. The respective severity/probability combinations are presented in the safety risk assessment matrix in Figure 7-3.

Figure 7-3

SEVERITY LEVEL	PROBABILITY LEVEL (1) Extremely Improbable / Unlikely	(2) Improbable But Known	(3) Remote Known Occurrence	(4) Occasional Frequent Occurrence	(5) Frequent Almost Certain
LEVEL (5) Catastrophic	MEDIUM RISK	HIGH RISK	INTOLERABLE	INTOLERABLE	INTOLERABLE
LEVEL (4) Hazardous	MEDIUM RISK	MEDIUM RISK	HIGH RISK	INTOLERABLE	INTOLERABLE
LEVEL (3) Major	LOW RISK	MEDIUM RISK	MEDIUM RISK	HIGH RISK	INTOLERABLE
LEVEL (2) MINOR	LOW RISK	LOW RISK	MEDIUM RISK	MEDIUM RISK	HIGH RISK
LEVEL (1) Insignificant	LOW RISK	LOW RISK	LOW RISK	MEDIUM RISK	MEDIUM RISK

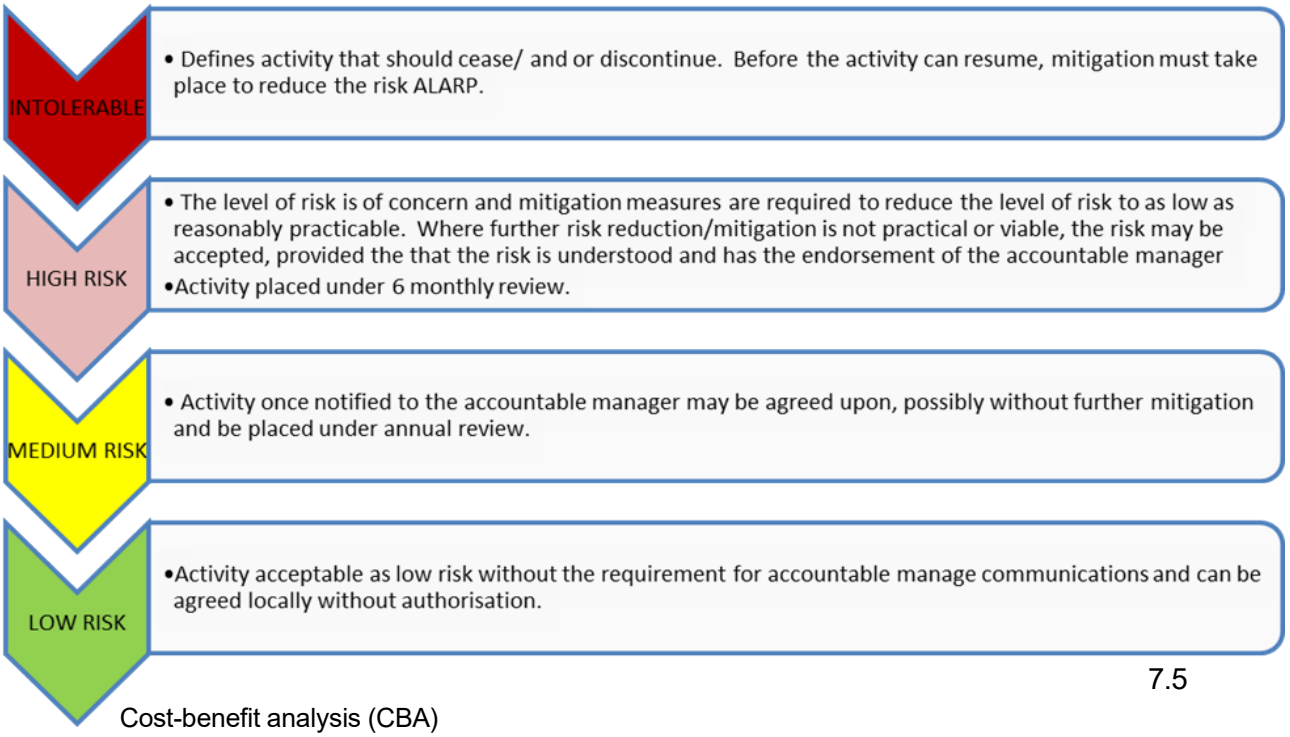
7.4.5.5 Safety risk management.

Safety risk management encompasses the assessment and mitigation of safety risks. The objective of safety risk management is to assess the risks associated with identified hazards and develop and implement effective and appropriate mitigations. Safety risk management is therefore a key component of the safety management process at both the State and product/service provider level.

Safety risks are conceptually assessed as acceptable, tolerable or intolerable. Risks assessed as initially falling in the intolerable region are unacceptable under any circumstances. The probability and/or severity of the consequences of the hazards are of such a magnitude, and the damaging potential of the hazard poses such a threat to safety, that immediate mitigation action is required.

Safety risks assessed in the tolerable region are acceptable provided that appropriate mitigation strategies are implemented by the organization. A safety risk initially assessed as intolerable may be mitigated and subsequently moved into the tolerable region provided that such risks remain controlled by appropriate mitigation strategies. In both cases, a supplementary cost-benefit analysis may be performed if deemed appropriate.

Safety risks assessed as initially falling in the acceptable region are acceptable as they currently stand and require no action to bring or keep the probability and/or severity of the consequences of hazards under organizational control.



7.5

Cost-benefit analysis (CBA)

Cost-benefit or cost-effectiveness analysis is normally an independent process from safety risk mitigation or assessment. It is commonly associated with a higher-level management protocol, such as a regulatory impact assessment or business expansion project. However, there may be situations where a risk assessment may be at a sufficiently high level or have a significant financial impact. In such situations, a supplementary CBA or cost-effectiveness process to support the risk assessment may be warranted. This is to ensure that the cost-effectiveness analysis or justification of recommended mitigation actions or preventive controls has taken into consideration the associated financial implications.

8. Safety assurance

8.1 General

8.1.1 A service provider shall develop and maintain safety assurance processes to ensure that the safety risk controls developed as a consequence of the hazard identification and safety risk management activities under paragraph 7 achieve their intended objectives.

8.1.2 Safety assurance processes shall apply to an SMS whether the activities and/or operations are accomplished internally or outsourced.

8.2 Safety performance monitoring and measurement

8.2.1 A service provider shall, as part of the SMS safety assurance activities, develop and maintain the necessary means to verify safety performance of the organization in reference to the safety performance indicators and safety performance targets of the SMS and to validate the effectiveness of implemented safety risk controls.

8.2.2 In a performance-based, enhanced safety environment, certain performance-based elements are introduced within a prescriptive framework. This will allow the compliance aspect of a regulation to have room for a more flexible, risk-based (and hence more dynamic) performance. As a result, some elements within the SMS and SSP frameworks may be managed on an increasingly performance-based rather than being purely prescriptive approach. These performance-based elements are under the safety assurance and safety risk management components of the respective frameworks.

8.2.3 The performance-based elements within an SMS/SSP framework include the process for safety performance monitoring and measurement at the individual product or service provider level. This element allows the organization to select its own safety monitoring indicators and the setting of relevant alerts and targets that are pertinent to its own context, performance history and expectations in agreement with the authority. There are no fixed (mandatory) prescribed safety indicators or alert levels or prescribed values under this SMS/SSP expectation. Additional new performance-based processes introduced and duly accepted/approved by the authority should have appropriate performance indicators developed for monitoring such performance-based processes.

8.2.4 Monitoring and measurement of a performance-based process should be done through appropriate performance, quality or safety indicators that continuously track the performance of that process. Parameters for such performance tracking may be occurrence outcomes, deviations or any event types that reflect the safety, quality or risk level of the process. A data trending chart should be used to track such outcomes. Outcome occurrences should normally be tracked as occurrence rates rather than absolute numbers. In conjunction with such indicators, alert as well as desired improvement target levels should be set for each indicator, where applicable. These will serve as markers to define what is the abnormal/unacceptable occurrence rate as well as the desired target (improvement) rate for the indicator. The alert level setting will effectively serve as the demarcation line between the acceptable trending region and the unacceptable region for a safety indicator. So long as the occurrence rate for a process does not trend beyond or breach the set alert level criteria, the number of such occurrences is deemed to be acceptable (not abnormal) for that monitoring period. On the other hand, the aim of a targeted improvement level is to achieve the desired improvement level within a defined future milestone or monitoring period. With such defined alert and target settings, it becomes apparent that a qualitative/quantitative performance outcome can be derived at the end of any given monitoring period. This may be done by counting the number of alert breaches and/or the number of targets achieved for an individual indicator and/or a package of safety indicators.

8.2.5 Safety performance monitoring and measurement means shall include the following:

8.2.5.1 hazard reporting systems;

8.2.5.2 safety audits;

8.2.5.3 safety surveys;

8.2.5.4 safety reviews;

8.2.5.5 safety studies; and

8.2.5.6 internal safety investigations

8.2.6 The hazard reporting procedures shall set out the conditions to ensure effective reporting, including the conditions under which disciplinary/administrative action shall not apply.

8.3 Management of change

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

8.3.2 The formal process for the management of change shall:

8.3.2.1 Procedures to ensure that substantial organizational or operational changes take into consideration any impact which they may have on existing safety risks.;

a) the vulnerability of systems and activities;

b) the stability of systems and operational environments;

c) past performance;

d) regulatory, industry and technological changes.

8.3.2.2 Procedures to ensure that appropriate safety assessment is performed prior to introduction of new equipment or processes which have safety risk implications.

8.3.2.3 Stability of systems and operational environments. Changes may be planned and under the direct control of the organization. Such changes include organizational growth or contraction, the expansion of products or services delivered, or the introduction of new technologies. Unplanned changes may include those related to economic cycles, labour unrest, as well as changes to the political, regulatory or operating environments.

8.3.2.4 Ensure that management of change procedures address the impact on existing safety performance and risk mitigation records before implementing new changes. As systems evolve, incremental changes can accumulate, requiring amendments to the initial system description. Therefore, change management necessitates periodic reviews of the system description and the baseline hazard analysis to determine their continued validity.

8.4 Continuous improvement of the safety system

8.4.1 A service provider shall, as part of the SMS safety assurance activities, develop and maintain formal processes to identify the causes of below standard performance of the SMS, determine the implications in its operation, and rectify situations involving below standard performance in order to ensure the continual improvement of the SMS.

8.4.2 Continuous improvement of the service provider SMS shall include:

8.4.2.1 proactive and reactive evaluations of facilities, equipment, documentation and procedures, to verify the effectiveness of strategies for control of safety risks; and

8.4.2.2 proactive evaluation of the individuals' performance, to verify the fulfilment of safety responsibilities.

9. Safety promotion

9.1 General

Safety promotion encourages a positive safety culture and creates an environment that is conducive to the achievement of the service provider's safety objectives. A positive safety culture is characterized by values, attitudes and behaviour that are committed to the organization's safety efforts. This is achieved through the combination of technical competence that is continually enhanced through training and education, effective communications and information sharing. Senior management provides the leadership to promote the safety culture throughout an organization.

9.1.1 Service providers shall establish and implement processes and procedures that facilitate effective communication throughout all levels of the organization. Service providers should communicate their safety objectives, as well as the current status of any related activities and events. Service providers must also encourage bottom-up communication, providing an environment that allows senior management to receive open and constructive feedback from operational personnel.

9.2 Safety training

9.2.1 A service provider shall, as part of its safety promotion activities, develop and maintain a safety training programme that ensures that personnel are trained and competent to perform the SMS duties.

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

9.2.3 The Accountable Manager shall receive safety awareness training regarding:

9.2.3.1 safety policy and objectives;

9.2.3.2 SMS roles and responsibilities;

9.2.3.3 SMS standards; and

9.2.3.4 safety assurance.

9.3 Safety communication

9.3.1 A service provider shall, as part of its safety promotion activities, develop and maintain formal means for safety communication, to:

9.3.1.1 ensure that all staff is fully aware of the SMS;

9.3.1.2 convey safety critical information;

9.3.1.3 explain why particular safety actions are taken;

9.3.1.4 explain why safety procedures are introduced or changed; and

9.3.1.5 convey generic safety information.

9.3.2 Formal means of safety communication shall include inter alia:

9.3.2.1 safety policies and procedures;

9.3.2.2 news letters;

9.3.2.3 bulletins; and

9.3.2.4 websites.

10. Quality policy

10.1 A service provider shall ensure that the organization quality policy is consistent with, and supports the fulfilment of the activities of the SMS.

11 Acceptable Level of Safety (ALoS)

11.1.1 The notion of ALoS is an essential ingredient for the effective operation of an SSP. Unless the notion of ALoS is understood and properly developed and implemented, it will be difficult to progress to a performance-based regulatory environment, and to monitor the actual performance of an SSP. The operation of an SSP may then be reduced to simply "ticking the appropriate boxes" under the false pretence of managing safety.

11.1.2 The basic management axiom that one cannot manage what one cannot measure. In any system, it is necessary to define a set of measurable performance outcomes in order to determine whether the system is truly operating in accordance with design expectations, as opposed to simply meeting regulatory requirements. The definition of a set of measurable performance outcomes also allows identifying where action may be required to bring operational performance of the system to the level of design expectations. Thus, measurable performance outcomes permit the actual performance of activities critical to safety to be assessed against existing organizational controls, so that safety risks can be maintained ALARP and necessary corrective action taken.

11.1.3 The introduction of the notion of ALoS also responds to the need to complement the historical approach to the management of safety based upon regulatory compliance, with a performance-based approach. A performance-based approach will assess the actual performance of activities critical to safety against existing organizational controls. Only through assurance of effective implementation of the SSP can the objective of continuous improvement of safety underlying safety management be achieved.

11.1.4 The development and implementation of ALoS builds upon certain basic concepts of systems theory. There is a hierarchy inherent to the basic concepts of systems theory underlying ALoS and the way these concepts must be sequenced in progression when developing ALoS. An understanding of the concepts and their inherent hierarchy is an essential foundation for the development of ALoS regarding an SSP. The concepts involved and their hierarchy are as follows:

11.1.4.1 *safety*;

11.1.4.2 *level of safety* is the degree of safety of a system. It is an emerging property of the system, which represents the quality of the system, safety-wise. It is expressed through safety indicators;

11.1.4.3 *safety indicators* are the parameters that characterize and/or typify the level of safety of a system;

11.1.4.4 *safety targets* are the concrete objectives of the level of safety;

11.1.4.5 *acceptable level of safety* is the minimum degree of safety that must be assured by a system in actual practice;

11.1.4.6 *safety indicator value* is the quantification of a safety indicator; and

11.1.4.7 *safety target value* is the quantification of a safety target.

11.1.5 The selection of appropriate safety indicators is key to the development of ALoS. Such selection should be a function of the detail to which the level of safety of the system is intended to be represented. If the level of safety is to be represented in broad, generic terms, the selection of safety indicators representing high-level/high-consequence system outcomes (quantitative) and/or high-level system functions (qualitative) is appropriate. If the level of safety of the system is to be represented in specific, narrow terms, then the selection of indicators representing low-level/low consequence system outcomes and lower level system functions is required. In both cases, meaningful safety indicators must be representative of the outcomes, processes and functions that characterize system safety.

11.1.6 Typical examples of safety indicators in the aviation system include, among others:

11.1.6.1 fatal airline accidents, but not limited to;

11.1.6.2 serious incidents;

11.1.6.3 runway excursion events;

11.1.6.4 ground collision events;

11.1.6.5 development/absence of primary aviation legislation;

11.1.6.6 development/absence of operating regulations; and

11.1.6.7 level of regulatory compliance.

11.1.7 Typical examples of safety targets in the aviation system include, among others:

11.1.7.1 reduction in fatal airline accidents;

11.1.7.2 reduction in serious incidents;

11.1.7.3 reduction in runway excursion events;

11.1.7.4 reduction in ground collision events; and

11.1.7.5 the number of inspections completed quarterly.

11.1.8 The first step in developing an ALoS related to an SSP is therefore to decide on the detail to which the level of safety CAAF is intended to be represented, and then select meaningful safety indicators that characterize or typify the level of safety of the State aviation system. The availability of safety data to CAAF is a determinant factor in the decision regarding the detail of representation, as well as the selection of quantitative or qualitative safety indicators. States that have developed safety data collection and analysis capabilities should be in a position to represent the level of safety in greater detail than States that have not. States in the former group should be able to define quantitative safety indicators, while States in the latter group may elect to initially favour qualitative safety indicators while they develop safety data collection and analysis capabilities. Once safety indicators have been defined, the next step is to define associated safety targets, which can be considered as objectives of improvement.

11.1.9 Once safety indicators and safety targets have been selected, the level of safety representing the State aviation system can be established. At such point, CAAF should be ready to progress to the development of ALoS, the *minimum* degree of safety in civil aviation that must be assured by the SSP in actual practice. In order to develop ALoS, values must be attached to the safety indicators, and objectives of improvement and/or maintenance of such values must be attached to the safety targets. While it is generally accepted that the ALoS related to an SSP is expressed through the safety indicator values and the safety target values, strictly speaking it is the safety target values that are the true expression of ALoS.

11.1.10 Further consideration when establishing ALoS must be given to:

11.1.10.1 the level of safety risk that applies;

11.1.10.2 the safety risk tolerance;

11.1.10.3 the cost/benefits of improvements to the aviation system; and

11.1.10.4 public expectations about the civil aviation system.

11.1.11 In order to properly develop ALoS regarding an SSP, it is also essential to understand the difference between two closely interrelated — and therefore sometimes confusing — yet quite distinct concepts: safety measurement and safety performance measurement.

11.1.12 *Safety measurement* refers to the quantification of the outcomes of selected high- level, high consequence events, such as accident and serious incident rates. Safety measurement can also be applied to reflect the quantification of selected high-level State functions, such as the status of development/implementation of primary aviation safety legislation or the absence thereof, the status of development/implementation of specific operating regulations or the absence thereof, and the level of regulatory compliance within the State. Safety measurement is not a continuous process, but is rather a spot check, normally conducted following pre-specified time frames, for example, annually, semiannually or quarterly. Safety measurement is associated with the SSP and reflects the extent to which the high-level safety objectives of the safety interventions of mitigation strategies have been achieved.

11.1.13 *Safety performance measurement* refers to the quantification of the outcomes of selected lowlevel, low consequence processes, such as the number of foreign object debris (FOD) events per specified number of ramp operations, or the number of unauthorized ground vehicle events on taxiways per a specific number of airport operations or during a specified period of time. Safety performance measurement is a non-stop activity, involving continuous monitoring and measurement, by an organization, of selected operational activities that are necessary to deliver the services the organization was constituted to deliver (provision of aerodrome services, air traffic control, training, etc.). Safety performance measurement is mostly, but not exclusively, associated with an SMS, and provides a measure of the actual operational performance of a management system, such as an SSP or an SMS, beyond the absolute measures resulting from safety measurement (including regulatory compliance). It also applies to the safety interventions and mitigation strategies established as part of an SSP, as applicable.

11.1.14 The ALoS related to an SSP must be developed based upon a judicious combination of safety measurement and safety performance measurement. The extent to which ALoS represents safety measurement or safety performance measurement depends upon the maturity of the SSP. Initially, immediately following development and

implementation of an SSP, the safety indicator values and the safety target values related to ALoS will likely be expressed through quantitative action statements on selected high-level/high-consequence outcomes (safety measurement). Figure 6-2 provides an example of safety indicator values and safety target values based on safety measurement.

Safety indicator value	Safety target value
1. *[Number]* CFIT approach and landing accidents per *[number]* departures	1. Reduce by *[number]* the number of / Maximum of *[number]* CFIT approach and landing accidents per *[number]* operations
2. *[Number]* runway excursions per *[number]* operations	2. Reduce by *[number]* the number of / Maximum of *[number]* runway excursions per *[number]* operations
3. *[Number]* ground collision accidents per year on a *[x-year]* rolling average	3. Reduce by *[number]* the number of / Maximum of *[number]* ground collision accidents per year on a *[x-year]* rolling average
4. *[Number]* high-severity events captured through the State MOR yearly	4. Minimum of *[number]* high-severity events captured through the State MOR yearly
5. *[Number]* inspections of operators completed quarterly	5. Minimum of *[number]* inspections of operators completed quarterly
6. *[Number]* AIS facilities with QMS implemented	6. *[Number]* AIS facilities with QMS implemented by *[time]*
7. Electronic filing of differences completed within *[number]* months/weeks	7. Electronic filing of differences completed within *[revised number]* months/weeks

Figure 6-2. An example of safety indicator values and safety target values based on safety measurement

11.1.15 As the SSP matures and safety data collection and analysis capabilities are developed through the safety assurance component of the SSP, the safety indicator values and the safety target values related to ALoS can be modified and expressed through a combination of quantitative action statements on selected high-level/high-consequence events (safety measurement) and quantitative action statements on selected low- level/low-consequence outcomes (safety performance measurement). As the SSP achieves maturity, the safety indicator values and the safety target values related to ALoS will be expressed through quantitative action statements on selected low-level/low-consequence outcomes (safety performance measurement). Figure 6-3 provides an example of safety indicator values and safety target values based on safety performance measurement.

Safety indicator value	Safety target value
1. *[Number]* level busts per *[number]* operations	1. Reduce by *[number]* the number of / Maximum of *[number]* level busts per *[number]* operations by *[date]*
2. *[Number]* Cat B and C runway incursions at 5 international *[State]* airports per *[number]* operations	2. Reduce by *[number]* the number of / Maximum of *[number]* Cat B and C runway incursions at 5 international *[State]* airports by *[date]*
3. *[Number]* TCAS/airprox events per *[number]* operations	3. Reduce by *[number]* the number of / Maximum of *[number]* TCAS/airprox events per *[number]* operations by *[date]*
4. *[Number]* non-conforming approaches (NCA) at 5 international *[State]* airports per *[number]* operations	4. Reduce by *[number]* the number of / Maximum of *[number]* non-conforming approaches (NCA) at 5 international *[State]* airports by *[date]*
5. *[Number]* apron FOD events at 5 international *[State]* airports per *[number]* operations	5. Reduce by *[number]* the number of / Maximum of *[number]* apron FOD events at 5 international *[State]* airports by *[date]*

Figure 6-3. An example of safety indicator values and safety target values based on safety performance measurement

11.1.16 Two generic aspects must be considered when assessing whether the specific safety target values of ALoS should represent improvement with respect to, or rather maintenance, of the related safety indicator values. First, consideration must be given to the availability of resources within the State to achieve the improvement considered. Second, consideration must be given to how expensive the action plan(s) deemed necessary to achieve the improvement is. A third consideration, applicable only to safety target values based upon safety performance measurement, is whether the assessment of the safety risks of the consequences of the hazards addressed by the improvement falls in the tolerable region of the safety risk management process discussed in Chapter 7. The safety target value may at one point reflect a safety risk assessment that falls in the tolerable region under prevailing circumstances. However, changes in the system, growth and so forth may render such safety risk assessment invalid. The safety target value must, in this case, reflect an improvement with respect to its associated safety indicator value to be valid in the changed environment.

11.1.17 ALoS is delivered through action plans. These are the tools and means needed to achieve the safety target values of ALoS related to an SSP. Action plans include the operational procedures, technology, systems and programmes to which measures of reliability, availability, performance and/or accuracy can be specified. An example of an action plan for a safety target related to reduction in controlled flight into terrain (CFIT) accidents would be the implementation of constant descent arrival procedures, and arrival procedures charts designed for stabilized approaches. An example of an action plan for a safety target related to reduction in runway incursion events would be deployment of a radar system with an expected 98 per cent availability of critical equipment.

11.1.18 It must be emphatically asserted that the notion of ALoS refers to national or State- level objectives, to be achieved through the SSP, as a means to verify satisfactory implementation of the SSP. Therefore, reference must be always made to the acceptable level of safety related to an SSP. The safety indicator values and safety target values of an ALoS provide a measurable way of ensuring and demonstrating the effectiveness of an SSP, beyond regulatory compliance. An SSP should fulfil all regulatory requirements as set forth by international and national regulations. Regulatory compliance still remains at the foundation of safety management. By selecting a combination of measurable operational performance outcomes, which are State-specific and which build upon the foundation provided by regulatory compliance, the real effectiveness and efficiency of the safety management processes underlying an SSP can be assured.

11.1.19 The implementation of an ALoS goes above and beyond regulatory compliance with national and international requirements. Establishing an ALoS for an SSP does not replace legal, regulatory or other established requirements, nor does it relieve States from their obligations regarding the *Convention on International Civil Aviation* (ICAO Doc 7300) and its related provisions contained in the Annexes to the Convention.

11.1.20 In conclusion, Figures 6-4, 6-5 and 6-6 summarize, in graphical format, the transition from initial to mature ALoS related to an SSP, ALoS reflecting safety measurement, and ALoS reflecting safety performance measurement of the related SMS.

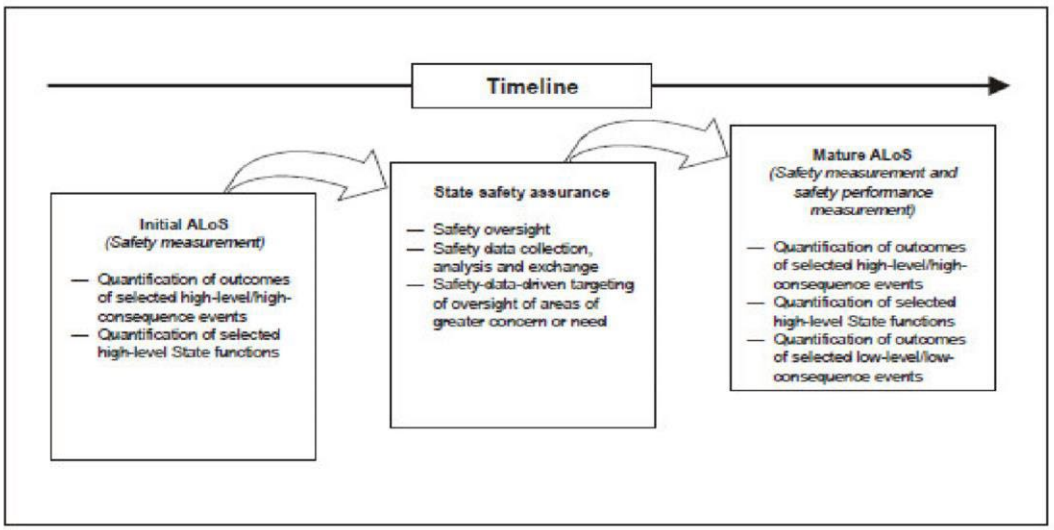


Figure 6-4. Transition from initial to mature ALoS related to an SSP

Safety target values	1. Reduce by *[number]* the number of / Maximum of *[number]* CFIT and approach and landing accidents per *[number]* departures. 2. Minimum of *[number]* inspections of operators completed quarterly. 3. …
Action plans	1. CFIT training package distributed to industry and supported by training courses. 2. Revision and, if necessary, update of hiring policy. Inspection manual updated. 3. …
Safety indicator values	1. *[Number]* CFIT and approach and landing accidents per *[number]* departures. 2. *[Number]* inspections of operators completed quarterly. 3. …
State	Will comply with all applicable international Standards.

Figure 6-5. ALoS reflecting safety measurement

Safety target values	1. Reduce by *[number]* the number of / Maximum of *[number]* non-conforming approaches (NCA) at 5 international airports per *[number]* arrivals by *[date]*. 2. Reduce by *[number]* the number of / Maximum of *[number]* Cat B and C runway incursions at 5 international *[State]* airports per *[number]* operations by *[date]*. 3. …
Action plans	1. Constant descent arrival (CDA) procedures implemented. Arrival procedures charts designed for stabilized approaches. 2. Installation of ASDE/X at 5 international *[State]* airports. 3. …
Safety indicator values	1. *[Number]* non-conforming approaches (NCA) at 5 international airports per *[number]* operations. 2. *[Number]* Cat B and C runway incursions at 5 international *[State]* airports per *[number]* operations. 3. …
State	Will comply with all applicable international Standards.

Figure 6-6. ALoS reflecting safety performance measurement

12. Implementation of the SMS

12.1 This standard proposes, but does not mandate, a phased implementation of a service provider SMS, which encompasses four phases as described in paragraph 11.2 through paragraph 11.5 hereunder.

12.2 **Phase 1 – *Planning*** should provide a blueprint on how the SMS requirements will be met and integrated to the organization's work activities, and an accountability framework for the implementation of the SMS:

12.2.1 Identify the Accountable Manager and the safety accountabilities of managers;

12.2.2 Identify the person (or planning group) within the organization responsible for implementing the SMS;

12.2.3 Describe the system (Air operator, ATC services provider, approved maintenance organization, certified aerodrome operator);

12.2.4 Conduct a gap analysis of the organization's existing resources compared with the national and international requirements for establishing an SMS;

12.2.5 Develop an SMS implementation plan that explains how the organization will implement the SMS on the basis of national requirements and international SARPs, the system description and the results of the gap analysis;

12.2.6 Develop documentation relevant to safety policy and objectives; and

12.2.7 Develop and establish means for safety communication.

12.2.8 Conduct a training needs analysis.

12.2.8.1 Organize and set up schedules for appropriate training of all staff according to their individual responsibilities and involvement in the SMS.

12.2.8.1 Develop safety training considering:

a) initial (general safety) job-specific training; and

b) recurrent training.

12.2.8.1 Identify the costs associated with training.

12.2.8.1 Develop a validation process that measures the effectiveness of training.

12.2.8.1 Establish a safety training records system.

12.2.9 Establish a mechanism or medium for safety communication through any of.

12.2.9.1 safety newsletters, notices and bulletins;

12.2.9.2 websites;

12.2.9.3 email.

12.3 **Phase 2 –** The objective of Phase 2 is to implement essential safety management processes, while at the same time correcting potential deficiencies in existing safety management processes. Most organizations will have some basic safety management activities in place at different levels of implementation. This phase aims at consolidating existing activities and developing those which do not yet exist.

12.3.1 Management commitment and responsibility.

12.3.1.1 Develop a safety policy.

12.3.1.1 Have the accountable manager sign the safety policy.

12.3.1.1 Communicate the safety policy throughout the organization.

12.3.1.1 Establish a review schedule for the safety policy to ensure it remains relevant and appropriate to the organization.

12.3.1.1 Establish safety objectives for the SMS by developing safety performance standards in terms of:

a) safety performance indicators;

b) safety performance targets and alert levels; and

c) action plans.

12.3.1.1 Establish the SMS requirements for subcontractors:

a) establish a procedure to write SMS requirements into the contracting process; and

b) establish the SMS requirements in the bidding documentation.

12.3.2. Safety accountabilities.

12.3.2.1 Define safety accountabilities and communicate them throughout the organization.

12.3.2.2 Establish the safety action group (SAG).

12.3.2.3 Establish the safety/SMS coordination committee.

12.3.2.4 Define clear functions for the SAG and the safety/SMS coordination committee.

12.3.2.5 Establish lines of communication between the safety services office, the accountable manager, the SAG and the safety/SMS coordination committee.

12.3.2.6 Appoint the accountable manager as the chairperson of the safety/SMS coordination committee.

12.3.2.7 Develop a schedule of meetings for the safety services office to meet with the safety/SMS coordination committee and SAG as needed.

12.3.3. Coordination of emergency response planning.

12.3.3.1 Review the outline of the ERP related to the delegation of authority and assignment of emergency responsibilities.

12.3.3.2 Establish coordination procedures for action by key personnel during the emergency and the return to normal operations.

12.3.3.3 Identify external entities that will interact with the organization during emergency situations.

12.3.3.4 Assess the respective ERPs of the external entities.

12.3.3.5 Establish coordination between the different ERPs.

12.3.3.6 Incorporate information about the coordination between the different ERPs in the organization's SMS documentation.

12.3.4. SMS documentation.

12.3.4.1 Create an SMS documentation system to describe, store, retrieve and archive all SMS-related information and records by:

a) Developing an SMS document that is either a stand-alone manual or a distinct section within an existing controlled organization manual.

b) Establishing an SMS filing system to collect and maintain current records relating to the organization's ongoing SMS processes;

c) Maintaining records to provide a historical reference as well as the current status of all SMS processes such as: a hazard register; an index of completed safety assessments; SMS/safety training records; current SPIs and associated safety objectives; internal SMS audit reports; SMS/safety committee meeting minutes and the SMS implementation plan;

d) Maintaining records that will serve as evidence of the SMS operation and activities during internal or external assessment or audit of the SMS.

12.4 **Phase 3 – *Proactive and predictive processes*** should put into practice those elements of the SMS implementation plan that refer to the safety risk management based on proactive and predictive processes:

12.4.1. Hazard identification

12.4.1.1 Establish a voluntary hazard reporting procedure.

Establish a programme/schedule for systematic review of all applicable aviation safety- related processes/equipment that are eligible for the HIRM process.

12.4.1.2 Establish a process for prioritization and assignment of identified hazards for risk mitigation.

12.4.2. Safety risk assessment and mitigation.

12.4.2.1 Establish a safety risk management procedure, including its approval and periodic review process.

Develop and adopt safety risk matrices relevant to the organization's operational or production processes.

Include adopted safety risk matrices and associated instructions in the organization's SMS or risk management training material.

12.4.3. Safety performance monitoring and measurement.

12.4.3.1 Establish an internal occurrence reporting and investigation procedure. This may include mandatory or major defect reports where applicable.

12.4.3.2 Establish safety data collection, processing and analysis of high- consequence outcomes.

12.4.3.3 Establish high consequence safety indicators (initial acceptable level of safety (ALoSP)) and their associated target and alert settings. Examples of high-consequence safety indicators are accident rates, serious incident rates and monitoring of high-risk non-compliance outcomes.

12.4.3.4 Reach an agreement with the authority on safety performance indicators and safety performance targets.

12.4.4. The management of change.

12.4.4.1 Establish a formal process for the management of change that considers:

a) the vulnerability of systems and activities;

b) the stability of systems and operational environments;

c) past performance;

d) regulatory, industry and technological changes.

12.4.4.2 Ensure that management of change procedures address the impact on existing safety performance and risk mitigation records before implementing new changes.

12.4.4.3 Establish procedures to ensure that safety assessment of new aviation safety-related operations, processes and equipment are conducted (or accounted for) as applicable, before they are commissioned.

12.4.5. Continuous improvement of the SMS.

12.4.5.1 Develop forms for internal evaluations.

12.4.5.2 Define an internal audit process.

12.4.5.3 Define an external audit process.

12.4.5.4 Define a schedule for evaluation of facilities, equipment, documentation and procedures to be completed through audits and surveys.

12.4.5.5 Develop documentation relevant to operational safety assurance.

12.5 **Phase 4 – *Operational safety assurance*** This is the final phase of SMS implementation. This phase involves the mature implementation of safety risk management and safety assurance. In this phase operational safety assurance is assessed through the implementation of periodic monitoring, feedback and continuous corrective action to maintain the effectiveness of safety risk controls.

12.5.1. Management commitment and responsibility.

12.5.1.1 enhance the existing disciplinary procedure/ policy with due consideration of unintentional errors or mistakes from deliberate or gross violations.

12.5.2. Hazard identification.

12.5.2.1 integrate hazards identified from occurrence investigation reports with the voluntary hazard reporting system;

12.5.2.2 integrate hazard identification and risk management procedures with the subcontractor's or customer's SMS where applicable.

12.5.2.3 If necessary, develop a process for prioritizing collected hazards for risk mitigation based on areas of greater need or concern.

12.5.3. Safety performance monitoring and measurement.

12.5.3.1 enhance the safety data collection and processing system to include lower- consequence events;

12.5.3.2 develop lower-consequence SPIs and associated targets/alert settings.

11.5.3.3 Reach an agreement with the authority on lower-consequence safety performance indicators and safety performance target/alert levels.

12.5.4. Continuous improvement of the SMS.

12.5.4.1 establish SMS audit programmes or integrate them into existing internal and external audit programmes;

12.5.4.2 establish other operational SMS review/survey programmes where appropriate.

12.5.5. Training and education.

12.5.5.1 ensure that the SMS training programme for all relevant personnel has been completed.

12.5.6. Safety communication.

12.5.6.1 Establish mechanisms to promote safety information sharing and exchange internally and externally.
