CIVIL AVIATION DIRECTIVE – 19

SAFETY MANAGEMENT

CIVIL AVIATION AUTHORITY OF MALAYSIA

ISSUE 01
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Introduction

In exercise of the powers conferred by section 24O of the Civil Aviation Act 1969 (Act 3), the Chief Executive Officer makes this Civil Aviation Directive 19 – Civil Aviation Safety Management (CAD 19 SM), pursuant to Regulation 167 of the Malaysian Civil Aviation Regulations (MCAR 2016)

The standards and requirements in this Directive are based mainly on standards and recommended practices (SARPs) stipulated in International Civil Aviation Organisation (ICAO) Annex 19 to the Chicago Convention — Safety Management.

This Directive is published by the Chief Executive Officer under section 24(o) of the Civil Aviation Act 1969 *(Act* 3) and comes into effect on 01 April 2021.

Any person who contravenes any provision in this Directive commits an offence and shall on conviction be liable to the punishment under section 24(O) of the Civil Aviation Act 1969 *(Act 3).*

(Captain Chester Voo Chee Soon)
Chief Executive Officer
Civil Aviation Authority of Malaysia

Civil Aviation Directive Components and Editorial Practices

This Civil Aviation Directive is made up of the following components and are defined as follows:

Standards: Usually preceded by words such as *"shall"* or *"must"*, are any specification for physical characteristics, configuration, performance, personnel or procedure, where uniform application is necessary for the safety or regularity of air navigation and to which Operators must conform. In the event of impossibility of compliance, notification to the CAAM is compulsory.

Recommended Practices: Usually preceded by the words such as "*should"* or "*may*", are any specification for physical characteristics, configuration, performance, personnel or procedure, where the uniform application is desirable in the interest of safety, regularity or efficiency of air navigation, and to which Operators will endeavour to conform.

Appendices: Material grouped separately for convenience but forms part of the Standards and Recommended Practices stipulated by the CAAM.

Definitions: Terms used in the Standards and Recommended Practices which are not self-explanatory in that they do not have accepted dictionary meanings. A definition does not have an independent status but is an essential part of each Standard and Recommended Practice in which the term is used, since a change in the meaning of the term would affect the specification.

Tables and Figures: These add to or illustrate a Standard or Recommended Practice and which are referred to therein, form part of the associated Standard or Recommended Practice and have the same status.

Notes: Included in the text, where appropriate, Notes give factual information or references bearing on the Standards or Recommended Practices in question but not constituting part of the Standards or Recommended Practices;

Attachments: Material supplementary to the Standards and Recommended Practices or included as a guide to their application.

It is to be noted that some Standards in this Civil Aviation Directive incorporates, by reference, other specifications having the status of Recommended Practices. In such cases, the text of the Recommended Practice becomes part of the Standard.

The units of measurement used in this document are in accordance with the International System of Units (SI) as specified in CAD 5. Where CAD 5 permits the use of non-SI alternative units, these are shown in parentheses following the basic units. Where two sets of units are quoted it must not be assumed that the pairs of values are equal and interchangeable. It may, however, be inferred that an equivalent level of safety is achieved when either set of units is used exclusively.

Any reference to a portion of this document, which is identified by a number and/or title, includes all subdivisions of that portion.

Throughout this Civil Aviation Directive, the use of the male gender should be understood to include male and female persons.

PUBLICATIONS

(referred to in this CAD)

Malaysian Civil Aviation Act 1969 (ACT 3)

Malaysian Civil Aviation Regulation 2016

Annex 1 — *Personnel Licensing*

Annex 6 — *Operation of Aircraft*

Annex 13 — *Aircraft Accident and Incident Investigation*

Annex 19 – *Safety Management*

CAGM 6004 AOC

Air Navigation Services (ANS) Regulatory Manual.

Airport Standards Directive 105 (ASD 105)

Airworthiness Notice 2101

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Record of Revisions

Revisions to this CAD shall be made by authorised personnel only. After inserting the revision, enter the required data in the revision sheet below. The *'Initials'* has to be signed off by the personnel responsible for the change.

Rev No.	Revision Date	Revision Details	Initials

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1 General

1.1 Citation

1.1.1 These directives are the Civil Aviation Directives 19 – Safety Management (CAD 19 – SM), Issue 01/Revision 00, and comes into operation on 1 April 2021.

1.1.2 This CAD 19 – SM, Issue 01/Revision 00 will remain current until withdrawn or superseded.

1.2 Applicability

1.2.1 The Standards contained in this CAD shall be applicable to safety management functions related to, or in direct support of, the safe operation of aircraft.

Note 1: Safety management provisions for CAAM are contained in the Malaysian SSP.

Note 2: Within the context of this CAD, the term "service provider" has the same meaning as defined in Regulation 167 of the Civil Aviation Regulations 2016.

Note 3: No provision of this CAD is intended to transfer to the State the responsibilities of the aviation service provider or operator. This includes functions related to, or in direct support of, the safe operation of aircraft.

Note 4: In the context of this CAD, "responsibility" (singular) refers to "State responsibility" with respect to international obligations under the Convention on International Civil Aviation, while "responsibilities" (plural) should be given its ordinary meaning (i.e., when referring to functions and activities that may be delegated).

Note 5: Safety management provisions pertaining to specific types of aviation activities are addressed in the relevant Annexes.

Note 6: Basic safety management principles applicable to the medical assessment process of licence holders are contained in Annex 1.

1.3 Revocation

1.3.1 This CAD, revokes appendix 12 and appendix 13 of FOD 60OR-16 - Organisation Requirements for Air Operations, Issue 3 Amendment 0

1.4 Abbreviations

AAIB	=	Air Accident Investigation Bureau
ADREP	=	Accident/incident data reporting
ADRS	=	Aircraft Data Recording Systems
ATS	=	Air traffic services
CAAM	=	Civil Aviation Authority of Malaysia
CAD	=	Civil aviation directive
FDA	=	Flight data analysis
FDAP	=	Flight data analysis programme

FDR	=	Flight data recorder
FOQA	=	Flight operational quality assurance
QAR	=	Quick Access Recorder
SARPS	=	Standards and Recommended Practices
SDCPS	=	Safety data collection and processing systems
SMM	=	Safety management manual
SMS	=	Safety management system
SPI	=	Safety performance indicator
SPT	=	Safety performance target
SSO	=	State safety oversight
SSP	=	State safety programme

1.5 Definitions

When the following terms are used in the Standards for Safety Management, they have the following meanings:

Accident is 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:

   i. being in the aircraft, or

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

   iii. 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:

   i. adversely affects the structural strength, performance or flight characteristics of the aircraft, and

   ii. 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);

c) or the aircraft is missing or is completely inaccessible.

Note 1: For statistical uniformity only, an injury resulting in death within thirty days of the date of the accident is classified, by ICAO, as a fatal injury.

Note 2: An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located.

Note 3: The type of unmanned aircraft system to be investigated is addressed in 5.1 of ICAO Annex 13.

Note 4: Guidance for the determination of aircraft damage can be found in Attachment E of ICAO Annex 13.

Aeroplane is defined as power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight.

Aircraft is any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

Air Accident Investigation Bureau (AAIB) is a body established by Ministry of Transport, Malaysia to conduct air accident investigations.

Hazard is defined as a condition or an object with the potential to cause or contribute to an aircraft incident or accident.

Helicopter is defined as a heavier-than-air aircraft supported in flight chiefly by the reactions of the air on one or more power-driven rotors on substantially vertical axes.

Note 1: Some States use the term "rotorcraft" as an alternative to "helicopter".

Incident means an occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.

Note 1: The types of incidents which are of interest for safety-related studies include the incidents listed in CAD 13, Attachment C.

Industry codes of practice are 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 Organisation's Standards and Recommended Practices, other aviation safety requirements and the best practices deemed appropriate.

Note 1. Some States accept and reference industry codes of practice in the development of regulations to meet the requirements of ICAO Annex 19, and make available, for the industry codes of practice, their sources and how they may be obtained.

Operational personnel mean personnel involved in aviation activities who are in a position to report safety information.

Note 1. Such personnel include, but are not limited to: flight crews; air traffic controllers; aeronautical station operators; maintenance technicians; personnel of aircraft design and manufacturing organisations; cabin crews; flight dispatchers, apron personnel and ground handling personnel

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

Safety data are a defined set of facts or set of safety values collected from various aviation-related sources, which is used to maintain or improve safety.

Note 1. Such safety data is collected from proactive or reactive safety-related activities, including but not limited to:

a) accident or incident investigations;

b) safety reporting;

c) continuing airworthiness reporting;

d) operational performance monitoring;

e) inspections, audits, surveys; or

f) safety studies and reviews.

Safety information is defined as Safety data processed, organised or analysed in a given context so as to make it useful for safety management purposes.

Safety management system (SMS) is a systematic approach to managing safety, including the necessary organisational structures, accountability, responsibilities, policies and procedures.

Safety oversight is a function performed by a State to ensure that individuals and organisations performing an aviation activity comply with safety-related national laws and regulations.

Safety performance means a state or a service provider's safety achievement as defined by its safety performance targets and safety performance indicators.

Safety performance indicator (SPI) is a data-based parameter used for monitoring and assessing safety performance.

Safety performance target (SPT is defined as the State or service provider's planned or intended target for a safety performance indicator over a given period that aligns with the safety objectives.

Safety risk is the predicted probability and severity of the consequences or outcomes of a hazard.

Serious injury means an injury which is sustained by a person in an accident and which:

a) requires hospitalisation for more than 48 hours, commencing within seven days from the date the injury was received; or

b) results in a fracture of any bone (except simple fractures of fingers, toes or nose); or

c) involves lacerations which cause severe haemorrhage, nerve, muscle or tendon damage; or

d) involves injury to any internal organ; or

e) involves second- or third-degree burns, or any burns affecting more than 5 per cent of the body surface; or

f) involves verified exposure to infectious substances or injurious radiation.

State safety programme (SSP) are an integrated set of regulations and activities aimed at improving safety.

Surveillance defines the State activities through which the State proactively verifies through inspections and audits that aviation licence, certificate, authorisation or approval holders continue to meet the established requirements and function at the level of competency and safety required by the State.

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2 Safety Management System (SMS)

2.1 Introduction

2.1.1 The SMS of a service provider shall:

a) be established in accordance with the SMS framework elements contained in this CAD.

b) be commensurate with the size of the service provider and the complexity of its aviation products or services.

2.2 SMS framework

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

TABLE 1: Components and elements of the ICAO SMS framework

COMPONENT	ELEMENT
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

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3 Safety Policy and Objectives

3.1 Management commitment

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

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

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

c) include safety reporting procedures;

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

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

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

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

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

a) form the basis for safety performance monitoring and measurement as required by 5.1.2;

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

c) be communicated throughout the organization; and

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

3.2 Safety accountability and responsibilities

3.2.1 The service provider shall:

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

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

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

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

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

3.3 Appointment of key safety personnel

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

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

3.4 Coordination of emergency response planning

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

3.5 SMS documentation

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

a) safety policy and objectives;

b) SMS requirements;

c) SMS processes and procedures; and

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

3.5.2 The service provider shall develop and maintain SMS operational records as part of its SMS documentation.

Note: Depending on the size of the service provider and the complexity of its aviation products or services, the SMS manual and SMS operational records may be in the form of stand-alone documents or may be integrated with other organisational documents (or documentation) maintained by the service provider. Refer to Appendix 2 for guidance on developing an SMS manual.

4 Safety Risk Management

4.1 Hazard identification.

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

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

Note: Refer to Appendix 3 for guidance for hazard identification and risk management process.

4.2 Safety reporting system.

4.2.1 The service provider shall develop and maintain a Safety Reporting System. It is one of the main sources for identifying hazard.

4.2.2 The system shall consist of and addresses following:

a) Voluntary and mandatory reporting.

b) To provide appropriate protections to encourage reporting.

c) Confidentiality of voluntary safety reporters.

d) Has a custodian of voluntary safety reports.

e) De-identification and archiving process.

4.3 Service Provider Safety Investigation

4.3.1 Service provider shall develop an investigation process for safety occurrences, hazards and report findings.

Note: 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 ICAO Annex 13.

Note: Appendix 4. outlines the guidance for 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.

4.4 Safety risk assessment and mitigation

4.4.1 The service provider shall develop and maintain a process that ensures analysis, assessment and control of the safety risks associated with identified hazards.

4.4.2 The service provider shall develop a procedure for periodic review of completed risk mitigation records.

Note 1. – Appendix 5 presents a typical guidance for safety risk management process. The completed hazard identification and safety risk assessment and mitigation process is documented and approved as appropriate and forms part of the safety information management system.

Note 2. – Appendix 6 presents a typical guidance for Safety risk probability and safety risk severity and a safety risk assessment matrix tables.

5 Safety Assurance

5.1 Safety performance monitoring and measurement

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

5.1.2 The service provider safety performance shall be verified in reference to the safety performance indicators (SPIs) and safety performance targets (SPTs) of the SMS in support of their safety objectives.

5.1.3 The service provider shall provide CAAM the actual SPIs, safety performance target and alert level every month.

5.1.4 If a service provider fails to achieve the setting of alert level or target level as agreed between CAAM and them, the service provider shall immediately report to CAAM and submit a corrective plan accordingly.

5.1.5 The service provider shall periodically review each SPIs, alert levels and target levels to ensure they remain effective, relevant and appropriate.

5.1.6 Any necessary adjustments to previously agreed SPIs, target or alert settings shall be substantiated by appropriate safety data and be documented as appropriate.

5.1.7 **Internal audit**

5.1.7.1 The service provider shall conduct periodic internal audit at least once a year.

5.1.7.2 The internal audit shall be focussed to determine:

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.

5.1.8 **Safety performance monitoring.**

5.1.8.1 The service provider shall develop a Safety Data Collection and Processing system (SDCPS) to monitor safety performance with reference to their SPTs and SPIs.

5.2 The management of change.

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

5.3 Continuous improvement of the SMS

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

6 Safety Promotion

6.1 Training and education

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

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

6.1.3 Safety training and education curricula shall consist of the following:

a) organisational safety policies, goals and objectives;

b) organisational safety roles and responsibilities related to safety;

c) basic safety risk management principles;

d) safety reporting systems;

e) the organisation's SMS processes and procedures; and

f) human factors.

6.2 Safety communication

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

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

b) conveys safety-critical information;

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

d) explains why safety procedures are introduced or changed.

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7 SMS Implementation

7.1 One SMS across multiple service providers

7.1.1 Organisations with multiple service provider certifications may choose to include them all under the scope of one SMS to capitalise on the benefits of SMS and better address interface aspects.

7.2 SMS implementation plan

7.2.1 The service provider shall develop an SMS implementation plan. It is developed in consultation with the accountable executive and managers responsible for the delivery of products and services related to, or in support of, the safe operation of aircraft. The SMS implementation plan includes timelines and milestones consistent with the requirements identified in the gap analysis process, the size of the service provider and the complexity of its products or services. The plan shall address coordination with external organisations or contractors where applicable.

7.2.2 The service provider shall carry out a gap analysis before implementing SMS. This compares the service provider's existing safety management processes and procedures with the SMS requirements as determined by CAAM.

Note 1: Appendix 8, Table 5-1 provides a guidance for gap analysis questions to facilitate service providers in systematically assessing their existing processes

Note 2: Appendix 8, Table 5-2 provides a guidance for SMS gap analysis and implementation task identification plan.

Note 3: Appendix 8, Table 5-3 provides a guidance for of SMS implementation schedule.

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8 Safety Data and Safety Information Collection, Analysis, Protection, Sharing and Exchange

8.1 Safety data collection and processing systems

8.1.1 The service provider shall establish safety data collection and processing systems (SDCPS) to capture, store, aggregate and enable the analysis of safety data and safety information.

8.1.2 SDCPS refers to processing and reporting systems, safety databases, schemes for exchange of information, and recorded information including but not limited to:

a) data and information pertaining to accident and incident investigations;

b) data and information related to safety investigations by State authorities or aviation service providers;

c) mandatory safety reporting systems as indicated in 8.1.3;

d) voluntary safety reporting systems as indicated in 8.1.4; and

e) self-disclosure reporting systems, including automatic data capture systems, as described in Annex 6, Part 1, Chapter 3, as well as manual data capture systems.

Note: The term "safety database" may refer to a single or multiple database(s).

8.1.3 The service provider shall establish a mandatory safety reporting system that includes the reporting of incidents.

8.1.4 The service provider shall establish a voluntary safety reporting system to collect safety data and safety information not captured by mandatory safety reporting systems.

8.1.5 CAAM and AAIB shall have access to the SDCPS to support their safety responsibilities.

8.1.6 The safety database shall use standardised taxonomy to facilitate safety information sharing and exchange Safety data and safety information analysis

8.2 Safety data and safety information analysis

8.2.1 The service provider shall establish and maintain a process to analyse the safety data and safety information from the SDCPS and associated safety databases.

8.2.2 An operator of an aeroplane of a maximum certificated take-off mass in excess of 27 000 kg shall establish and maintain a FDAP as part of its safety management system.

8.2.3 An operator of a helicopter of a certified take-off mass in excess of 7 000 kg or having a passenger seating configuration of more than 9 and fitted with a flight data recorder shall establish and maintain a FDAP.

Note 1: An operator may contract the operation of a FDAP to another party while retaining overall responsibility for the maintenance of such a programme.

Note2: Establishment of FDAP shall be in accordance to CAGM 6004 AOC.

8.3 Safety data and safety information protection

8.3.1 The service provider shall accord protection to safety data captured by, and safety information derived from, voluntary safety reporting systems and related sources in accordance with CAAM Enforcement Policy.

8.3.2 The service provider shall extend the protection referred to in 8.3.1 to safety data captured by, and safety information derived from, mandatory safety reporting system and related sources.

8.3.3 Subject to 8.3.1 and 8.3.2, The service provider shall not make available or use safety data or safety information collected, stored or analysed in accordance with 8.1 or 8.2 for purposes other than maintaining or improving safety, unless the competent authority determines, in accordance with CAAM Enforcement Policy, that a principle of exception applies.

8.3.4 Notwithstanding 8.3.3, The service provider shall not be prevented from using safety data or safety information to take any preventive, corrective or remedial action that is necessary to maintain or improve aviation safety.

Note: Specific provision aimed at ensuring that there is no overlap with the protection of investigation records in Annex 13 is contained in ICAO Annex 19, Appendix 3, 1.2.

8.3.5 The service provider shall take necessary measures, including the promotion of a positive safety culture, to encourage safety reporting through the systems referred to in 8.1.3 and 8.1.4.

9 Appendices

9.1 Appendix 1 – Specific Safety Management Requirements.

9.1.1 **Air Operator**

9.1.1.1 The requirements are contained in CAGM 6004 AOC

9.1.2 Acceptance of Safety Performance Indicators.

9.1.2.1 As part of the SMS acceptance process, the Air Operators' proposed safety performance indicators (SPIs) and their associated events, targets and alerts will be reviewed before agreed upon by CAAM.

9.1.2.2 The SPI events shall include, but are not limited to:

a) Abnormal runway contact (ARC)

b) Bird strike (Bird)

c) Controlled flight into terrain (CFIT)

d) Collision with obstacle during take-off and landing (CTOL)

e) Fuel related events (FUEL)

f) Ground collision (GCOL)

g) Loss of control – Ground (LOS-G)

h) Loss of control – Inflight (LOC-I)

i) Navigation errors (NAV)

j) Occurrence during ground handling operations (RAMP)

k) Runway excursion (RE)

l) Runway incursion (RI)

m) System/component failure or malfunction, Non-power plant (SCF-NP)

n) System/component failure or malfunction, Power plant (SCF-PP)

o) (TCAS RA)

p) Unstabilised approach (UA)

9.1.2.3 Air operators shall monthly, submit safety performance indicators (SPIs) and their Acceptable Level of Safety Performance (ALoSP) to CAAM.

9.1.3 **Airworthiness Division Service Providers**

9.1.3.1 The requirements are contained in Airworthiness Notice 2101

9.1.4 **ATS Provider SMS**

9.1.4.1 The requirements are contained in Chapter 8 of the Air Navigation Services (ANS) Regulatory Manual.

9.1.5 **Aerodrome Operator**

9.1.5.1 The requirements are contained in the Airport Standards Directive 105 (ASD 105), Safety Management System at Aerodromes.

9.2 Appendix 2 – Guidance on the Development of SMS Manual

9.2.1 This appendix provides guidance on the structure of a typical SMS Manual. The guidance is and could be applied to the various types of service providers in Malaysian aviation system. While all the components and elements of the SMS framework must be put in place, the degree of implementation shall commensurate with the size, nature and complexity of operations.

9.2.2 The SMS Manual may be formatted in the following manner:

a) Section headings: The section headings are listed under manual contents.

b) Objective: This paragraph provides a short write-up on what the section is intended to achieve.

c) Consideration: This paragraph provides a non-exhaustive list of points to consider in drafting the section.

d) Cross-reference documents: with information supporting the SMS elements found in other relevant manuals or SOPs of the service provider, may be included in the SMS Manual.

9.2.3 Manual Contents

a) Document Control

b) SMS Regulatory Requirements

c) Scope and Integration of the Safety Management System

d) Safety Policy

e) Safety Objectives

f) Safety Accountabilities and Key Personnel

g) Non-Punitive Reporting Policy

h) Safety Reporting

i) Hazard Identification, Safety Risk Assessment and Mitigation

j) Safety Performance Monitoring and Measurement

k) Safety Investigations

l) Safety Training and Communication

m) Continuous Improvement and SMS Audit

n) SMS Data and Records Management

o) Management of Change

p) Coordination of Emergency Response Plan

q) A gap analysis identifying additional need for safety arrangement and structures. (ATS).

9.2.4 Example of Manual Content

9.2.4.1 Document control

Objective

Describe how the manual(s) will be kept up to date and how the organisation will ensure that all personnel involved in safety-related duties have the most current version.

Criteria

Hard copy or controlled electronic media and distribution list.

The correlation between the SMS manual and other existing manuals such as the maintenance control manual (MCM) or the operations manual.

The process for periodic review of the manual and its related forms/documents to ensure their continuing suitability, adequacy and effectiveness.

The manual's administration, approval and regulatory acceptance process.

Cross-reference documents

Quality manual, engineering manual, etc.

9.2.4.2 SMS regulatory requirements

Objective

Address current SMS regulations and guidance material for necessary reference and awareness by all concerned.

Criteria

a) Spell out the current SMS regulations/standards. Include the compliance timeframe and advisory material references as applicable.

b) Where appropriate, elaborate on or explain the significance and implications of the regulations to the organisation.

c) Establish a correlation with other safety-related requirements or standards where appropriate.

Cross-reference documents

SMS regulation/requirement references, SMS guidance document references, etc.

9.2.4.3 Scope and integration of the safety management system

Objective

Describe the scope and extent of the organisation's aviation-related operations and facilities within which the SMS will apply. The scope of the processes, equipment and operations deemed eligible for the organisation's hazard identification and risk management (HIRM) programme shall be addressed.

Criteria

a) Spell out the nature of the organisation's aviation business and its position or role within the industry as a whole.

b) Identify the major areas, departments, workshops and facilities of the organisation within which the SMS will apply.

c) Identify the major processes, operations and equipment which are deemed eligible for the organisation's HIRM programme, especially those which are pertinent to aviation safety. If the scope of the HIRM-eligible processes, operations and equipment is too detailed or extensive, it may be controlled under a supplementary document as appropriate.

d) Where the SMS is expected to be operated or administered across a group of interlinked organisations or contractors, define and document such integration and associated accountabilities as applicable.

e) Where there are other related control/management systems within the organisation, such as QMS, OSHE and SeMS, identify their relevant integration (where applicable) within the aviation SMS.

Cross-reference documents

Quality manual, engineering manual, etc.

9.2.4.4 Safety policy and safety objectives

Objective

Describe the organisation's intentions, management principles and commitment to improving aviation safety in terms of the product or service provider. A safety policy should be a short description similar to a mission statement.

Criteria

a) The safety policy should be appropriate to the size and complexity of the organisation.

b) The safety policy states the organisation's intentions, management principles and commitment to continuous improvement in aviation safety.

c) The safety policy is approved and signed by the accountable executive.

d) The safety policy is promoted by the accountable executive and all other managers.

e) The safety policy is reviewed periodically.

f) Personnel at all levels are involved in the establishment and maintenance of the safety management system.

g) The safety policy is communicated to all employees with the intent that they are made aware of their individual safety obligations.

Cross-reference documents

OSHE safety policy, etc.

9.2.4.5 Safety objectives

Objective

Describe the safety objectives of the organisation. The safety objectives should be a short statement that describes in broad terms what the organisation hopes to achieve.

Criteria

a) The safety objectives have been established.

b) The safety objectives are expressed as a top-level statement describing the organisation's commitment to achieving safety.

c) There is a formal process to develop a coherent set of safety objectives.

d) The safety objectives are publicised and distributed.

e) Resources have been allocated for achieving the objectives.

f) The safety objectives are linked to safety indicators to facilitate monitoring and measurement where appropriate.

Cross-reference documents

Safety performance indicators document, etc.

9.2.4.6 Safety accountabilities and key safety personnel

Objective

Describe all accountabilities, responsibilities and authorities for personnel involved in the SMS.

Criteria

a) The accountable executive is responsible for ensuring that the safety management system is properly implemented and is performing to requirements in all areas of the organisation.

b) An appropriate safety manager (office), safety committee or safety action groups have been appointed as appropriate.

c) Safety accountabilities, responsibilities and authorities of personnel at all levels of the organisation are defined and documented.

d) All personnel understand their accountabilities, responsibilities and authorities with regard to all safety management processes, decisions and actions.

e) An SMS organisational accountabilities diagram is available.

Cross-reference documents

Company exposition manual, SOP manual, administration manual, etc.

9.2.4.7 Voluntary and mandatory safety reporting system processes and procedures

Objective

A reporting system shall include both reactive (accident/incident reports, etc.) and proactive (hazard reports). Describe the respective reporting systems. Factors to consider include: report format, confidentiality, addressees, investigation/evaluation procedures, corrective/ preventive actions and report dissemination.

Criteria

a) The organisation has a procedure that provides for the capture of internal occurrences including accidents, incidents and other occurrences relevant to SMS.

b) A distinction is to be made between mandatory reports (accidents, serious incidents, major defects, etc.), which are required to be notified to the CAA, and other routine occurrence reports, which remain within the organisation.

c) There is also a voluntary and confidential hazard/occurrence reporting system, incorporating appropriate identity/data protection as applicable.

d) The respective reporting processes are simple, accessible and commensurate with the size of the organisation.

e) High-consequence reports and associated recommendations are addressed to and reviewed by the appropriate level of management.

f) Reports are collected in an appropriate database to facilitate the necessary analysis.

Cross-reference document

- - - - - - - - - - - - - -

9.2.4.8 Hazard identification and safety risk assessment processes and procedures

Objective

Describe the hazard identification system and how such data are collated. Describe the process for the categorisation of hazards/risks and their subsequent prioritisation for a documented safety assessment. Describe how the safety assessment process is conducted and how preventive action plans are implemented.

Criteria

a) Identified hazards are evaluated, prioritised and processed for risk assessment as appropriate.

b) There is a structured process for risk assessment involving the evaluation of severity, likelihood, tolerability and preventive controls.

c) Hazard identification and risk assessment procedures focus on aviation safety as their fundamental context.

d) The risk assessment process utilises worksheets, forms or software appropriate to the complexity of the organisation and operations involved.

e) Completed safety assessments are approved by the appropriate level of management.

f) There is a process for evaluating the effectiveness of the corrective, preventive and recovery measures that have been developed.

g) There is a process for periodic review of completed safety assessments and documenting their outcomes.

Cross-reference documents

- - - - - - - - - - - - - -

9.2.4.9 Procedures for establishing and monitoring safety performance

Objective

Describe the safety performance monitoring and measurement component of the SMS. This includes the organisation's SMS safety performance indicators (SPIs).

Criteria

a) The formal process to develop and maintain a set of safety performance indicators and their associated performance targets.

b) Correlation established between the SPIs and the organisation's safety objectives where applicable and the process of regulatory acceptance of the SPIs where required.

c) The process of monitoring the performance of these SPIs including remedial action procedure whenever unacceptable or abnormal trends are triggered.

d) Any other supplementary SMS or safety performance monitoring and measurement criteria or process.

Cross-reference documents

- - - - - - - - - - - - - - -

9.2.4.10 Safety investigation procedures

Objective

Describe how accidents/incidents/occurrences are investigated and processed within the organisation, including their correlation with the organisation's SMS hazard identification and risk management system.

Criteria

a) Procedures to ensure that reported accidents and incidents are investigated internally.

b) Dissemination of completed investigation reports internally as well as to the CAA as applicable.

c) A process for ensuring that corrective actions taken or recommended are carried out and for evaluating their outcomes/effectiveness.

d) Procedure on disciplinary inquiry and actions associated with investigation report outcomes.

e) Clearly defined conditions under which punitive disciplinary action would be considered (e.g. illegal activity, recklessness, gross negligence or wilful misconduct).

f) A process to ensure that investigations include identification of active failures as well as contributing factors and hazards.

g) Investigation procedure and format provides for findings on contributing factors or hazards to be processed for follow-up action by the organisation's hazard identification and risk management system where appropriate.

Cross-reference documents

- - - - - - - - - - - - - -

9.2.4.11 SMS training processes and procedures and communication

Objective

Describe the type of SMS and other safety-related training that staff receive and the process for assuring the effectiveness of the training. Describe how such training procedures are documented. Describe the safety communication processes/channels within the organisation.

Criteria

a) The training syllabus, eligibility and requirements are documented.

b) There is a validation process that measures the effectiveness of training.

c) The training includes initial, recurrent and update training, where applicable.

d) The organisation's SMS training is part of the organisation's overall training programme.

e) SMS awareness is incorporated into the employment or indoctrination programme.

f) The safety communication processes/channels within the organisation.

Cross-reference documents

- - - - - - - - - - - - - -

9.2.4.12 Internal audit procedures

Objective

Describe the process for the continuous review and improvement of the SMS.

Criteria

a) The process for regular internal audit/review of the organisation's SMS to ensure its continuing suitability, adequacy and effectiveness.

b) Describe any other programmes contributing to continuous improvement of the organisation's SMS and safety performance, e.g MEDA, safety surveys, ISO systems.

Cross-reference documents

- - - - - - - - - - - - - -

9.2.4.13 SMS documentation management procedures

Objective

Describe the method of storing all SMS-related records and documents.

Criteria

a) The organisation has an SMS records or archiving system that ensures the retention of all records generated in conjunction with the implementation and operation of the SMS.

b) Records to be kept include hazard reports, risk assessment reports, safety action group/safety meeting notes, safety performance indicator charts, SMS audit reports and SMS training records.

c) Records shall be traceable for all elements of the SMS and be accessible for routine administration of the SMS as well as internal and external audits purposes.

Cross-reference documents

- - - - - - - - - - - - - -

9.2.4.14 Management of change procedures

Objective

Describe the organisation's process for managing changes that may have an impact on safety risks and how such processes are integrated with the SMS.

Criteria

a) Procedures to ensure that substantial organisational or operational changes take into consideration any impact which they may have on existing safety risks.

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

c) Procedures for review of existing safety assessments whenever there are changes to the associated process or equipment.

Cross-reference documents

Company SOP relating to management of change, etc.

9.2.4.15 Where applicable, coordination of emergency response plan

Objective

Describe the organisation's intentions regarding, and commitment to dealing with, emergency situations and their corresponding recovery controls. Outline the roles and responsibilities of key personnel. The emergency response plan can be a separate document or it can be part of the SMS manual.

Criteria (as applicable to the organisation)

a) The organisation has an emergency plan that outlines the roles and responsibilities in the event of a major incident, crisis or accident.

b) There is a notification process that includes an emergency call list and an internal mobilisation process.

c) The organisation has arrangements with other agencies for aid and the provision of emergency services as applicable.

d) The organisation has procedures for emergency mode operations where applicable.

e) There is a procedure for overseeing the welfare of all affected individuals and for notifying next of kin.

f) The organisation has established procedures for handling the media and insurance-related issues.

g) There are defined accident investigation responsibilities within the organisation.

h) The requirement for preservation of evidence, securing the affected area, and mandatory/ governmental reporting is clearly stated.

i) There is emergency preparedness and response training for affected personnel.

j) A disabled aircraft or equipment evacuation plan has been developed by the organisation in consultation with aircraft/equipment owners, aerodrome operators or other agencies as applicable.

k) A procedure exists for recording activities during an emergency response.

Cross-reference documents

ERP manual, etc.

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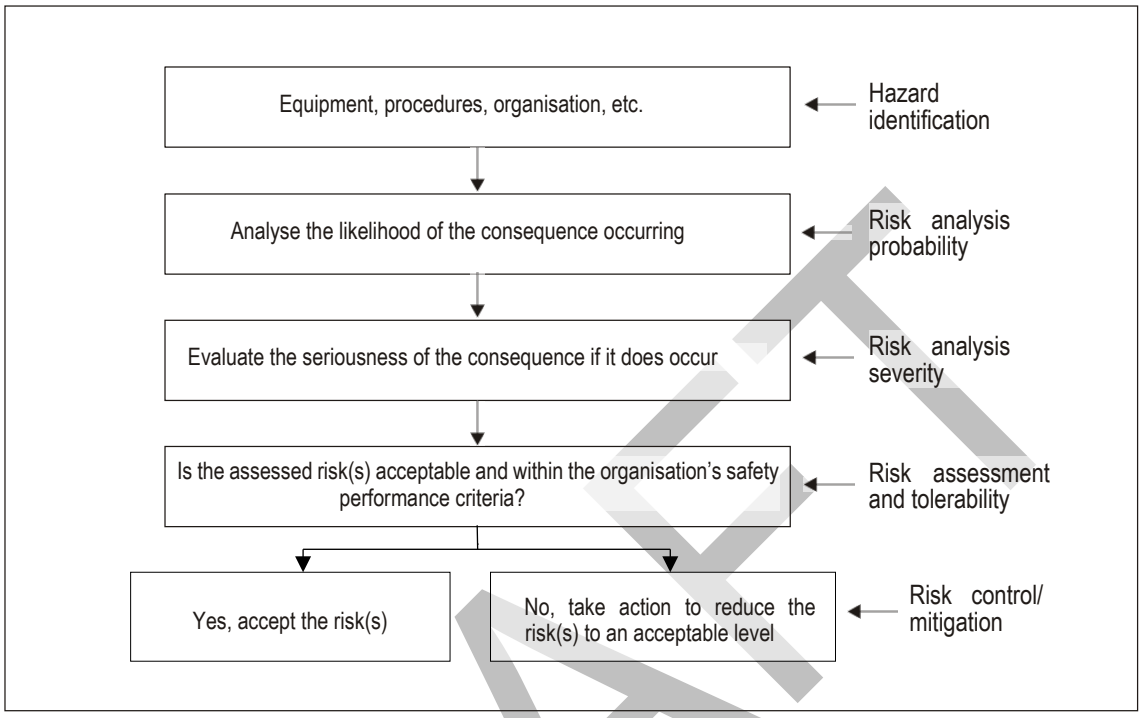
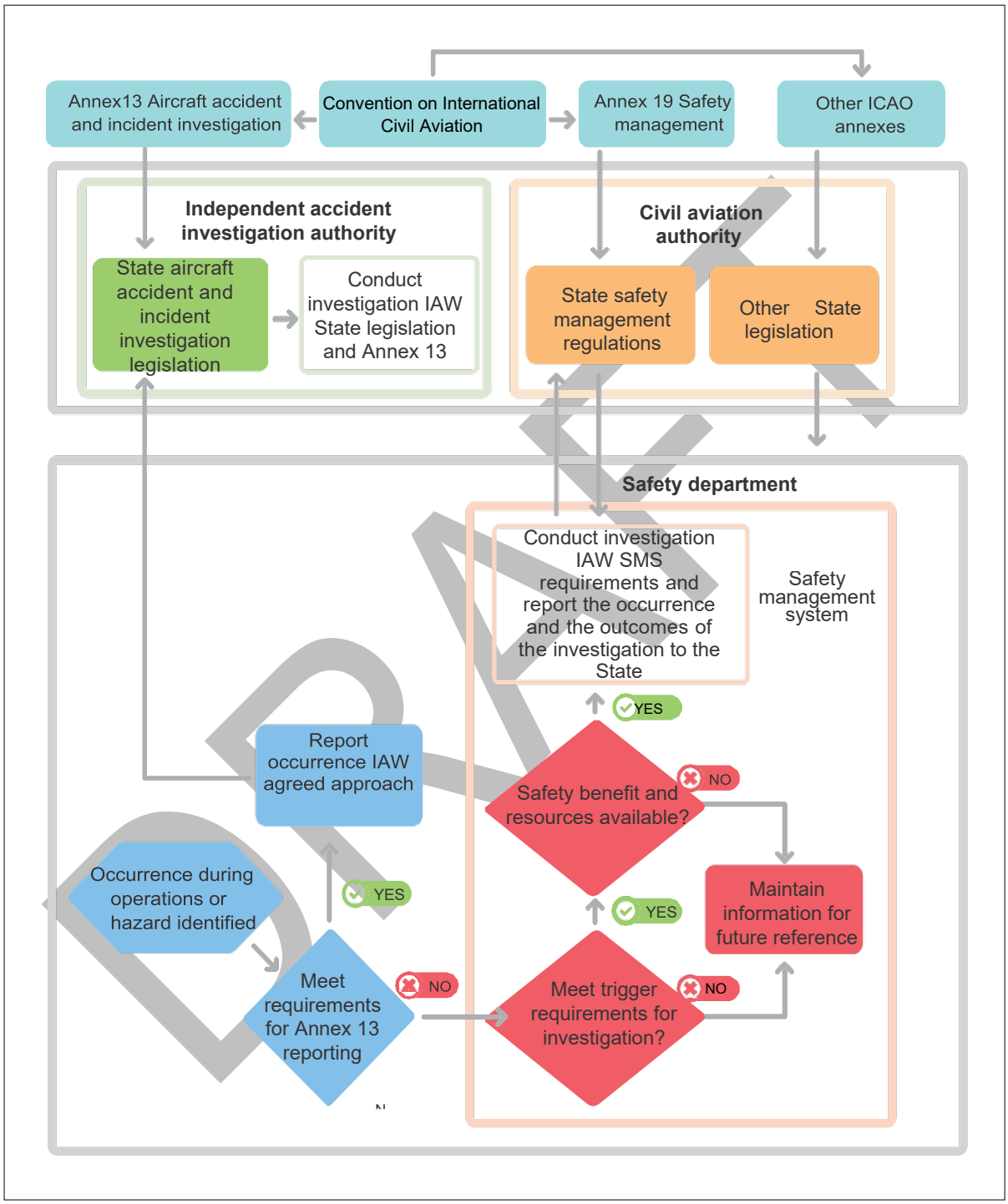
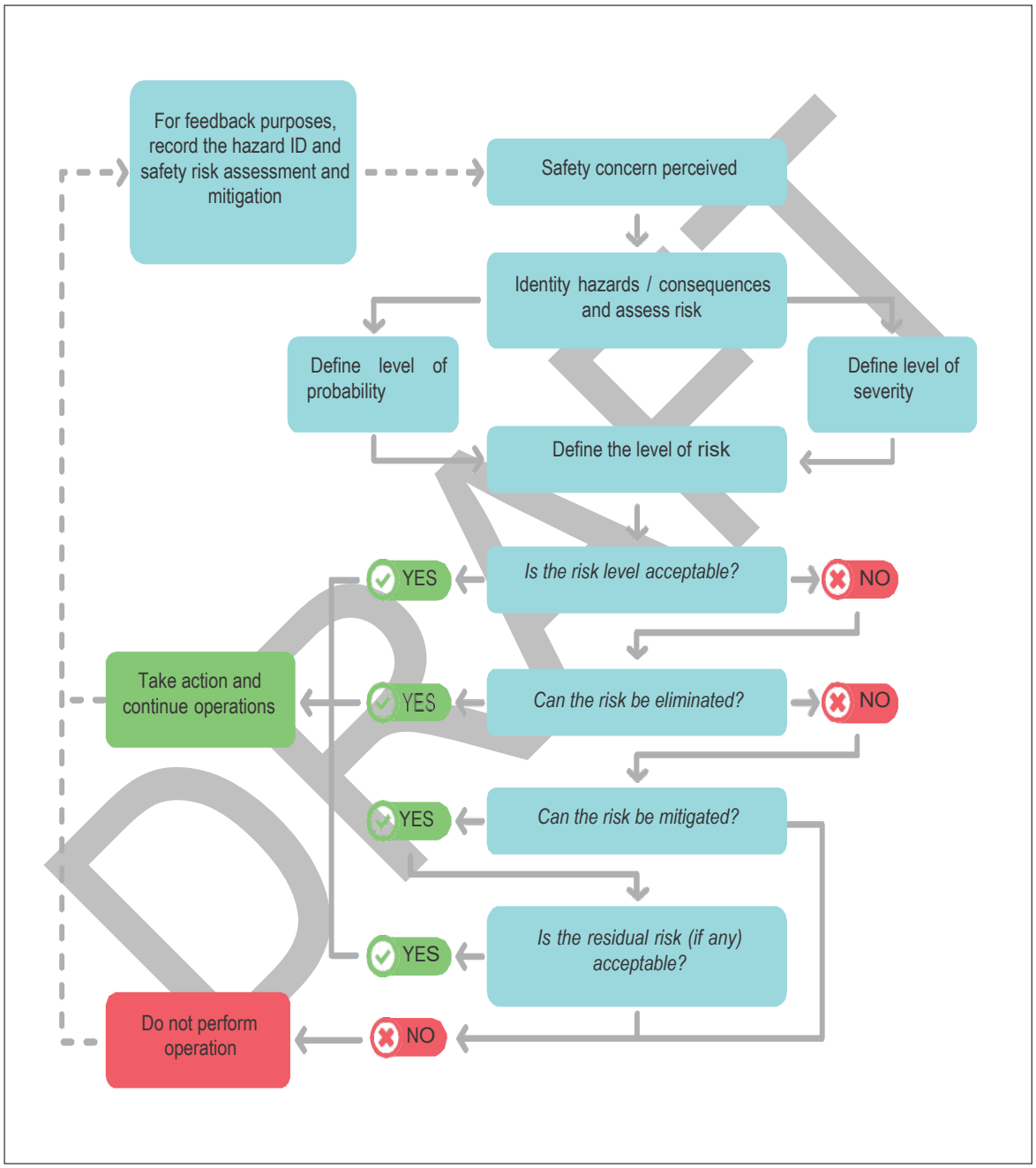
9.3 Appendix 3 – Guidance for Hazard Identification and Risk Management process.



9.4 Appendix 4 – Guidance for Safety Investigation Decision Process.



9.5 Appendix 5 – Guidance for Safety risk management decision aid



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9.6 Appendix 6 – Safety Risk Probability/ Safety Risk Severity/ Safety Risk Matrix/ Safety Risk Tolerability Tables.

Safety Risk Probability table.

Likelihood	*Meaning*	*Value*
Frequent	Likely to occur many times (has occurred frequently)	5
Occasional	Likely to occur sometimes (has occurred infrequently)	4
Remote	Unlikely to occur, but possible (has occurred rarely)	3
Improbable	Very unlikely to occur (not known to have occurred)	2
Extremely improbable	Almost inconceivable that the event will occur	1

Safety Risk Severity table.

Severity	*Meaning*	*Value*
Catastrophic	• Aircraft / equipment destroyed • Multiple deaths	A
Hazardous	• A large reduction in safety margins, physical distress or a workload such that operational personnel cannot be relied upon to perform their tasks accurately or completely • Serious injury • Major equipment damage	B
Major	• A significant reduction in safety margins, a reduction in the ability of operational personnel to cope with adverse operating conditions as a result of an increase in workload or as a result of conditions impairing their efficiency • Serious incident • Injury to persons	C
Minor	• Nuisance • Operating limitations • Use of emergency procedures • Minor incident	D
Negligible	• Few consequences	E

Safety Risk Matrix.

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

Safety Risk Tolerability.

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

9.7 Appendix 7 – SMS Safety Performance Indicators

Tables 4-1 to 4-4 (safety indicator examples) provide illustrative examples of aggregate safety performance indicators (SPIs) and their corresponding alert and target level setting criteria. The SMS SPIs are reflected on the right-hand side of the tables. The corresponding alert and target level criteria for each indicator are to be accounted for as shown. The SSP safety performance indicators on the left-hand side of the tables are shown to indicate the necessary correlation between the SMS and SSP safety indicators. SMS SPIs should be developed by product and service providers in consultation with their respective State regulatory organisations. Their proposed SPIs will need to be congruent with the State's SSP safety indicators; hence necessary agreement/acceptance should be obtained.

Table 4-5 (example of an SMS safety performance indicator chart) is an example of what a high-consequence SMS safety performance indicator chart looks like. In this case it is an airline operator's reportable/mandatory incident rate. The chart on the left is the preceding year's performance, while the chart on the right is the current year's ongoing data updates. The alert level setting is based on basic safety metrics standard deviation criteria. The Excel spreadsheet formula is "=STDEVP". For the purpose of manual standard deviation calculation, the formula is:

$$\sigma = \sqrt{\frac{\sum (X - \mu)^2}{N}}$$

where X is the value of each data point; "N" is the number of data points and "μ" is the average value of all the data points.

The target setting is a desired percentage improvement (in this case 5%) over the previous year's data point average. This chart is generated by the data sheet shown in Table 4-6.

The data sheet in Table 5-A6-6 is used to generate the safety performance indicator chart shown in Table 5-A6-5. The same can be used to generate any other safety performance indicator with the appropriate data entry and safety performance indicator descriptor amendment.

Table 4-7 (example of an SMS performance summary) provides a summary of all the operators' SMS safety indicators, with their respective alert and target level outcomes annotated. Such a summary may be compiled at the end of each monitoring period to provide an overview of the SMS performance. If a more quantitative performance summary measurement is desired, appropriate points may be assigned to each Yes/No outcome for each target and alert outcome.

Example:

High-consequence indicators:

Alert level not breached [Yes (4), No (0)]

Target achieved [Yes (3), No (0)]

Lower-consequence indicators:

Alert level not breached [Yes (2), No (0)]

Target achieved [Yes (1), No (0)]

This may allow a summary score (or percentage) to be obtained to indicate the overall SMS safety performance at the end of any given monitoring period.

SSP safety indicators (aggregate State)						*SMS safety performance indicators (individual service provider)*					
High-consequence indicators (occurrence/outcome-based)			*Lower-consequence indicators (event/activity-based)*			*High-consequence indicators (occurrence/outcome-based)*			*Lower-consequence indicators (event/activity-based)*		
Safety indicator	*Alert level criteria*	*Target level criteria*	*Safety indicator*	*Alert level criteria*	*Target level criteria*	*Safety performance indicator*	*Alert level criteria*	*Target level criteria*	*Safety performance indicator*	*Alert level criteria*	*Target level criteria*
Air operators (air operators of the State only)											
CAA aggregate air operator monthly/quarterly accident/serious incident rate (e.g. per 1 000 FH)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate	CAA aggregate air operator annual surveillance audit LEI % or findings rate (findings per audit)	Consideration	Consideration	Air operator individual fleet monthly serious incident rate (e.g. per 1 000 FH)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate	Operator combined fleet monthly incident rate (e.g. per 1 000 FH)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate
CAA aggregate air operator quarterly engine IFSD incident rate (e.g. per 1 000 FH)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate	CAA aggregate air operator annual line station inspection LEI % or findings rate (findings per inspection)	Consideration	Consideration	Air operator combined fleet monthly serious incident rate (e.g. per 1 000 FH)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate	Operator internal QMS/SMS annual audit LEI % or findings rate (findings per audit)	Consideration	Consideration
			CAA annual foreign air operator ramp surveillance inspection average LEI % (for each foreign operator)	Consideration	Consideration	Air operator engine IFSD incident rate (e.g. per 1 000 FH)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate	Operator voluntary hazard report rate (e.g. per 1 000 FH)	Consideration	Consideration
			CAA aggregate operator DGR incident report rate (e.g. per 1 000 FH)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate				Operator DGR incident report rate (e.g. per 1 000 FH)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate
etc.											

Table 4-1. Examples of safety performance indicators for air operators

SSP safety indicators (aggregate State)						*SMS safety performance indicators (individual service provider)*					
High-consequence indicators (occurrence/outcome-based)			*Lower-consequence indicators (event/activity-based)*			*High-consequence indicators (occurrence/outcome-based)*			*Lower-consequence indicators (event/activity-based)*		
Safety indicator	*Alert level criteria*	*Target level criteria*	*Safety indicator*	*Alert level criteria*	*Target level criteria*	*Safety performance indicator*	*Alert level criteria*	*Target level criteria*	*Safety performance indicator*	*Alert level criteria*	*Target level criteria*
Aerodrome operators											
CAA aggregate aerodrome monthly/quarterly ground accident/serious incident rate — involving any aircraft (e.g. per 10 000 ground movements)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate	CAA aggregate aerodrome operator annual surveillance audit LEI % or findings rate (findings per audit)	Consideration	Consideration	Aerodrome operator quarterly ground accident/serious incident rate — involving any aircraft (e.g. per 10 000 ground movements)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate	Aerodrome operator internal QMS/SMS annual audit LEI % or findings rate (findings per audit)	Consideration	Consideration
CAA aggregate aerodrome monthly/quarterly runway excursion incident rate — involving any aircraft (e.g. per 10 000 departures)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate				Aerodrome operator quarterly runway excursion incident rate — involving any aircraft (e.g. per 10 000 departures)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate	Aerodrome operator quarterly runway foreign object/debris hazard report rate (e.g. per 10 000 ground movements)	Consideration	Consideration
CAA aggregate aerodrome monthly/quarterly runway incursion incident rate — involving any aircraft (e.g. per 10 000 departures)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate				Aerodrome operator quarterly runway incursion incident rate — involving any aircraft (e.g. per 10 000 departures)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate	Operator voluntary hazard report rate (per operational personnel per quarter)	Consideration	Consideration
									Aerodrome operator quarterly aircraft ground foreign object damage incident report rate — involving damage to aircraft (e.g. per 10 000 ground movements)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate
etc.											

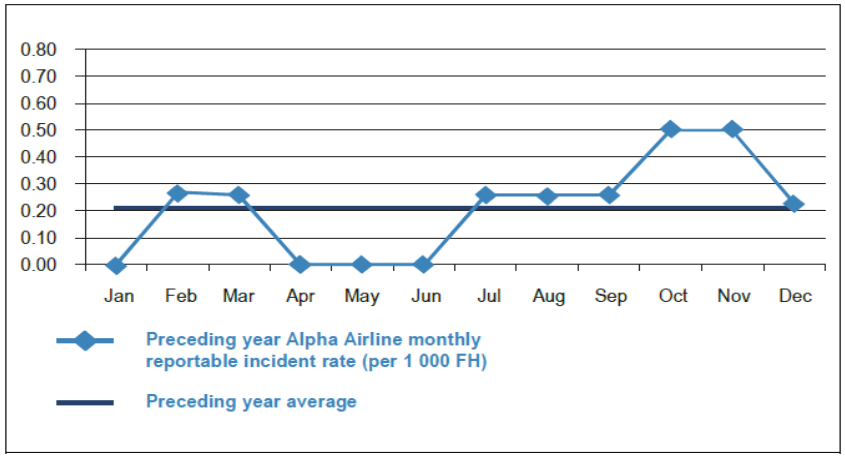
Table 4-2. Examples of safety performance indicators for aerodrome operators

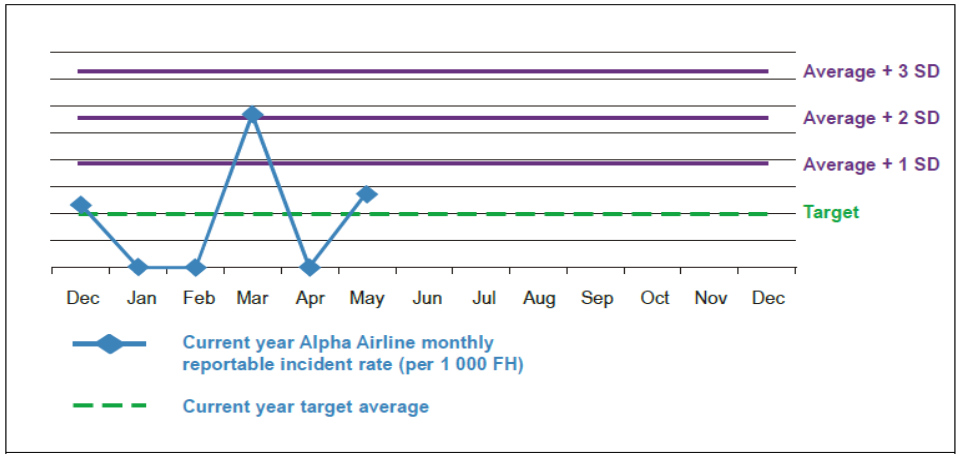
SSP safety indicators (aggregate State)						*SMS safety performance indicators (individual service provider)*					
High-consequence indicators (occurrence/outcome-based)			*Lower-consequence indicators (event/activity-based)*			*High-consequence indicators (occurrence/outcome-based)*			*Lower-consequence indicators (event/activity-based)*		
Safety indicator	*Alert level criteria*	*Target level criteria*	*Safety indicator*	*Alert level criteria*	*Target level criteria*	*Safety performance indicator*	*Alert level criteria*	*Target level criteria*	*Safety performance indicator*	*Alert level criteria*	*Target level criteria*
ATS operators											
CAA aggregate ATS quarterly FIR (airspace) serious incident rate — involving any aircraft (e.g. per 100 000 flight movements)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate	CAA aggregate ATS quarterly FIR TCAS RA incident rate — involving any aircraft (e.g. per 100 000 flight movements)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate	ATS operator quarterly FIR serious incident rate — involving any aircraft (e.g. per 100 000 flight movements)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate	ATS operator quarterly FIR TCAS RA incident rate — involving any aircraft (e.g. per 100 000 flight movements)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate
			CAA aggregate ATS quarterly FIR level bust (LOS) incident rate — involving any aircraft (e.g. per 100 000 flight movements)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate	ATS operator quarterly/annual near-miss incident rate (e.g. per 100 000 flight movements)	Assuming the historical annual average rate is 3, the possible alert rate could be 5.	Assuming the historical annual average rate is 3, the possible target rate could be 2.	ATS operator quarterly FIR level bust (LOS) incident rate — involving any aircraft (e.g. per 100 000 flight movements)	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate
			CAA aggregate ATS operator annual surveillance audit LEI % or findings rate (findings per audit)	Consideration	Consideration				ATS operator internal QMS/SMS annual audit LEI % or findings rate (findings per audit)	Consideration	Consideration
etc.											

Table 4-3. Examples of safety performance indicators for ATS operators

SSP safety indicators (aggregate State)						*SMS safety performance indicators (individual service provider)*					
High-consequence indicators (occurrence/outcome-based)			*Lower-consequence indicators (event/activity-based)*			*High-consequence indicators (occurrence/outcome-based)*			*Lower-consequence indicators (event/activity-based)*		
Safety indicator	*Alert level criteria*	*Target level criteria*	*Safety indicator*	*Alert level criteria*	*Target level criteria*	*Safety performance indicator*	*Alert level criteria*	*Target level criteria*	*Safety performance indicator*	*Alert level criteria*	*Target level criteria*
DOA/POA/MRO											
CAA aggregate MRO quarterly mandatory defect reports (MDR) received	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate	CAA aggregate MRO/POA/DOA annual surveillance audit LEI % or findings rate (findings per audit)	Consideration	Consideration	MRO/POA quarterly rate of component technical warranty claims	Average + 1/2/3 SD (annual or 2 yearly reset)	__% (e.g. 5%) improvement between each annual mean rate	MRO/POA/DOA internal QMS/SMS annual audit LEI % or findings rate (findings per audit)	Consideration	Consideration
CAA aggregate POA/DOA quarterly rate of operational products which are the subject of ADs/ASBs (per product line)	Consideration	Consideration				POA/DOA quarterly rate of operational products which are the subject of ADs/ASBs (per product line)	Consideration	Consideration	MRO/POA/DOA quarterly final inspection/testing failure/rejection rate (due to internal quality issues)	Consideration	Consideration
						MRO/POA quarterly rate of component mandatory/major defect reports raised (due to internal quality issues)	Consideration	Consideration	MRO/POA/DOA voluntary hazard report rate (per operational personnel per quarter)	Consideration	Consideration
etc.											

Table 4-4. Examples of safety performance indicators for maintenance, production and design organisations (DOA/POA/MRO)





a) Alert level setting:

The alert level for a new monitoring period (current year) is based on the preceding period's performance (preceding year), namely its data points average and standard deviation. The three alert lines are average + 1 SD, average + 2 SD and average + 3 SD.

b) Alert level trigger:

An alert (abnormal/unacceptable trend) is indicated if any of the conditions below are met for the current monitoring period (current year):

— any single point is above the 3 SD line
— 2 consecutive points are above the 2 SD line
— 3 consecutive points are above the 1 SD line.

When an alert is triggered (potential high risk or out-of-control situation), appropriate follow-up action is expected, such as further analysis to determine the source and root cause of the abnormal incident rate and any necessary action to address the unacceptable trend.

c) Target level setting (planned improvement):

The target level setting may be less structured than the alert level setting, e.g. target the new (current year) monitoring period's average rate to be say 5% lower (better) than the preceding period's average value.

d) Target achievement:

At the end of the current year, if the average rate for the current year is at least 5% or more lower than the preceding year's average rate, then the set target of 5% improvement is deemed to have been achieved.

e) Alert and target levels — validity period:

Alert and target levels should be reviewed/reset for each new monitoring period, based on the equivalent preceding period's average rate and SD, as applicable.

Table 4-5. Example of an SMS safety performance indicator chart (with alert and target level settings)

Preceding year				
Month	*Alpha Airline total FH*	*Number of reportable/MOR incidents*	*Incident rate**	*Average*
January	3 992	—	0.00	0.21
February	3 727	1.00	0.27	0.21
March	3 900	1.00	0.26	0.21
April	3 870	—	0.00	0.21
May	3 976	—	0.00	0.21
June	3 809	—	0.00	0.21
July	3 870	1.00	0.26	0.21
August	3 904	1.00	0.26	0.21
September	3 864	1.00	0.26	0.21
October	3 973	2.00	0.50	0.21
November	3 955	2.00	0.51	0.21
December	4 369	1.00	0.23	0.21
		Average	0.21	
		SD	0.18	

Average + 1 SD	Average + 2 SD	Average + 3 SD
0.39	0.56	0.73

Current year alert level setting criteria is based on preceding year (Average + 1/2/3 SD).

Current year							
Month	*Alpha Airline total FH*	*Number of reportable/ MOR incidents*	*Incident rate**	*Preceding year average + 1 SD*	*Preceding year average + 2 SD*	*Preceding year average + 3 SD*	*Current year target average*
December	4 369	1.00	0.23	0.39	0.56	0.73	0.21
January	4 090	0.00	0.00	0.39	0.56	0.73	0.20
February	3 316	0.00	0.00	0.39	0.56	0.73	0.20
March	3 482	2.00	0.57	0.39	0.56	0.73	0.20
April	3 549	0.00	0.00	0.39	0.56	0.73	0.20
May	3 633	1.00	0.28	0.39	0.56	0.73	0.20
June				0.39	0.56	0.73	0.20
July				0.39	0.56	0.73	0.20
August				0.39	0.56	0.73	0.20
September				0.39	0.56	0.73	0.20
October				0.39	0.56	0.73	0.20
November				0.39	0.56	0.73	0.20
December				0.39	0.56	0.73	0.20
		Average					
		SD					

Current year target is say 5% average rate improvement over the average rate for the preceding year, which is:	0.20

* Rate calculation (per 1 000 FH).

Table 4-6. Sample data sheet used to generate a high-consequence SMS safety indicator chart (with alert and target setting criteria)

High-consequence safety performance indicator					
	SPI description	*SPI alert level criteria (for 2010)*	*Alert level breached (Yes/No)*	*SPI target level criteria (for 2010)*	*Target achieved (Yes/No)*
1	Alpha Airline's A320 fleet monthly serious incident rate (e.g. per 1 000 FH)	Average + 1/2/3 SD (annual or 2 yearly reset)	Yes	5% improvement of the 2010 average rate over the 2009 average rate	No
2	Alpha Airline's A320 fleet engine IFSD incident rate (e.g. per 1 000 FH)	Average + 1/2/3 SD (annual or 2 yearly reset)	Yes	3% improvement of the 2010 average rate over the 2009 average rate	Yes
3	etc.				

Lower-consequence safety indicators					
	SPI description	*SPI alert level criteria (for 2010)*	*Alert level breached (Yes/No)*	*SPI target level criteria (for 2010)*	*Target achieved (Yes/No)*
1	Operator combined fleet monthly incident rate (e.g. per 1 000 FH)	Average + 1/2/3 SD (annual or 2 yearly reset)	Yes	5% improvement of the 2010 average rate over the 2009 average rate	No
2	Operator internal QMS annual audit LEI % or findings rate (findings per audit)	More than 25% average LEI or any Level 1 finding or more than 5 Level 2 findings per audit	Yes	5% improvement of the 2010 average rate over the 2009 average rate	Yes
3	Operator voluntary hazard report rate (e.g. per 1 000 FH)	TBD		TBD	
4	Operator DGR incident report rate (e.g. per 1 000 FH)	Average + 1/2/3 SD (annual or 2 yearly reset)	No	5% improvement of the 2010 average rate over the 2009 average rate	Yes
5	etc.				

Note 1. Other process indicators. Apart from the above SMS level safety indicators, there may be other system level indicators within each operational area of an organisation. Examples would include process- or system-specific monitoring indicators in engineering, operations, QMS, etc., or indicators associated with performance-based programmes such as fatigue risk management or fuel management. Such process- or system-specific indicators should rightly be administered as part of the system or process concerned. They may be viewed as specific system or process level indicators which supplement the higher level safety performance indicators. They should be addressed within the respective system or process manuals/SOPs as appropriate. Nevertheless, the criteria for setting alert or target levels for such indicators should preferably be aligned with that of the SMS level safety performance indicators where applicable.

Note 2. Selection of indicators and settings. The combination (or package) of high and lower-consequence safety indicators is to be selected by an organisation according to the scope of the organisation's system. For those indicators where the suggested alert or target level setting criteria is not applicable, the organisation may consider alternate criteria as appropriate. General guidance is to set alerts and targets that take into consideration recent historical or current performance.

9.8 Appendix 8 – SMS Gap Analysis Checklist and Implementation Plan

1. Initial Gap Analysis Checklist

1.1 The initial gap analysis checklist in Table 5-1 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. This initial checklist would need to be followed up by an appropriate implementation plan as per Tables 5-2 and 5-3.

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.

Table 5-1. Gap analysis checklist

No.	*Aspect to be analysed or question to be answered*	*SMM 4th edition reference*	*State regulations reference*	*Answer*	*Status of implementation*
Component 1 — SAFETY POLICY AND OBJECTIVES					
Element 1.1 — Management commitment					
1.1-1	Is there a safety policy in place?			☐ Yes ☐ No ☐ Partial	
1.1-2	Does the safety policy reflect senior management's commitment regarding safety management?			☐ Yes ☐ No ☐ Partial	
1.1-3	Is the safety policy appropriate to the size, nature and complexity of the organisation?			☐ Yes ☐ No ☐ Partial	
1.1-4	Is the safety policy relevant to aviation safety?			☐ Yes ☐ No ☐ Partial	

No.	Aspect to be analysed or question to be answered	SMM 4th edition reference	State regulations reference	Answer	Status of implementation
1.1-5	Is the safety policy signed by the accountable executive?			☐ Yes ☐ No ☐ Partial	
1.1-6	Is the safety policy communicated, with visible endorsement, throughout the [Organisation]?			☐ Yes ☐ No ☐ Partial	
1.1-7	Is the safety policy periodically reviewed to ensure it remains relevant and appropriate to the [Organisation]?			☐ Yes ☐ No ☐ Partial	
Element 1.2 — Safety accountability and responsibilities					
1.2-1	Has [Organisation] identified an accountable executive who, irrespective of other functions, shall have ultimate accountability, on behalf of the [Organisation], for the implementation and maintenance of an effective SMS?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ Partial	
1.2-3	Does the Accountable Executive have final authority over all aviation activities of his organisation?			☐ Yes ☐ No ☐ Partial	
1.2-4	Has [Organisation] identified and documented the safety accountabilities of management as well as operational personnel, with respect to the SMS?			☐ Yes ☐ No ☐ Partial	
1.2-5	Is there a safety committee or review board for the purpose of reviewing SMS and safety performance?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ Partial	
1.2-7	Does the safety committee include relevant operational or departmental heads as applicable?			☐ Yes ☐ No ☐ Partial	
1.2-8	Are there safety action groups that work in conjunction with the safety committee (especially for large/complex organisations)?			☐ Yes ☐ No ☐ Partial	

No.	Aspect to be analysed or question to be answered	SMM 4th edition reference	State regulations reference	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?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ Partial	
1.4-4	Is there a plan and record for drills or exercises with respect to the ERP?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ Partial	
1.4-6	Does [Organisation] have a process to distribute and communicate the ERP to all relevant personnel, including relevant external organisations?			☐ Yes ☐ No ☐ Partial	
1.4-7	Is there a procedure for periodic review of the ERP to ensure its continuing relevance and effectiveness?			☐ Yes ☐ No ☐ 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 CAA? [5.3.36 to 5.3.38]			☐ Yes ☐ No ☐ Partial	

No.	Aspect to be analysed or question to be answered	SMM 4th edition reference	State regulations reference	Answer	Status of implementation
1.5-2	Does the SMS documentation address the organisation's SMS and its associated components and elements?			☐ Yes ☐ No ☐ Partial	
1.5-3	Is [Organisation] SMS framework in alignment with the regulatory SMS framework?			☐ Yes ☐ No ☐ Partial	
1.5-4	Does [Organisation] maintain a record of relevant supporting documentation pertinent to the implementation and operation of the SMS?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ Partial	
1.5-7	Is the SMS implementation plan endorsed by the accountable executive?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ Partial	

No.	Aspect to be analysed or question to be answered	SMM 4th edition reference	State regulations reference	Answer	Status of implementation
2.1-3	Does [Organisation] SDCPS include procedures for incident/accident reporting by operational or production personnel?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ Partial	
2.1-5	Does [Organisation] have procedures for investigation of all reported incident/accidents?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ Partial	
2.1-7	Are there procedures to review hazards/threats from relevant industry reports for follow-up actions or risk evaluation where applicable?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ Partial	
2.2-2	Is the risk assessment reports approved by departmental managers or at a higher level where appropriate?			☐ Yes ☐ No ☐ Partial	
2.2-3	Is there a procedure for periodic review of existing risk mitigation records?			☐ Yes ☐ No ☐ Partial	
2.2-4	Is there a procedure to account for mitigation actions whenever unacceptable risk levels are identified?			☐ Yes ☐ No ☐ Partial	
2.2-5	Is there a procedure to prioritise identified hazards for risk mitigation actions?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ Partial	
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?			☐ Yes ☐ No ☐ Partial	

No.	Aspect to be analysed or question to be answered	SMM 4th edition reference	State regulations reference	Answer	Status of implementation
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?			☐ Yes ☐ No ☐ Partial	
3.1-3	Do the safety performance indicators include alert/target settings to define unacceptable performance regions and planned improvement goals?			☐ Yes ☐ No ☐ Partial	
3.1-4	Is the setting of alert levels or out-of-control criteria based on objective safety metrics principles?			☐ Yes ☐ No ☐ 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)?			☐ Yes ☐ No ☐ Partial	
3.1-6	Are safety performance indicators and their associated performance settings developed in consultation with, and subject to, the civil aviation authority's agreement?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ Partial	
3.1-8	Are the safety performance indicators periodically reviewed?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ Partial	

No.	Aspect to be analysed or question to be answered	SMM 4th edition reference	State regulations reference	Answer	Status of implementation
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?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ Partial	
Element 3.3 — Continuous improvement of the SMS					
3.3-1	Is there a procedure for periodic internal audit/assessment of the SMS?			☐ Yes ☐ No ☐ Partial	
3.3-2	Is there a current internal SMS audit/assessment plan?			☐ Yes ☐ No ☐ Partial	
3.3-3	Does the SMS audit plan include the sampling of completed/existing safety risk assessments?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ Partial	
3.3-5	Does the SMS audit plan cover the SMS interface with subcontractors or customers where applicable?			☐ Yes ☐ No ☐ 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?			☐ Yes ☐ No ☐ Partial	

2. Detailed SMS Gap Analysis and Implementation Tasks (Table 5-2)

2.1 The initial gap analysis checklist in Table 5-1 should then be followed up by using the detailed “SMS gap analysis and implementation task identification plan” in Table 2. Once completed, Table 5-2 will provide follow-up analysis on details of the gaps and help translate these into actual required tasks and subtasks in the specific context of the organisation’s processes and procedures. Each task will then accordingly be assigned to appropriate individuals or groups for action. It is important that correlation of individual element/task development with their descriptive placeholders in the SMS document be provided for in Table 5-2 in order to trigger progressive updating of the draft SMS document as each element is implemented or enhanced. (Initial element write-ups in SMS documents tend to be anticipatory rather than declaratory.)

3. Actions/Tasks Implementation Schedule (Table 5-3)

3.1 Table 5-3 will show the milestones (start-end dates) scheduled for each task/action. For a phased implementation approach, these tasks/actions will need to be sorted according to the phase allocation of their related elements. Table 5-3 can be a separate consolidation of all outstanding actions/tasks or, if preferred, be a continuation of Table 5-2 in the form of a spreadsheet. Where it is anticipated that the actual number of tasks/actions and their milestones are sufficiently voluminous and complex so as to require utilising a project management software to manage them, this may be done by using software such as MS project/Gantt chart as appropriate. Table 5-4 is an illustration of a Gantt chart.

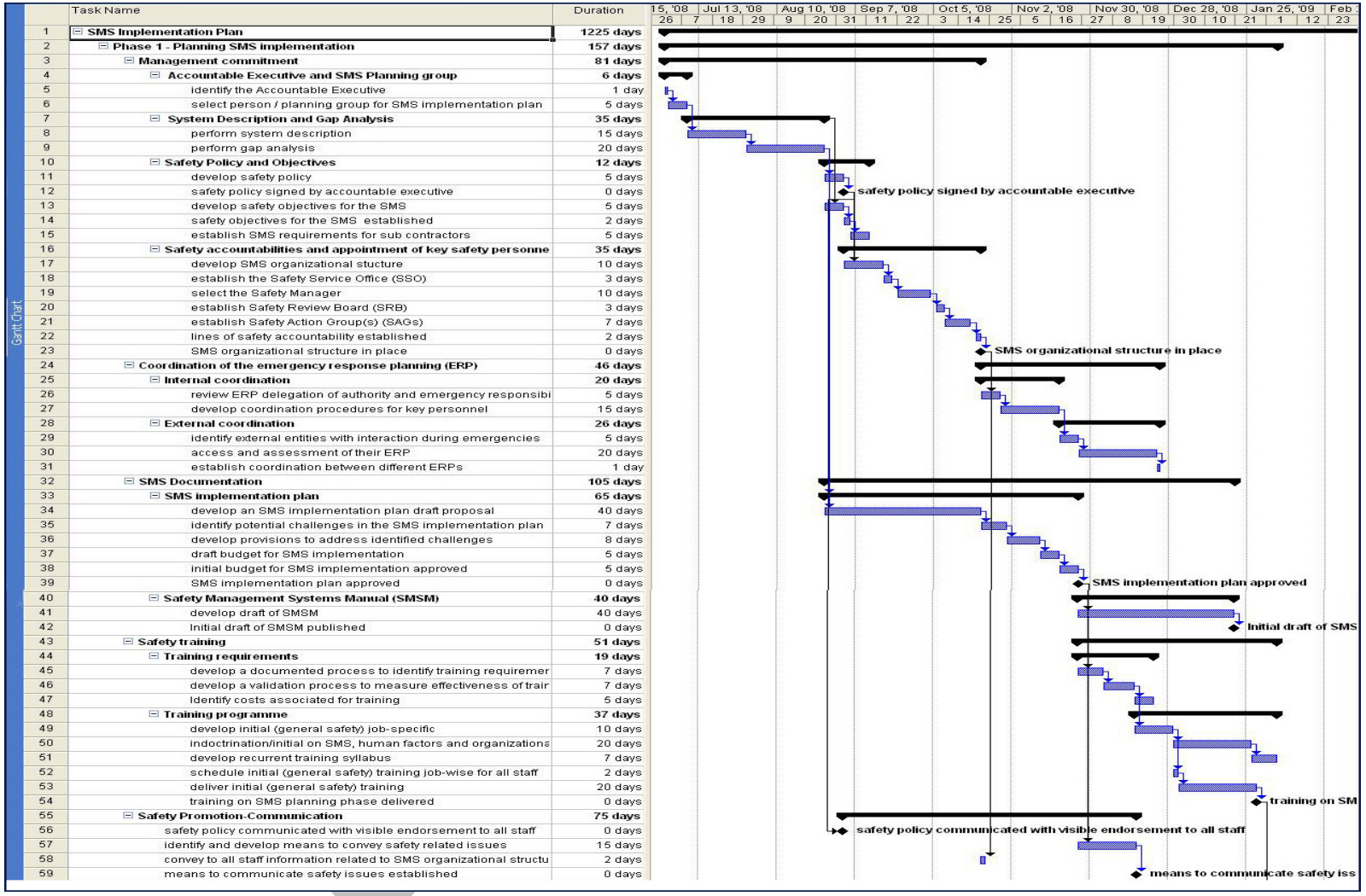
Table 5-2. Example SMS gap analysis and implementation task identification plan

Question Ref #	*Gap analysis question*	*Answer (Yes/No/Partial)*	*Description of gap*	*Action/task required to fill the gap*	*Assigned task group/person*	*SMS document reference*	*Status of action/task (Open/WIP/Closed)*
1.1-1	Is there a safety policy in place?	Partial	The existing safety policy addresses OSHE only.	a) enhance the existing safety policy to include aviation SMS objectives and policies or develop a separate aviation safety policy; b) have the safety policy approved and signed by the accountable executive.	Task Group 1	Chapter 1, Section 1.3.	Open
etc.							

Table 5-3. Example SMS implementation schedule

Action/task required to fill the gap	*SMS document ref.*	*Assigned task group/ person*	*Status of action/ task*	*Schedule/timeline*												
				1Q 17	*2Q 17*	*3Q 17*	*4Q 17*	*1Q 18*	*2Q 18*	*3Q 18*	*4Q 18*	*1Q 19*	*2Q 19*	*3Q 19*	*4Q 19*	*etc.*
1.1-1 a)Enhance the existing safety policy to include aviation SMS objectives and policies or develop a separate aviation safety policy.	Chapter 1, Section 1.3.	Task Group 1	Open													
1.1-1 b)Require the safety policy to be approved and signed by the accountable executive.																
etc.																

Table 5-4. Sample SMS implementation schedule (Gantt chart)



	Task Name	Duration
1	**SMS Implementation Plan**	**1225 days**
2	**Phase 1 - Planning SMS implementation**	**157 days**
3	**Management commitment**	**81 days**
4	**Accountable Executive and SMS Planning group**	**6 days**
5	identify the Accountable Executive	1 day
6	select person / planning group for SMS implementation plan	5 days
7	**System Description and Gap Analysis**	**35 days**
8	perform system description	15 days
9	perform gap analysis	20 days
10	**Safety Policy and Objectives**	**12 days**
11	develop safety policy	5 days
12	safety policy signed by accountable executive	0 days
13	develop safety objectives for the SMS	5 days
14	safety objectives for the SMS established	2 days
15	establish SMS requirements for sub contractors	5 days
16	**Safety accountabilities and appointment of key safety personne**	**35 days**
17	develop SMS organizational stucture	10 days
18	establish the Safety Service Office (SSO)	3 days
19	select the Safety Manager	10 days
20	establish Safety Review Board (SRB)	3 days
21	establish Safety Action Group(s) (SAGs)	7 days
22	lines of safety accountability established	2 days
23	SMS organizational structure in place	0 days
24	**Coordination of the emergency response planning (ERP)**	**46 days**
25	**Internal coordination**	**20 days**
26	review ERP delegation of authority and emergency responsibi	5 days
27	develop coordination procedures for key personnel	15 days
28	**External coordination**	**26 days**
29	identify external entities with interaction during emergencies	5 days
30	access and assessment of their ERP	20 days
31	establish coordination between different ERPs	1 day
32	**SMS Documentation**	**105 days**
33	**SMS implementation plan**	**65 days**
34	develop an SMS implementation plan draft proposal	40 days
35	identify potential challenges in the SMS implementation plan	7 days
36	develop provisions to address identified challenges	8 days
37	draft budget for SMS implementation	5 days
38	initial budget for SMS implementation approved	5 days
39	SMS implementation plan approved	0 days
40	**Safety Management Systems Manual (SMSM)**	**40 days**
41	develop draft of SMSM	40 days
42	Initial draft of SMSM published	0 days
43	**Safety training**	**51 days**
44	**Training requirements**	**19 days**
45	develop a documented process to identify training requiremer	7 days
46	develop a validation process to measure effectiveness of trair	7 days
47	Identify costs associated for training	5 days
48	**Training programme**	**37 days**
49	develop initial (general safety) job-specific	10 days
50	indoctrination/initial on SMS, human factors and organizations	20 days
51	develop recurrent training syllabus	7 days
52	schedule initial (general safety) training job-wise for all staff	2 days
53	deliver initial (general safety) training	20 days
54	training on SMS planning phase delivered	0 days
55	**Safety Promotion-Communication**	**75 days**
56	safety policy communicated with visible endorsement to all staff	0 days
57	identify and develop means to convey safety related issues	15 days
58	convey to all staff information related to SMS organizational structu	2 days
59	means to communicate safety issues established	0 days

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Organisation Name				Date of Assessment			Assessed by POI/ PMI			
Components	Elements	Level 1	Input	Doc Ref/ Remarks	Level 2	Input	Doc Ref/ Remarks	Level 3	Input	Doc Ref/ Remarks
Safety Policy	NIL	SP/L1/1			SP/L2/1			SP/L3/1		
		There is a documented Safety Policy statement.			The Safety Policy is readily visible or accessible to all personnel.			There is evidence that the Safety Policy is communicated to all employees with intent that they are made aware of their individual safety obligations.		
		SP/L1/2			SP/L2/2			SP/L3/2		
		The Safety Policy is appropriate to the size, nature and complexity of the organisation.			The Safety Policy is endorsed by the Accountable Manager.			There is a periodic review of the Safety Policy by senior management or the Safety Committee		
		SP/L1/3			SP/L2/3					
		The Safety Policy is relevant to aviation safety.			The safety policy do address the provision of necessary human and financial resources for its implementation.					
	Accountable Manager	AM/L1/1			AM/L2/1			AM/L3/1		
		There is a documented safety (SMS) accountability within the organisation that begins with the Accountable Manager			The Accountable Manager's terms of reference indicate his ultimate responsibility for the implementation and maintenance of the SMS			The Accountable Manager's terms of reference indicate his ultimate responsibility for all safety issues		
		AM/L1/2			AM/L2/2					
		The Accountable Manager has full control over financial and human resources associated with his Air Operator Cert/ Cert of Approval			The Accountable Manager's terms of reference indicate his final authority over all operations conducted under his Air Operator Cert/ Cert of Approval					

Components	Elements	Level 1	Input	Doc Ref/ Remarks	Level 2	Input	Doc Ref/ Remarks	Level 3	Input	Doc Ref/ Remarks
Safety Roles and Accountabilities	Safety (SMS) Manager	SM/L1/1			SM/L2/1			SM/L3/1		
		There is a Manager who performs the role of administering the SMS			The Manager responsible for administering the SMS does not hold other responsibilities that may conflict or impair his role as SMS manager.			The SMS Manager reports directly to the Accountable Manager, especially concerning SMS performance and improvement		
		SM/L1/2						SM/L3/2		
		The Manager performing the SMS role have relevant SMS functions included in his terms of reference						The SMS Manager is a senior management position not lower than or subservient to other operational or production positions		
	Safety Committee	SC/L1/1			SC/L2/1			SC/L3/1		
		There is a Safety Committee (or equivalent meeting) for purpose of reviewing safety performance			For a large organisation, there are departmental or section Safety Action Groups that work in conjunction with the Safety Committee			The Safety Committee is chaired by the Accountable Manager or (for very large organisations) by an appropriately assigned deputy, duly substantiated in the SMS manual		
		SC/L1/2			SC/L2/2			SC/L3/2		
		The Safety Committee do include relevant operational or departmental Heads as members			There is an appointed Safety (SMS) coordinator within the Safety Action Group			The Safety Action Groups are chaired by the divisional or section Head.		
Safety Objectives and Goals	N –	SOG/L1/1			SOG/L2/1			SOG/L3/1		
		The organisation do establish safety objectives or goals relevant to its aviation operations or services.			The safety objectives/ goals are compatible with the organisation's Safety Policy			There is a periodic review of the safety objectives/ goals for continuing validity where applicable.		
		SOG/L 1/2			SOG/L2/ 2			SOG/L3/ 2		

		There are safety objectives/ goals which are measurable.			The safety objectives/ goals are monitored for achievement			There is evidence that the safety objectives/ goals are communicated to all employees with intent that they are made aware of their individual obligations and contributions.		

Components	Elements	Level 1	Input	Doc Ref/ Remarks	Level 2	Input	Doc Ref/ Remarks	Level 3	Input	Doc Ref/ Remarks
Safety Performance & ALS	NIL	SPALS/L1/1			SPALS/L2/1			SPALS/L3/1		
		There are safety performance indicators relevant to aviation safety			The ALS safety performance indicators are based on data relating to occurrence of some safety or quality related events or reports			There is a procedure for corrective or follow up action to be taken when there is significant abnormal trend or breach of any Acceptable Level of safety (ALS).		
		SPALS/L1/2			SPALS/L2/2					
		There are identified safety performance indicators for monitoring the organisation's minimum Acceptable Level of Safety (ALS) in the SMS manual.			Safety performance indicators are reviewed by the safety committee for trend, minimum safety (alert) levels and targets (desired levels) wher applicable.					
	Hazard Identification	HI/L1/1			HI/L2/1			HI/L3/1		
		There is a procedure to encourage voluntary hazards/ threats reporting by all employees.			In the hazard identification system, there is a clear differentiation between a hazard and risk.			There is a procedure to identify hazards/ threats from internal incident/ accident investigation reports for follow up risk evaluation where applicable.		
		HI/L1/2			HI/L2/2			HI/L3/2		

		There is a procedure for incident/ accident reporting by operational or production personnel.			There is a policy that provides immunity from disciplinary actions (with any exceptions indicated) for all employees that report safety related deficiencies, threats or hazards.			There is a procedure to review hazards/ threats from available industry service or incident/ accident investigation reports for follow up risk evaluation where applicable.			

Components	Elements	Level 1	Input	Doc Ref/ Remarks	Level 2	Input	Doc Ref/ Remarks	Level 3	Input	Doc Ref/ Remarks
Hazard and Risk Management		HI/L1/3						HI/L3/3		
		There is a procedure for investigation of incident/ accidents relating to quality or safety.						There is a procedure for personnel to report hazards/ threats not amounting to incident/ accidents.		
		RM/L1/1			RM/L2/1			RM/L3/1		
		There is a documented Hazard Identification and Risk Assessment (HIRA) procedure involving the use of objective risk analysis tools.			Risk assessment reports are approved by departmental managers or higher level where appropriate.			There is a procedure for periodic review of existing risk analysis records.		
		RM/L1/2			RM/L2/2			RM/L3/2		
		There is a procedure to account for mitigation actions whenever unaccceptable risks are identified.			There is a procedure to define acceptable and unacceptable risks.			There is a procedure for special review of risk analysis records when there are changes that may affect their associated hazards or risks.		
		RM/L1/3			RM/L2/3			RM/L3/3		
		There is a procedure for identification of operations/ processes/ facilities/ equipment which are deemed (by the organisation) as relevant for HIRA performance.			There is a procedure to define mitigation actions which require senior management approval.			Recommended mitigation actions which require senior management decision or approval are accounted for and documented.		
		RM/L1/4			RM/L2/4			RM/L3/4		

		There is a program for progressive HIRA performance of all aviation safety-related operations/ processes/ facilities/ equipment as identified by the organisation.			There is a procedure to prioritise HIRA performance for operations/ processes/ facilities/ equipment with identified or known safety-critical hazards/ risks.			There is evidence of progressive compliance and maintenance of the organisation's HIRA performance program.		

Components	Elements	Level 1	Input	Doc Ref/ Remarks	Level 2	Input	Doc Ref/ Remarks	Level 3	Input	Doc Ref/ Remarks
Management of Change	NIL	MC/L1/1			MC/L2/1			MC/L3/1		
		There is a procedure for review of relevant existing aviation safety related facilities and equipment (including any HIRA records) whenever there are pertinent changes to those facilities or equipment .			There is a procedure for review of new aviation safety related facilities and equipment for hazards/ risks before they are commissioned.			There is a procedure for review of relevant existing facilities, equipment, operations or processes (including any HIRA records) whenever there are pertinent changes external to the organisation such as regulatory/ industry standards, best practices or technology.		
		MC/L1/2			MC/L2/2					
		There is a procedure for review of relevant existing aviation safety related operations and processes (including any HIRA records) whenever there are pertinent changes to those operations or processes.			There is a procedure for review of new aviation safety related operations and processes for hazards/ risks before they are commissioned.					
SMS Training, Communication &		STCP/L1/1			STCP/L2/1			STCP/L3/1		
		There is a documented personnel Safety (SMS) training procedure/ policy.			Personnel involved in conducting risk evaluations are provided with appropriate risk management training or familiarisation.			There is evidence of organisation wide SMS education or awareness efforts.		
		STCP/L1/2			STCP/L2/2			STCP/L3/2		

		The SMS manager has undergone an appropriate SMS training course or program.			Personnel directly involved in the SMS (Safety Committee/ SAG members) have undergone appropriate SMS training or familiarisation.			There is evidence of a Safety (SMS) publication, circular or channel for communicating Safety (SMS) matters to employees.		
		STCP/L1/3								
		The Accountable Manager has undergone appropriate SMS familiarisation, briefing or training.								
Components	Elements	Level 1	Input	Doc Ref/ Remarks	Level 2	Input	Doc Ref/ Remarks	Level 3	Input	Doc Ref/ Remarks
S M C	SMS Manual/ Exposition	SME/L1/1			SME/L2/1			SME/L3/1		
		There is a documented SMS procedure or manual. which is approved by the Accountable Manager and accepted by DCA.			All 12 components of SMS regulatory requirements (SMS Handbook paragraph 7) are addressed in the SMS procedures.			The SMS procedures do reflect the integration of the various safety related control systems within the organisation such as Occupational Safety/ Flight Safety/ Quality Control/ Environmental Control as applicable.		
		SME/L1/2			SME/L2/2			SME/L3/2		
		The SMS procedures are documented in a systematic and consolidated manner.			All relevant elements within each component of the SMS regulatory requirements (SMS Handbook paragraph 9) are addressed in the SMS procedures.			The SMS procedures do reflect relevant coordination or integration with substantial external service providers or operators where applicable.		
		SME/L1/3			SME/L2/3					
		The SMS procedures is a stand alone controlled document or part of an existing controlled document.			There is a process to periodically review the SMS documentation to ensure its continuing suitability, adequacy and effectiveness.					
	S 2	SR/L1/1			SR/L2/1			SR/L3/1		

		Records pertaining to Safety Committee/ SAG meeting (or equivalent) minutes are maintained.			Records pertaining to Safety Committee/ SAG meeting (or equivalent) minutes are made available to all members and the Accountable Manager			There is a documented policy with respect to generation, distribution and retention of SMS records.		
		SR/L1/2			SR/L2/2			SR/L3/2		
		Records pertaining to Safety/ Risk Assessments performed are maintained.			Records pertaining to Safety/ Risk Assessments performed are accessible to all relevant parties.			Records pertaining to periodic review of existing Safety/ Risk Assessments or special review in conjunction with relevant changes are available.		
		SR/L1/3								
		Records pertaining to identified or reported hazards/ threats are maintained.								

Components	Elements	Level 1	Input	Doc Ref/ Remarks	Level 2	Input	Doc Ref/ Remarks	Level 3	Input	Doc Ref/ Remarks
Audit and Continuous Improvement	NIL	AAP/L1/1			AAP/L2/1			AAP/L3/1		
		There is a procedure for periodic internal audit/ assessment of the SMS			There is a follow up procedure to address audit corrective actions.			SMS audit/ assessment has been carried out according to plan.		
		AAP/L1/2			AAP/L2/2			AAP/L3/2		
		There is a current internal SMS audit/ assessment plan.			The internal SMS audit plan do cover SMS roles and procedures of all departments as defined within the scope of the SMS.			SMS audit/ assessment reports are reviewed by the Accountable Manager.		
		AAP/L1/3			AAP/L2/3			AAP/L3/3		
		There is a documented internal SMS audit/ assessment checklist.			The SMS audit plan do include the sampling of completed safety assessments.			The SMS audit plan do cover the SMS roles/ inputs of contractors where applicable.		
	N –	ERP/L1/1			ERP/L2/1			ERP/L3/1		

		There is a documented Emergency Response Plan or Procedure.			The ERP do include procedures for safe transition from normal to emergency and back to normal operations.			The ERP do address relevant integration with substantial external service providers or operators where applicable		
		ERP/L1/2			ERP/L2/2			ERP/L3/2		
		The ERP is appropriate to the size, nature and complexity of the organisation.			There is a plan for drills or exercises with respect to the ERP.			There is a procedure for periodic review of the ERP as well as after key ERP personnel or organisational changes.		
		ERP/L1/3			ERP/L2/3			ERP/L3/3		
		The ERP do include assignment of emergency responsibilities/ authority.			ERP drills or exercises are carried out according to plan and result of drills carried out are documented.			There is provision in ERP to address preservation of safety/ quality/ continuity of its aviation product/ services during emergency/ crisis/ AOG situations, where applicable.		

SUB-TOTAL	CATEGORY 1
Y	
N	
NA	
NO OF QN	
COMPLETED	

CATEGORY 2
0
0
0
33
0

CATEGORY 3
0
0
0
30
0

GRAND TOTAL*	
Y	0
N	0
NA	0
NO. OF QN	1
COMPLETED	0

ASSESSMENT RESULT (% OF YES):

0.0%

CORRECTIVE ACTION NOTICE (CAN) PROCEDURE [WEF 1 JULY 2009]:

MINIMUM OVERALL (%) PERFORMANCE (All Questions):

Corrective Action Notice (CAN) to be issued for overall performance of less than 45% during 1st year of assessment. 90 days for corrective action to obtain not less than 45% overall performance.

Note: Minimum overall performance (%) criteria will be 65% for 2nd year of assessment and 85% for 3rd year of assessment (and thereafter)

1) MINIMUM COMPONENT PERFORMANCE (Level 1 Questions):

Corrective Action Notice (CAN) to be issued for "No" answers to any Level 1 Questions. 60 days for corrective action to obtain a "Yes" answer.

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9.9 Appendix 10 – Application For Acceptance of Air Traffic Service (ATS) Provider SMS.

APPENDIX 8B *DCA /BIT/ATC-SMS01*

Application for Acceptance of Air Traffic Service (ATS) Provider Safety Management System (SMS)

1	APPLICANT	
1.1	Organisation	*Insert name of organisation*
1.2	Address	*Insert correspondence address*
1.3	Contact Person	*Insert name*
1.4	Telephone	
1.5	Facsimile	
1.6	Email	
1.7	Location	*List location(s) of ATC facilities*
2.	ATS SCOPE	
2.1	*List types of air traffic control service provided*	
3.	HUMAN RESOURCE	
3.1	Air Traffic Controllers	*Insert number*
3.2	Administrative personnel	*Insert number*
4.	Signature	

Date	*Stamp of Accountable Executive*	*Signature*

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9.10 Appendix 11 – Flight Data Analysis Programme (FDAP)

9.10.1 FDAP

9.10.1.1 The requirements for the establishment of Flight Data Analysis Programme are contained in CAGM 6004

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