Training Program Outline for Inspector SMS Competency

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This document was prepared by the Safety Management International Collaboration Group (SM ICG). The purpose of the SM ICG is to promote a common understanding of Safety Management System (SMS)/State Safety Programme (SSP) principles and requirements, facilitating their application across the international aviation community. In this document, the term "organization" refers to a product or service provider, operator, business, and company, as well as aviation industry organizations; and the term "authority" refers to the regulator authority, Civil Aviation Authority (CAA), National Aviation Authority (NAA), and any other relevant government agency or entity with oversight responsibility.

The current core membership of the SM ICG includes the Aviation Safety and Security Agency (AESA) of Spain, the National Civil Aviation Agency (ANAC) of Brazil, the Civil Aviation Authority of the Netherlands (CAA NL), the Civil Aviation Authority of New Zealand (CAA NZ), the Civil Aviation Authority of Singapore (CAAS), the Civil Aviation Department of Hong Kong (CAD HK), the Civil Aviation Safety Authority (CASA) of Australia, the Direction Générale de l'Aviation Civile (DGAC) in France, the Ente Nazionale per l'Aviazione Civile (ENAC) in Italy, the European Aviation Safety Agency (EASA), the Federal Office of Civil Aviation (FOCA) of Switzerland, the Finnish Transport Safety Agency (Trafi), the Irish Aviation Authority (IAA), Japan Civil Aviation Bureau (JCAB), the United States Federal Aviation Administration (FAA) Aviation Safety Organization, Transport Canada Civil Aviation (TCCA), the United Arab Emirates General Civil Aviation Authority (UAE GCAA), and the Civil Aviation Authority of United Kingdom (UK CAA). Additionally, the International Civil Aviation Organization (ICAO) is an observer to this group.

Members of the SM ICG:
- Collaborate on common SMS/SSP topics of interest
- Share lessons learned
- Encourage the progression of a harmonized SMS/SSP
- Share products with the aviation community
- Collaborate with international organizations such as ICAO and civil aviation authorities that have implemented or are implementing SMS and SSP

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SM ICG products can be found on SKYbrary at:

http://www.skybrary.aero/index.php/Safety_Management_International_Collaboration_Group_(SM_ICG)

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1. Introduction

Aviation authority workforces include highly skilled positions with significant technical, vocational, and educational requirements. With the implementation of performance-based Safety Management System (SMS) requirements for service providers, aviation authorities need to ensure that their inspectors have the required competencies to perform SMS oversight effectively.

The purpose of this document is to provide an outline to aviation authorities on what should be included in a training program to prepare inspectors to carry out SMS oversight activities.

Note: The term "inspectors" in this document refers to aviation authority personnel authorized to carry out SMS oversight of regulated organizations.

Note: The term "SMS oversight" in this document is intended to cover:

- *Initial SMS approval/certification/authorization, and*

- *Surveillance of regulated organizations to verify that they continue to meet the applicable requirements.*

2. SMS Training Program Outline

The training program outline in this document focuses on developing inspector competencies for SMS oversight of regulated organizations.

The scope of the training program outline includes prerequisites, learning objectives, topics to be covered, and resources for developing training that will help build these SMS competencies.

The scope of this document does not include lesson plans or methods for assessing inspector SMS competencies.

Appendix A, *Pre-existing Inspector Competencies*, contains pre-existing competencies recommended for inspectors prior to entering an SMS training program.

Appendix B, *Overview of Training Program Outline*, gives an overview of learning objectives for training program sections.

Appendix C, *Detailed Training Program Outline*, details key learning points and resources to support each learning objective. These resources may be used to develop lesson plans for an SMS training program. *Note: The resources cited in Appendix C are not exhaustive.*

3. SMS Competencies

The foundation for the training program outline is the competency framework in the SM ICG's Inspector SMS Competency Guidance. This framework groups the competencies into the following core subject areas:

1) Management systems

2) Regulatory framework and intent

3) Oversight techniques

4) Organizational safety performance

5) Organizational safety culture

6) Confidentiality of sensitive information

7) Communication skills

8) System interactions and interfaces

9) Analytical skills

10) Decision-making skills

11) Open-mindedness

12) Assertiveness

13) Teamwork

14) Judgment

15) Human and organizational factors

16) Safety-critical implications

These core competency groups are referenced by number in the right-most column of the training program outline in Appendix C.

Appendix A:
Pre-existing Inspector Competencies

The following competencies from SM ICG's Inspector SMS Competency Guidance are not addressed in the Training Program Outline because they are considered to be pre-existing competencies recommended for inspectors prior to entering an SMS training program:

SM ICG Competency	SM ICG Core Competency #
▪ Participated in training and has demonstrated experience in regulatory surveillance activities	3
▪ Understands legislation and regulations regarding data disclosure and protection	6
▪ Demonstrates highly developed written communication skills, including the ability to write detailed technical reports ▪ Demonstrates experience and ability to communicate effectively in a complex technical environment ▪ Demonstrates a high level of interpersonal, oral, and written communication skills, including the ability to liaise effectively at a senior level and influence outcomes both internally and with external organizations ▪ Able to adequately manage conflict and confrontation in a work environment	7
▪ Able to use logic and analysis to arrive at appropriate conclusions from relevant information and assumptions ▪ Able to infer, categorize, organize, and connect related concepts ▪ Able to exercise judgment, intelligence, and discretion in making decisions ▪ Demonstrates skills that can help identify decision alternatives ▪ Able to envision possible future consequences of alternative solutions ▪ Able to collaborate, communicate, cooperate, learn, negotiate, and listen to ensure effective group decision-making ▪ Skilled in managing emotions and perception issues to ensure objectivity in stressful decision situations ▪ Able to discern what factors contribute to a situation allowing for focusing on an appropriate solution	10

SM ICG Competency	SM ICG Core Competency #
▪ Rigorously and tenaciously finds proof or objective evidence ▪ Able to state opinions firmly without either aggressively threatening or submissively accepting the opinions of others	[12]
▪ Able to collaborate and cooperate to achieve a common goal ▪ Able to employ cooperative behaviour to resolve interpersonal problems and optimize member interaction ▪ Able to build trust and respect among team members ▪ Able to receive and offer constructive feedback to other team members ▪ Able to work with specialists from other technical disciplines	[13]
▪ Able to recognize and mitigate personal biases and emotional involvement when conducting inspections ▪ Able to justify and document major decisions based on observable signals	[14]

Appendix B:
Overview of Training Program Outline

The Training Program Outline for Inspector SMS Competency consists of four sections in order of progression:

1. Safety Management Concepts
2. Regulatory Framework
3. SMS Components
    a) Safety policy and objectives
    b) Safety risk management
    c) Safety assurance
    d) Safety promotion
4. SMS Evaluation

Learning Objectives for Training Program Sections

Section 1: Safety Management Concepts

1. To explain what a management system is
2. To identify how safety is integrated into an organization's management system
3. To recognize the potential safety impacts of interfaces between an organization's SMS and other organizations
4. To recognize the potential safety impacts of interfaces between systems within an organization
5. To recognize risks to safety related to human and organizational factors
6. To recognize the impact of an organization's safety culture on its safety performance

Section 2: Regulatory Framework

1. To describe the applicable international standards, State legislation, and regulations related to aviation safety management
2. To explain the intent of State legislation and regulations related to aviation safety management
3. To recognize the relationship of the State Safety Programme (SSP) with SMS requirements
4. To apply State policies and procedures with respect to SMS
5. To explain the principles of prescriptive and performance-based requirements

Section 3: SMS Components

Component 1: Safety policy and objectives

1. To distinguish the accountability and responsibilities of the Accountable Executive, management, and key safety personnel

2. To discern how management commitment to an organization's SMS is reflected in the safety policy and evidenced by their actions throughout the organization

3. To identify how organizations set and measure safety objectives

4. To validate an organization's emergency response plan coordination process

5. To evaluate an organization's SMS documentation system

Component 2: Safety risk management

1. To evaluate an organization's safety reporting system and investigation process

2. To assess an organization's hazard identification processes

3. To assess the effectiveness of an organization's risk management process

Component 3: Safety assurance

1. To analyze an organization's means to measure safety performance

2. To evaluate how an organization assesses its safety performance compared with its safety objectives

3. To assess an organization's change management process

4. To explain the relationship between quality assurance and safety assurance

5. To evaluate how an organization assesses the effectiveness of its SMS, to continuously improve the SMS

Component 4: Safety promotion

1. To evaluate an organization's safety communication, training, and education processes

Section 4: SMS Evaluation

1. To recognize different approaches to implementing and achieving an effective SMS

2. To plan an assessment of an organization's SMS

3. To demonstrate interviewing skills of all levels of organizational personnel involved in the SMS

4. To obtain objective evidence where possible and exercise judgment when necessary to reach conclusions about an organization's SMS

5. To explain the allowable use and control of information obtained from an organization's SMS

6. To identify systemic deficiencies in an organization

7. To assess the effectiveness of an SMS and discern whether the SMS is appropriate for the size and complexity of the organization

Appendix C:
Detailed Training Program Outline

Section 1: Safety Management Concepts

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
1	To explain what a management system is	Definition of management system Management systems typically include: • Organizational structure • Framework for establishing accountability—responsibility and authority • Processes for setting goals and determining requirements • Processes for delivery of the organization's products/services • A means of controlling and assuring attainment of the requirements (including corrective action processes) • Processes for communicating and assuring necessary competencies	[Wikipedia definition](#) [ISO 9000-2015 definition](#) TCCA slide defining Safety and Security Management Systems: Definition of Safety and Security Managen [ISO Management System Standards](#)	[1](#)

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
2	To identify how safety is integrated into an organization's management system	Purpose of SMS Integration of management processes (Plan-Do-Check-Act cycle) with technical and safety processes Application of safety management to operational/technical functions of the organization	ICAO *SMM*: 2.9, "Integration of Management Systems" SM ICG *The Senior Manager's Role in SMS* FAA slide explaining system safety: Definition of System Safety.pptx UK CAA slide of an integrated management system: Management system slide.pdf	1

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
3	To recognize the potential safety impacts of interfaces between an organization's SMS and other organizations	Interfaces—and potential impacts—between other organizations Communication and agreements between organizations such as access to reporting systems and joint risk assessments Identification of hazards from external sources Risk acceptance (transfer, sharing, avoidance) Safety assurance of contractors and other organizations	ICAO SMP/2-WP/16, *Interfaces Between SMSs, and Between SMS and SSP*: SMP.2 - WP.16 Interfaces.pdf SM ICG *SMS Integration: Points to Consider* CASA *SMS for Aviation - A Practical Guide (2nd Edition) Booklet 2: Safety Policy and Objectives* (p.10) FAA ATO *SMS Manual*: 2.1 Introduction to Managing System Safety UK CAA slides on managing interfaces: Interface Management.pdf *Helicopter Maintenance Magazine*, August 2013: "The Importance of an Integrated Quality Management System (QMS) and Safety Management System (SMS) in Aviation Operations"	8

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
4	To recognize the potential safety impacts of interfaces between systems within an organization	Interfaces—and potential impacts—between systems within an organization Systems include functional area systems and those related to organization management systems (e.g., Quality Management System (QMS), Occupational Health and Safety Management System, Security Management System) Different certificates/privileges held by one organization (e.g., Air Traffic Organization (ATO), Approved Maintenance Organization (AMO), air operator) Accident causation models of safety events (cross-domain interactions)	ICAO SMP/2-WP/14, *System Description*: SMP.2 - WP.14 System Description.p SM ICG *SMS Integration: Points to Consider* NZCAA AC 100-1, *Safety Management*: 1.6, "SMS Integration with other Management Systems" ICAO *SMM*: 2.9 & 5.4.2, "Integration of Management Systems" FAA ATO *SMS Manual*: 2.1, "Introduction to Managing System Safety" Case study on cross-domain interactions in accident causation: *A STAMP Analysis of the LEX COMAIR 5191 Accident*	8

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
5	To recognize human and organizational factors/related risks to safety	High-level key aspects of human and organizational factors considerations: • Communications • Leadership • Human performance models (e.g., SHELL, 5M) • Situational awareness • Decision-making • Fatigue and fatigue risk management • Human error and error management • Workload and task design *(Note: This is not an HF course; thus, it only refers to key concepts.)*	CASA *SMS for Aviation - A Practical Guide (2nd Edition) Booklet 6: Human Factors* CASA *Safety Behaviours: Human Factors Resource Guide for Engineers*: Chapter 1, "Introduction"; Chapter 3, "Human performance and its limitations"; Chapter 12, "Human factors within an organisation" CASA *Integration of Human Factors into SMS* *FSF Operator's Guide to Human Factors in Aviation*: Human Factors Strategy UK CAA *CAP 716 Aviation Maintenance Human Factors (EASA Part 145)* TCCA *Human Performance Factors for Elementary Work and Servicing* FAA *Operator's Manual: Human Factors in Aviation Maintenance* FAA *Operator's Manual: Human Factors in Airport Operations* FAA Human Factors Awareness Course FAA ATO *SMS Manual*: 2.3.2, "The Human Element's Effect on Safety" FAA *Human Factors Acquisition Job Aid* FAA *Human Factors Design Guide* *Human Factors Analysis and Classification System (HFACS)* ICAO *Human Factors Guidelines for Aircraft Maintenance Manual (Doc. 9824)*	8, 15

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
6	To recognize the impact of an organization's safety culture on its safety performance	Definition of safety culture and its components: risk, just, reporting, learning, informed and flexible cultures and their impact on personnel behaviours at various levels of the organization Different types of national, ethnic, and professional cultures and how they may affect the safety culture of an organization Importance of the safety policy and safety leadership to foster a positive safety culture Importance of an open reporting environment and its impact on the effectiveness of a management system Possible reduction of reporting due to sanctions applied by authorities against the organization based on reported data Benefits of a Just Culture: • Increased safety reporting; • Trust building; and • More effective safety and operational management. Punishment vs. Learning Definition of the boundary between 'Acceptable Behaviour' and 'Unacceptable Behaviour' Identification of processes and policies that support a just culture	ICAO SMP/2-WP/12, *Promotion of a Positive Safety Culture*: [PDF] SMP.2 - WP.12 Promotion of a posi *Safety Culture Framework for the ECAST SMS-WG* *CASA SMS for Aviation - A Practical Guide (2nd Edition) Booklet 4: Safety Assurance* (p. 39–41) *Eurocontrol Just Culture Policy* *CANSO Standard of Excellence in Safety Management Systems* (Appendix A, Section 1, pp. 17–18, "Development of a Positive and Proactive Safety Culture") *FAA ATO SMS Manual*: 1.6, "Safety Culture and Promotion: Valuing Safety in the ATO" ICAO *SMM*: 2.6, "Safety Culture"; Appendix 1 to Chapter 2, "Organization Safety Culture (OSC)/Organization Risk Profile (ORP) Assessment Checklist" SM ICG *Safety Culture Guidance and Evaluation Tool (under development)*	5, 6, 15

Section 2: Regulatory Framework

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
1	To describe the applicable international standards, State legislation, and regulations related to aviation safety management	ICAO Annex 19 Standards and Recommended Practices (SARPs) National Regulations for SMS (and standards, if applicable) SMS applicability (Which organizations does it apply to?) Effective dates	ICAO *Annex 19* State SMS Regulations	2
2	To explain the intent of State legislation and regulations related to aviation safety management	National guidance material for SMS Acceptable means of compliance guidance	State guidance	2
3	To recognize the relationship of the State Safety Programme (SSP) with SMS requirements	Relationship between SSP and SMS The interaction between an organization's SMS and the SSP	ICAO *Annex 19* and *SMM* State SSP State SMS Regulations	2
4	To apply State policies and procedures with respect to SMS	National SMS policy(ies) and procedures (acceptance/certification, oversight/surveillance, etc.) National enforcement policies and how they may differ in respect to SMS State's approach to SMS implementation (use of implementation plans and timescales for implementation)	State SMS policies and procedures State SSP	2

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
5	To explain the principles of prescriptive and performance-based requirements	Principles of prescriptive requirements and performance-based requirements Verification of compliance using prescriptive and performance-based requirements	ICAO *SMM*: 2.16, "Prescriptive and Performance-Based Requirements" EASA *Report on Performance-Based Regulations*: PBR WG_Report on Performance Based TCCA slide explaining types of regulations: Slide on types of regulations.ppt SM ICG *SMS Evaluation Tool*	1, 3

Section 3: SMS Component 1 (Safety policy and objectives)

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
1	To distinguish the accountability and responsibilities of the Accountable Executive, management, and key safety personnel	Safety performance roles and responsibilities of: a) Accountable Executive b) Senior Management c) Frontline Managers d) Safety Manager e) Safety Committees, if applicable Safety accountability vs. responsibility (delegation) Level(s) of management with authority to make decisions regarding safety risk tolerability Accountable Executive in organizations holding multiple certificates	SM ICG *The Senior Manager's Role in SMS* SM ICG *The Frontline Manager's Role in SMS* ICAO *SMM*: 5.3.16–5.3.23, 5.3.27–5.3.33, Appendix 2 to Chapter 5 CASA *SMS for Aviation - A Practical Guide (2nd Edition) Booklet 2: Safety Policy and Objectives* (p. 1–7) TCCA AC 107-001, *Guidance on Safety Management Systems Development*: 3.5, "The Accountable Executive and Corporate Culture"	1

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
2	To discern how management commitment to an organization's SMS is reflected in the safety policy and evidenced by their actions throughout the organization	Safety policy does the following: • Defines the organization's commitment to safety, including the promotion of a positive safety culture • Identifies the obligations of staff to use the safety reporting system • Describes what is unacceptable behaviour (including circumstances under which disciplinary action would not apply) • Commits to provide sufficient resources to manage safety (financial, human, material, and equipment) Organizational structure appropriate to the size and complexity of the organization Management commitment and active support (alignment of the organization's activities to the safety policy, allocation of resources, management reviews, dashboards, safety meeting attendance) Periodic review of safety policy (e.g., change of AE or significant organizational change)	SM ICG *The Senior Manager's Role in SMS* SM ICG *The Frontline Manager's Role in SMS* SM ICG *SMS Evaluation Tool* ICAO *SMM*: 5.3.6–5.3.12 ISO 9001, *Guidance on Auditing Top Management Commitment*	N/A

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
3	To identify how organizations set and measure safety objectives	Safety objectives do the following: • Reflect the organization's commitment to continuously improve the effectiveness of their SMS • Are communicated throughout the organization and periodically reviewed Safety performance management reflects the State SSP/EASP or other regional safety plans (if available) Relationship between safety objectives, safety performance targets, and safety performance indicators	Resource Material for Section 3 Compon ICAO *SMM*: 4.2.21–4.2.23, "Agreement on service provider's safety performance" SM ICG *SMS for Small Organisations* (p. 3) *SMS for Airports*: 4.2, "Safety Policy and Objectives" TCCA AC 107-001, *Guidance on Safety Management Systems Development*: 4.2–4.3, "Safety Policy and Objectives"	4

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
4	To validate an organization's emergency response plan coordination process	Sectors required by the State to establish and maintain Emergency Response Plans (ERP) Coordination of ERPs with the organization's affected external interfaces	ICAO *SMM*: Appendix 3 to Chapter 5 ICAO SMP/2-WP/13, *ERP Coordination*: [PDF icon] SMP.2 - WP.13 Coordination of ser' CASA *SMS for Aviation - A Practical Guide (2nd Edition) Booklet 2: Safety Policy and Objectives* (p. 13–14) TCCA AC 107-001, *Guidance on Safety Management Systems Development*: 10.0, "Emergency Response Plan" CAA NZ AC 100-1, *Safety Management*: 2.2, "Coordinated Emergency Response Planning" *SMS for Airports*: Coordination of Emergency Planning (pp. 16–17) FAA AC 150/5200-31C, *Airport Emergency Plan*	N/A

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
5	To evaluate an organization's SMS documentation system	SMS documentation system includes: a) SMS Manuals—to describe SMS policies, processes, procedures, and accountabilities • Integration of SMS manual with other required documentation, need for document controls, periodic reviews b) SMS Records—outputs of the SMS processes and procedures (examples of records: meeting minutes, safety data, safety reports, hazard logs, risk registers, safety risk assessments, etc.) • Retention of records	ICAO *SMM*: 5.3.36–5.3.38, Appendix 4 to Chapter 5 SM ICG *SMS Evaluation Tool* ISO 9001, *Guidance on Auditing Electronic Documented Information Systems* TCCA AC 107-001, *Guidance on Safety Management Systems Development*: 5.0, "Documentation" CAA NZ AC 100-1, *Safety Management*: 2.3, "Development, Control and Maintenance of Safety Management Documentation" EHEST *SMM for Complex Operators*: Chapter 7, "Documentation Control Procedure"	1, 11

Section 3: SMS Component 2 (Safety risk management)

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
1	To evaluate an organization's safety reporting system and investigation process	Mandatory and voluntary reporting systems • Perimeter of mandatory and voluntary reporting systems: accessibility to third parties Maturity of reporting—types of reports (i.e., first-, second-, third-generation reports: "He has done something wrong," "Something may go wrong," "I have done something wrong," etc.) Internal investigation of safety events • Prioritization of safety investigations Causal analysis process and outputs • Various models of causal analysis: BowTie, Fishbone Diagram, 5 Whys, etc. Timely corrective and preventive actions Validation of effectiveness in preventing recurrence • Recurrence indicates ineffective corrective action	ICAO *SMM*: 5.3.66–5.3.71, Appendix 5 to Chapter 5 SM ICG *SMS for Small Organisations*: 2.1.1–2.1.3, Appendix 8 CASA *SMS for Aviation - A Practical Guide (2nd Edition) Booklet 4: Safety Assurance* (pp. 2–3) *SMS for Airports*: 6.4, "Safety Reporting"; 6.5, "Accident and Incident Investigation" CAA NZ AC 100-1, *Safety Management*: 2.6, "Safety Investigation" TCCA AC 107-001, *Guidance on Safety Management Systems Development*: 6.2, "Reactive Processes" TCCA AC SUR-002, *Root Cause Analysis and Corrrective Action for TCCA Findings* *Root Cause Analysis for Beginners* *Mini-Guide to Root Cause Analysis* *Best Practices for Event Review Committees*	9, 16

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
2	To assess an organization's hazard identification processes	Definition of and relationship between hazards and consequences Methods of hazard identification (reactive, proactive) • Use of multiple sources of hazard identification • Hazard identification is ongoing Examples of typical hazards for aviation sectors Hazards related to interfaces Hazards related to human factors Organizational hazards Collection and analysis of hazards	SM ICG *SMS Evaluation Tool* SM ICG *Hazard Taxonomy Examples* SM ICG *Development of a Common Hazard Taxonomy* ECAST *SMS WG Guidance on Hazards Identification* *SMS for Airports*: 5.3, "Identify Hazards"; Table 8, "Common Airport Hazards" CASA *SMS for Aviation - A Practical Guide (2nd Edition) Booklet 3: Safety Risk Management* (pp. 1–5) CAA NZ AC 100-1, *Safety Management*, 2.4, "Hazard Identification" TCCA AC 107-001, *Guidance on Safety Management Systems Development*: 6.3, "Pro-Active Processes" ICAO *SMM*: 2.13, 5.3.42–5.3.52 Shell Aircraft International: *A Simplified Process for Hazard Management*	16

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
3	To assess the effectiveness of an organization's risk management process	Definitions and concepts related to risk management Risk management process (analysis, assessment, and control of the safety risks associated with identified hazards) Risk management techniques, tools, models, methods Tolerable level of risk and risk control prioritization Safety-critical implications in risk management include: • Failing to identify latent hazards within the organization, which could lead to unacceptable levels of risk • Under-rating risk (based on what happened or has happened in the past, not what could have happened) • Assessing risk in isolation (not involving staff with practical knowledge of the activity being assessed) • Assessing only the most severe outcome (which is usually also the least probable, while a less severe but more probable risk scenario could result in a higher risk rating) • Awareness of vulnerability in underlying assumptions when determining probability and severity	Resource Material for Section 3 Compon ICAO *SMM*: 2.14–2.15, Appendix 2-3 to Chapter 2, 5.3.53–5.3.61 SM ICG *SMS Evaluation Tool* CAA NZ AC 100-1, *Safety Management*: 2.5, "Risk Management" CASA *SMS for Aviation - A Practical Guide (2nd Edition) Booklet 3: "Safety Risk Management* EHEST *SMM for Complex Operators*: Chapter 8, "Safety Risk Management" *SMS for Airports*: 5.4–5.7 FAA ATO *SMS Manual*: Chapter 3, "The Safety Analysis and Risk Mitigation Process" *ARMS Methodology for Risk Assessment*, *How to Risk Assess Using the ARMS Methodology*, *ARMS Quick Reference Guide* FSF *Basic Aviation Risk Standard* TCCA *Integrated Risk Management Framework Lexicon* (*English and French*): TCCA Risk Management Lexicon	9, 16

Section 3: SMS Component 3 (Safety assurance)

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
1	To analyze an organization's means to measure safety performance *(What)*	Definitions related to safety performance • Safety performance relates to the organization's contribution to aviation safety Indicators: Types of indicators, use of indicators, characteristics of effective indicators, possible unintended effects of using indicators and targets Data: Types of data, sources of data, quality of data, characteristics of data, limitations of data, data collection methods Data analysis: Tools, capability, trends Measuring what is important rather than what is easy to measure Results: Input into management review process, action taken	[Word icon] Resource Material for Section 3 Compon ICAO *SMM*: 2.12, 5.4–5.1, 5.4–5.7, Appendix 6 to Chapter 5 SM ICG *A Systems Approach to Measuring Safety Performance: The Regulator Perspective* SM ICG *Measuring Safety Performance Guidelines for Service Providers* SM ICG *SMS for Small Organisations*: 3.1, "Safety Performance Monitoring and Measurement," Appendix 11, "Safety Performance Indicators for a Small Organization" SMS for Airports: 6.7, "Measuring SMS Performance—Trend Analysis" CAA NZ AC 100-1, *Safety Management*: 2.7, "Monitoring and Measuring Safety Performance" Eurocontrol "ANS Performance Monitoring" FAA ATO *SMS Manual*: 1.5.1, "Measuring NAS-Wide ATO Safety Performance"; 3.6.4, "Develop Safety Performance Targets" FAA ATO *Performance Measurement Profile*: [PDF icon] SRER_-_FY13_meas ure_profile.pdf	4, 9

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
2	To evaluate how an organization assesses its safety performance compared with its safety objectives *(How)*	Links and robustness of the safety performance cycle: Set objectives, targets and indicators → Determine sources of data → Gather and analyze data → Monitor performance indicators → Measure safety performance → Input into management review → Assess results and take action → Validate corrective action effectiveness → Review objectives and targets → etc. Effectiveness looks at whether: • The process is documented • Safety data is collected; what sources of data the organization is using; the quality of the data used for safety indicators; how accessible safety reporting systems are • Safety data is analysed; what analytical capability the organization has; what tools are used • Information is extracted; what trends are detected; how indicators are used as input into the management review process • Alert levels and alerting triggers are appropriate and activated • Indicators are understood and results are communicated; feedback to submitters using the reporting systems • Information drives corrective action or further improvement in safety performance targets; which management decisions are made • Indicators are periodically reviewed for appropriateness and pertinence	SM ICG *SMS Evaluation Tool* EASA/ANSP *Questionnaire for Measurement of Effectiveness of Safety Management SKPI* ICAO *SMM*: Appendix 12 to Chapter 4, "SMS Assessment Checklist"	4, 9

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
3	To assess an organization's change management process	Recognizing which changes, in isolation or combination, may have a safety impact • Changes which may affect the level of safety risk associated with the organization's aviation products, infrastructure/system, management, operation, or services provided Recognizing the impact of internal and external change • Identifying and managing the safety risks that may arise from those changes Effectiveness of existing risk controls/mitigations Introduction of new hazards	ICAO *SMM*: 2.8, 5.3.74–5.3.77 CASA *SMS for Aviation - A Practical Guide (2nd Edition): Booklet 4, Safety Assurance* (pp. 4–12) CASA *Managing Change in the Aviation Industry* CAA NZ AC 100-1, *Safety Management*: 2.8, "Management of Change" SM ICG *SMS for Small Organizations*: 3.2, "The Management of Change"; Appendix 13, "Management of Change Template" EHEST *SMM for Complex Operators*: 8.9, "The Management of Change"; Appendix 8, "Change Management Form" TCCA Aviation Safety Letter – "An Ounce of Prevention"	1

4	To explain the relationship between quality assurance and safety assurance	Defining quality assurance and safety assurance	ICAO *SMM*: 5.3.62–5.3.65	1, 8
		Safety assurance complements quality assurance to validate the effectiveness of safety risk controls	ICAO SMP/2-WP/4, *Internal Audit Role in Safety Assurance*:	
		Interaction between quality assurance and safety assurance	SMP.2 - WP.04 Internal audit role in	
		Basic characteristics of QMS and differences with SMS	ICAO SMP/2-WP/5, *Management System Integration*:	
			SMP.2 - WP.05 Management system	
			CAA NZ Resource Kit Booklet 2, *From QMS to SMS*	
			CAA NZ AC 00-3, *Internal Quality Assurance*	
			TCCA AC 107-001, *Guidance on Safety Management Systems Development*: 9.0, "Quality Assurance Program"	
			TCCA AC SUR-003, *Quality Assurance Programs* (under development)	
			ISO 0900, *Guidance on Auditing the Internal Audit Program*	
			Safety Assurance v Quality Assurance (lessons learned from Toyota):	
			Safety Assurance v Quality Assurance.pd	
			Aviation Safety Management System: Towards an Integrated Management System (Portugese):	

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
			104-769-1-PB[1]_Art igo Christian.pdf	
5	To evaluate how an organization assesses the effectiveness of its SMS, to continuously improve the SMS	What effectiveness means External/internal review processes (audits, surveys, safety performance indicators (SPIs), lessons learned, etc.) • Outcomes feeding back into the SMS Link with the safety performance cycle • Recognizing a change in safety performance and taking action Senior management review of the effectiveness of the SMS	ICAO *SMM*: 5.3.78–5.3.82 SM ICG *SMS Evaluation Tool* ISO 9001, *Guidance on Auditing Improvement* NZCAA AC 100-1, *Safety Management*: 2.9, "Continuous Improvement of the SMS"; 2.10, "Internal Audit Programme"; 2.11, "Management Review" *SMS for Airports*: 6.6, "SMS and Internal Safety Assessments"; Annex B and C SM ICG *SMS for Small Organizations*: 3.3, "Continuous Improvement of the SMS"; Appendix 14, "Management Review Template"	1

Section 3: SMS Component 4 (Safety promotion)

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
1	To evaluate an organization's safety communication, training, and education processes	**Training and Competency:** • Competency definition and competency assessment • Training needs analysis (includes contracted personnel), including ongoing (recurrent) training • Training methodology appropriate to the material and the individual • Training will vary between different roles in the organization • Competency of trainers (external providers or internally delivered) • Effectiveness of safety training program is monitored • Training documentation and records **Safety Communication:** • Identification of relevant safety information sources (internal and external, including from interfacing organizations) • Communication of safety information (internal, and external to other affected organizations) • Methods of communication (appropriate to target audience) • Safety-critical information is communicated in a timely manner • Ensuring communication is received and acted upon as required	ICAO *SMM*: 5.3.86–5.3.93 CASA *SMS for Aviation - A Practical Guide (2nd Edition Booklet 5: Safety Promotion* NZCAA AC 100-1, *Safety Management*: 2.12, "Safety Training and Competency"; 2.13, "Communication of Safety-Critical Information"; Annex E, "Training and Competency Guidance Material" *SMS for Airports*: 6.8, "Safety Training and Education" EHEST *SMM for Complex Operators*: Chapter 10, "Safety Promotion"; Chapter 11, "Training and Communication on Safety" SM ICG *SMS Evaluation Tool* ISO 9001, *Guidance on Auditing Competence* ISO 9001, *Guidance on Auditing Internal Communication*	1, 11

Section 4: SMS Evaluation

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
1	To recognize different approaches to implementing and achieving an effective SMS	Various approaches to implement SMS SMS procedures should be customized to each organization Extending a single SMS over multiple activities requiring an approval/certificate Integration of SMS with existing management system	ICAO SMP/2-WP/10, *Scalability of SMS and SSP Implementation*: SMP.2 - WP.10 Scalability.pdf ***Less complex organizations:*** SM ICG *SMS for Small Organizations* SM ICG *SMS for Small Organizations: Considerations for Regulators* CASA *SMS for Aviation - A Practical Guide (2nd Edition)" Booklet 7: SMS for Small, Non-Complex Organisations* CAA NZ Resource Kit Booklet 3, *Implementing SMS Guidelines for Small Aviation Organisations* UK CAA CAP 1059, *Safety Management Systems: Guidance for Small, Non-Complex Organisations* TCCA AC 107-002, *SMS Development Guide for Smaller Aviation Organizations* ***More complex organizations:*** UK CAA CAP 795, *Safety Management Systems (SMS) Guidance for Organisations* TCCA AC 107-001, *Guidance on Safety Management Systems Development*	1, 11

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
2	To plan an assessment of an organization's SMS	Team management, work scheduling, planning effective interviews, and sampling, etc. Researching safety intelligence, safety record, enforcement record, and documentation of the organization The authority's policies, processes, procedures, and tools for the assessment of an organization's SMS	TCCA AC SUR-004, *Civil Aviation Surveillance Program* International Accreditation Forum "Duration of QMS and EMS Audits" CASA *SMS Inspector's Handbook* (*under development*) ANAC training material for SMS assessment planning *(under development)*	3

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
3	To demonstrate interviewing skills of all levels of organizational personnel involved in the SMS	Adaptation of questions according to the roles and responsibilities of the individual (consider flow of communication across the organization) Use of probing questions/cascading questions Cross-checking responses from various sources	UK CAA SMS assessment questions: SMS assessment questionsrev3.pdf *AeroSafetyWorld*, May 2012, "SMS Reconsidered": 4 questions to assess SMS effectiveness NZ CAA V-cycle diagrams: CAA V Diagram.docx CAA V Diagram Application Example.p *Quality Progress*, October 2009, "Ask, and Ye Shall Receive": ask-and-ye-shall-receive[1].pd...	7
4	To obtain objective evidence where possible and exercise judgment when necessary to reach conclusions about an organization's SMS	Cross-checking of information from different sources Seeking confirmation of doubts and concerns Gathering objective evidence to support evaluation activities Use of subjective judgment to assess effectiveness rather than just compliance	State legal authorities for inspectors re evidence gathering ISO 9001, *Audit Guidance on Evidence Collection*	14

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
5	To explain the allowable use and control of information obtained from an organization's SMS	State legal framework and regulator policies for protection and release of organization information (appropriate vs. inappropriate usage or disclosure) Appropriate information to take into the regulator's possession (what is evidence?) Potential impact of data release or inappropriate usage, including inadvertent disclosure State responsibility to determine the most appropriate action to address safety issues arising from sensitive information accessed (e.g., internal reporting systems, flight data monitoring (FDM))	State legal requirements and policies Example compliance philosophies: FAA Order 8000.373, *Federal Aviation Administration Compliance Philosophy* TCCA CAD 107-004, Aviation Enforcement – Safety Management Systems	6
6	To identify systemic deficiencies in an organization	Systems thinking (i.e., beyond how the organization presents itself through its manuals, to understand their system and processes) Definition of systemic Difference between systemic and individual deficiencies Systemic deficiencies at an organizational level	Resource Material for Section 4 Learning SKYbrary Toolkit: *Systems Thinking for Safety/Systems Thinking Methods* Virginia Deptartment of Health training example for systemic deficiency	3, 8

Learning Objective #	Learning Objective	Key Learning Points	Resources	SM ICG Core Competency #
7	To assess the effectiveness of an SMS and discern whether the SMS is appropriate for the size and complexity of the organization	Typical markers of organizational complexity Application of the State SMS evaluation tool to assess an SMS, including scalability Acceptance criteria taken into account for the assessment and the expectation for different levels of performance (Present, Suitable, Operating, Effective) How well the SMS processes are applied to technical processes What is compliance? "Simple compliance" (are they complying?) vs. "effective compliance" (how they are complying, how compliance will be maintained, is the output as expected?).	SM ICG *SMS Evaluation Tool* DGAC *SMS Assessment Tool*: For_SMICG_-_SMS_assessment_tool_V2 ICAO *SMM*: Appendix 12 to Chapter 4, "SMS Assessment Checklist" EASA/ANSP Questionnaire for Measurement of Effectiveness of Safety Management SKPI SM ICG *SMS for Small Organisations: Considerations for Regulators* *AeroSafetyWorld, May 2012, SMS Reconsidered*: Four questions to assess SMS effectiveness	1, 11