Operational Risk: Implementing Open Norms (ORION)

Intellectual Output 2 (IO2) Report 10/11/21
SMS Implementation Training Guide

Authors: Vassos Lappa (KTC), Pernilla Ulfvengren (KTH), Nick McDonald (SCL), Daniele Baranzini (Ergo), Derek Ross (TCD), Siobhan Corrigan (TCD), Thomas Demosthenous (KTC), Vangelis Demosthenous (KTC)

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Executive Summary

This document details the training content that was produced for the ORION Project. In it you can find information about the three Core courses and the Advanced Risk Management modules. All the training material mentioned in the guide is available and can be used to deliver any of the courses listed below.

1. Core Training

    a. SMS for All Personnel

    b. SMS for Key Personnel

    c. SMS for Managers

2. Advanced Risk Management

    a. Module 0: Safety Management System Maturity Assessment

    b. Module 1: Operational Risk & Organisational Hazard

    c. Module 2: Proactive Risk Management

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    f. Module 5: Organizational Change and Strategy

For each course there is a list of objectives, a duration, a description of the audience that is targeted by the course, a detailed module breakdown and a list of the documents relevant to it. All relevant documents are available online.

Acknowledgements

Introduction

This guide details the courses developed as part of Intellectual Output 2 of the Operational Risk: Implement Open Norms (ORION) project. The findings of the ORION project are intended to be applicable to other contexts and sectors. It is also recommended that wider literature on SMS specific to sectors is considered to support the localisation of findings presented here.

Below a brief definition and description of the Safety Management System (SMS) is provided. Following this an overview of the ORION project and lastly a guide for each training program.

What is a Safety Management System (SMS)?

The International Civil Aviation Organisation (ICAO) define a Safety Management System (SMS) as, "*a systematic approach to managing safety, including the necessary organisational structures, accountabilities, policies and procedures,*" (ICAO, SMS Manual 4th edition, 2018). The overall aim of a SMS is to proactively and prospectively manage safety in order to minimise risks to system through the removal or mitigation of hazards. A SMS is based on an inclusive philosophy whereby each actor within a defined system actively contributes to safety. This is often achieved through communicating safety and relevant performance related issues through formal reporting systems. As ICAO state, "*safety management effectively implemented can lead to a documented, process-based approach to safety, as well as a better understanding of safety-related interdependencies and relationships,*" (ibid). Therefore, the generation of knowledge about the system safety requires significant amounts of data to be elicited, managed and effectively analysed in order to establish a realistic understanding of the system as close to real time as possible. The resulting knowledge needs to be transformed into actions that uphold or enhance safety of the system for its members and users.

The ICAO SMS Framework is set around four components (also referred to as pillars of SMS).

- Safety policy and objectives:
    - Management commitment and responsibilities;
    - Safety accountabilities;
    - Co-ordination of emergency response planning;
    - SMS documentation.
- Safety risk management
    - Hazard identification;
    - Risk assessment and mitigation.
- Safety assurance:
    - Safety performance monitoring and measurement;
    - Management of change;
    - Continuous improvement of the SMS.
- Safety promotion:
    - Training and education;
    - Safety communication.

The ORION Project Overview

The Operational Risk: Implementing Open Norms (ORION) project has developed and implemented training to foster soft socio-technical skills for fully implementing and embedding a safety management system (SMS) and managing operational risk. ORION focuses on the skills needed to make the transition between fulfilling the formal requirements of a SMS and having a system that is fully embedded in normal operational practice so that it is fully part of the culture of the organisation, ensuring effective practice according the best practicable standards and delivering a high and constantly improving level of safety. This requires the skills and capability to productively address the systemic factors that influence and motivate people to behave in particular ways and to facilitate change. It also requires learning from others' experience.

The ORION project is co-funded by the Erasmus+ Programme of the European Union.

Objectives

The overall goal of ORION is to improve outcomes in the management of operational risk, across a wide range of risk-critical industries. Knowledge can also be utilized to contribute to a stronger economy and business model in the provision of safety related services across safety critical industries, and to promote a culture of sharing and learning from best practice in implementation among industry partners.

The aims of the ORION project are delivered through five objectives:
1. To design and develop training materials to support and facilitate implementation and embedding of SMS in norms of practice and effective management of risk in the operation.
2. The training can be delivered in short courses in the associate organisations. A common train-the-trainer programme leading to training in the ORION project Associate Partner organisations, each was directly supported by an ORION partner.
3. The training and support aims to result an implementation case study approach. This is intended to build and extend the knowledge base of evidence that links multiple implementation cases studies.
4. A validation programme starting with stakeholder needs and progressively verifying delivery on those needs and validate the project outcomes.
5. Utlising evidence on each of these activities to contribute to the development guidelines for open norms of best practice in the full implementation of SMS.

Background to the ORION Project

The background to the ORION project are framed around several complementary identified needs:

Implementing SMS and Managing Operational Risk

The Associate Partners of this project are in various stages of implementing SMS and integrating SMS with OHSAS. They need to achieve real value from this organisational effort. Embedding SMS requires building actual norms of behaviour and performance, reporting, implementing improvement.

Creating an evidence base

An empirically grounded evidence base of SMS implementation is lacking. While ORION is based on a wide range of research in certain industries (aviation, maritime, health, emergency services), there is a need to create a more comprehensive evidence base of what works in implementing SMS across a range of industries and regions.

Best practice guidelines

There are not many standards or much guidance as to how to implement and embed SMS. One good example of best practice guidelines comes from the Civil Air Navigation Services Organisation (CANSO) who published a Standard of Excellence in Safety Management Systems (SoE in SMS) and an associated implementation guide to support ANSPs (Air Navigation Service Providers) in their safety management. The CANSO SoE in SMS is compliant with ICAO Annex 19 (ICAO. Annex 19: Safety management. International Civil Aviation Organisation; 2013). This is largely a generic standard that is easily applicable to other industries. Level E of this standard is the highest level of implementation and embedding of safety practices that are shown to be effective. Another example is Transport Canada guidelines for both development and assessment of SMS in aviation. However, while there is a strong logic to these documents it lacks a solid evidence base from actual implementation.

Generate Open Norms

Overall, it is important to demonstrate what is possible in terms of good practice in SMS implementation across a range of industries. This then shows what could and should be normal. Creating open access to this evidence in implementation case studies begins to build open norms of how to progressively improve the real functioning of SMS in dealing with the pervasive intractable problems of operational risk.

Intellectual Outputs

The results of the ORION project are linked directly to the Intellectual Outputs and Multiplier Events that have been delivered through the project. Each of the Intellectual Outputs provide important results that are of value to the industries and sectors who are represented by the Associate Partners in the ORION project. These are described briefly below:

Intellectual Output 1 (IO1) SMS Maturity Assessment

Intellectual Output 1 provides a report synthesizing research evidence and best practice guidelines, together with an analysis of the current maturity level of Safety Management Systems (SMS) in the Associate Partner organisations. This analysis will support the development of SMS Implementation Training.

Intellectual Output 2 (IO2) SMS Implementation Training

Intellectual Output 2 (IOS) provides an overall training design for train the trainers within the partnership as well as training SMS facilitators within the Associate Partners (including design of the facilitation and training to be offered by the facilitators in their organisations). This training includes developing an implementation case study approach. An initial training

design and development activity occurred ahead of training events delivered to each of the Associate Partners that supported the full SMS implementation activity.

Intellectual Output 3 (IO3) SMS Implementation Validation

The purpose of Intellectual Output 3 (IO3) is to demonstrate how to undertake validation to provide confidence that the concept being developed and implemented meets the stated objectives in practice. Key activities of the validation tasks in ORION are to:

- Ensure the SMS needs are fulfilled.
- Iteratively verify and validate components and activities through stages of concept, design, implementation, and operations during project.
- Feedback to various providers of progression according to requirements along the development stages.

Intellectual Output 4 (IO4) SMS Implementation Framework

In Intellectual Output 4 (IO4) best practice guidelines are consolidated the initial evidence base, the training designed and delivered, and evaluated and validated using a case-based approach. This draws on the lessons learned about implementation to inform guidelines for best practice in implementation.

Intellectual Output 5 (IO5) SMS Norms of Practice Manual

Intellectual Output 5 (IO5) offers guidance on SMS Norms of Practice and consolidates lessons representing the core aspects of each of the previous outputs. This is designed to maximise transferability and impact by presenting in appropriate media the essential content of the ORION programme. This is innovative in providing concise evidence-based standards of good practice in SMS implementation, that are carefully designed to be easily transferable between organisations, across industrial and service domains, and spanning different regions. The SMS Norms of Practice provides a material report for the that can be used to support ORION SMS activities.

About this guide

This document details the training content that was produced for the ORION Project. In it you can find information about the three Core courses and the Advanced Risk Management modules. All the training material mentioned in the guide is available and can be used to deliver any of the courses listed below.

3. Core Training

   a. SMS for All Personnel

   b. SMS for Key Personnel

   c. SMS for Managers

4. Advanced Risk Management

   a. Module 0: Safety Management System Maturity Assessment

   b. Module 1: Operational Risk & Organisational Hazard

   c. Module 2: Proactive Risk Management

   d. Module 3: SMS Data Analytics

   e. Module 4: Monitoring & Measurement for Safety Assurance

   f. Module 5: Organizational Change and Strategy

For each course there is a list of objectives, a duration, a description of the audience that is targeted by the course, a detailed module breakdown and a list of the documents relevant to it. All relevant documents are available online.

Core Training

The core training is intended to prepare all the personnel of an organisation to implement and maintain a Safety Management System (SMS). The core training includes three different courses, each aimed at a different audience according to their role in the SMS.

Safety Management Systems (SMS) for All Personnel

SMS is successful only if the organisation manages to put everybody on-board through commitment and involvement in the various SMS processes. This training is designed to address this involvement and assist the organisation not only to meet the requirements but also to achieve safety and operational benefits.

The course can be modified to meet the requirements of a customized Training Need Analysis (TNA) on the specific learning area.

Duration: This is intended to be a one-day training course.

Objectives:
Upon completion of this course, trainees will expand their learning capacity and understanding of:
- What is a Safety Management System (SMS)
- Importance and benefits of SMS
- Analysis of the 4 SMS Components
- Hazard Identification and Risk Assessment
- Reporting procedures and responsibilities
- Appreciation of the many dimensions of Safety Culture

Participants will also develop additional skills and competencies to:
- Support the organisation's initiatives on SMS Implementation
- Report incidents, hazards etc., using available reporting tools
- Make safety suggestions to promote and improve safety
- Contribute to the risk management process by providing ideas and applying the required measures
- Cooperate effectively with colleagues and communicate safety matters / exchange safety views with colleagues (inter and intra departmental liaison and communication)

Audience: This course is suitable to all the personnel of an organization

Modules
The modules for the one-day SMS course are presented in the table below. For each the subjects covered, and the exercises are briefly described. This module description can be used as a lesson plan.

Module	Subjects to be covered	Exercises
Module 1: Introduction to SMS	- Introductions - Training objectives - SMS Basics - SMS Regulatory Background - SMS BENEFITS - SMS Challenges - Kratis Model - Parameters and Requirements SMS implementation	**In groups:** Trainee Introductions – Expectations **In groups:** Benefits of SMS on Self, Team and Company **Video:** Benefits CASA Safety **In groups:** Challenges of SMS in your organisation **In groups:** What happens in relation to the elements of Kratis Model in your organisation? What is your contribution
Module 2: Safety Culture - Reporting	- Safety Culture – The 7 dimensions - Measure Safety Culture - Improve Safety Culture	**Video:** "Supersonic" part 1 **In Groups:** Safety Culture Dimensions in "Supersonic" **In Groups**: Practical ways to improve the Safety Culture

Module 3: Reporting – Just Culture	- Reporting Culture - What to report - Just Culture - Types of behaviour	**Case Study:** Alaska
		In groups:
		   a. Why is a good reporting system required?
		   b. Why do some people refrain from completing and submitting reports?
		
		Video: "Supersonic" part 2
		Individual: Categorise Justin's behaviour

Module 4 – Risk Management – Hazard Identification	- Importance of RM - Risk Management process - Hazard definition - Types of Hazards - Taxonomy of Hazards - SMISG - Sources for Hazard Identification - Internal - External - Hazard Identification	**Group:** Importance of RM **Group:** Challenges of RM **Video :** Lamborghini RM **Groups:** Identify some Hazards from each category **Groups:** Which are your biggest three hazards? **Group:** Sources for Hazard Identification

Module 5 – Risk Management – Risk Assessment	• Risk definition • Risk Probability & Risk Severity • Safety Risk Assessment Matrix • The bow tie technique – Riding a Bicycle • Hazard - Undesirable Event • Threats – Consequences • Controls • Using the Bow-tie to Risk Assess	**Groups:** Bow-Tie RM. "Building on fire"

Material

The table below lists all the documents that are used for the delivery of the course. Each line states the type of document, the name of the file and the languages that is available.

Type	Name	Languge
Lesson Plan	SMS - Lesson Plan	English,Italian, Swedish, Greek
Handout for the participant	Bowtie Blank	English,Italian, Swedish, Greek
Handout for the participant	Just Culture - 1 each	English,Italian, Swedish, Greek
Handout for the participant	Safety Culture - 1 each bw	English,Italian, Swedish, Greek
Presentation	Module 1 Introduction to SMS	English,Italian, Swedish, Greek
Presentation	Module 2 Safety Culture	English,Italian, Swedish, Greek
Presentation	Module 3 - Reporting - Just Culture	English,Italian, Swedish, Greek
Presentation	Module 4 Risk Management – Hazard Identification	English,Italian, Swedish, Greek
Presentation	Module 5 Risk Management – Risk Assessment	English,Italian, Swedish, Greek

Safety Management System SMS for Key Personnel

SMS is required to manage risk and keep operations safe. To manage such a program an organisation is obliged to develop the necessary knowledge and skills among its key personnel. This training provides essential knowledge and develops the required skills and competencies of all attending trainings. A course which is directed to safety and quality professionals, line managers and the personnel who would work in the implementation and operation of the SMS.

The course can be designed to meet the requirements of customized Training Need Analysis (TNA) on the specific learning area.

Duration: This is intended to be a five-day course.

Objectives

Upon completion of this course, trainees will expand their learning capacity and understanding and will develop additional skills and competencies to:

- Appreciate the importance of Safety Management Systems (SMS)
- Contribute to the effectiveness of hazard identification
- Define the basic SMS components
- Appreciate the importance of Safety Culture
- Appreciate the importance of Risk Management
- Perform data driven Risk Management
- Use RM Excel tool
- Identify Implementation Process
- Perform a Gap Analysis
- Produce recommendations

Audience: This course is suitable to Line Managers, Safety & Quality personnel, safety committee members and other key personnel who can take a lead in the implementation of SMS.

Modules

The modules for the five-day SMS course are presented in the table below. For each the subjects covered, and the exercises are briefly described. This module description can be used as a lesson plan.

Module	Subjects to be covered	Exercises
Introduction	- Introductions – Expectations - Training objectives - SMS Challenges - Eagle Aviation - Re-starting the Company	**Group:** Introduction – Expectations **In groups:** Challenges of SMS

Module 1 : Introduction to SMS	- What is SMS - SMS Regulatory Background - Benefits of SMS - Importance of SMS - SMS Blockers	**In groups:** Benefits of SMS **Video:** CASA Safety Video **Individual:** Aviation Safety and Financial Performance **In groups:** What are the Blockers of SMS **In groups:** How to overcome these Blockers
Module 2 : Safety Culture	- The Kratis Model - Safety Culture – The 7 dimensions - Measure Safety Culture - Improve Safety Culture	**Video:** "Supersonic" part 1 **In Groups:** Safety Culture Dimensions in "Supersonic"
Module 3 – Key Safety Personnel	- Key Safety Personnel - CEO - Safety Manager - Safety Review Committee (SRC) – terms of reference / duties and responsibilities. - Safety Action Group (SAG) – terms of reference / duties and responsibilities.	**In groups:** How can management commitment be demonstrated? **In groups:** SAG meeting simulation
Module 4 - Safety Assurance	- Safety Performance Monitoring and Measurement - Safety Assurance in an Organisation (sources of safety data) - Why measure performance? - Safety Performance Measurement – establishment of SPIs & SPTs - examples	**In groups:** Develop 2 Leading and 2 Lagging SPIs for your department
Module 5 – Reporting – Just Culture	- Case study – Alaska - Importance of Reporting - What to report - What is Just Culture - Just Culture - Types of behaviour	**Video:** Alaska **In groups:** a. Why is a good reporting system required? b. Why do some people refrain from completing and submitting reports?

		Video: "Supersonic" part 2 **Individual:** Categorise Justin's behaviour **In Groups**: Practical ways to improve the Safety Culture

Module 6: Introduction to RM	● Importance of RM
	● Challenges of RM
	● Risk Management objectives
	● Risk Management process
	● Hazard definition
	● Types of Hazards
	● Taxonomy of Hazards - SMISG
	● Sources for Hazard Identification
	   ○ Internal
	   ○ External
	● Hazard Identification
	● MOC - SHELL
		Group: Importance of RM
		Group: Challenges of RM
		Video : Lamborghini RM
		Groups: Identify some Hazards from each category
		Groups: Which are your biggest three hazards?
		Group: Sources for Hazard Identification
		In groups: Use SHELL for MOC to identify Hazards

Module 7: RM Process - Risk Assessment	● Risk definition ● Risk Probability & Risk Severity ● Safety Risk Assessment Matrix ● The bow tie technique – Riding a Bicycle ● Hazard - Undesirable Event ● Threats – Consequences ● Controls ● Using the Bow-tie to Risk Assess	**Groups:** Bow-Tie RM. "Building on fire
Module 9 – Practical Risk Management	● Use Manual tool to analyse the Risk ● Use of data to decide on the effectiveness of the controls ● Use of Data to decide on Probability and Severity ● Demonstration of Excel Tool ● Practical Risk Management – Use of Excel Tool	**Groups:** Use Manual tool **Trainer:** Demonstrate the use of the tool using the Fire example **Groups:** Risk Assessment of a job related hazard - Create a Bow-Tie **Groups:** Practise the use of the tool

Module 9 – **Practical Risk Management**	• Practical Risk Management – Present Findings	**Groups:** Present Findings
Module 10 – SMS Implementation	• SMS Implementation - Basic Outline • Parameters and Requirements SMS implementation • The Kratis Model • Tools to perform a Gap Analysis • Perform a Gap Analysis • Record Findings • Develop Recommendations • Present findings and recommendations • Written multiple choice questionnaire to be completed by each trainee	**In groups:** What happens in relation to the elements of Kratis Model What is your contribution? In groups: Perform a Gap Analysis using the tool. In groups: Develop recommendations based on findings In groups: Present findings and recommendations

Material

The table below lists all the documents that are used for the delivery of the course. Each line states the type of document, the name of the file and the languages that is available.

Type	Name	Languge
Lesson Plan	SMS - Lesson Plan	English
Handout for the participant	Bowtie Blank	English
Handout for the participant	Just Culture - 1 each	English
Handout for the participant	Safety Culture - 1 each bw	English
Handout for the participant	Package Eagle exercise - 3 copies	English
Handout for the participant	profit & Loss - Print 1 each cut in two	English
Handout for the participant	RM Tool - Kratis 12 - Manual - V2	English
Handout for the participant	SAG Meeting exercise Aug 2019 - 1 each	English
Test for the participant	SMS EXAM	English
Presentation	Introduction	English
Presentation	Module 1 Itroduction to SMS	English
Presentation	Module 2 Safety Culture	English
Presentation	Module 3 - Reporting - Just Culture	English
Presentation	Module 4 Risk Management – Hazard Identification	English

Presentation	Module 5 Risk Management – Risk Assessment	English
Presentation	Module 6 Key People in SMS	English
Presentation	Module 7 Safety Assurance	English

Safety Management System (SMS) for Managers

This training discusses the management responsibilities and accountabilities relevant to SMS – development and implementation. The discussion of the role of the senior management in achieving operational and safety benefits through SMS implementation is also an integrated element of this course. To manage such a program an organisation is obliged to develop the necessary knowledge and skills among its key personnel; as well as empowering key personnel to effectively deal with it. This training provides essential knowledge and develops the required skills and competencies of Senior Management.

The course can be designed to meet the requirements of customized Training Need Analysis (TNA) on the specific learning area.

Duration: This is intended to be a two-day course.

Objectives:
Upon completion of this course, trainees will expand their learning capacity and understanding of:
- What is Safety Management System (SMS)
- Importance and benefits of SMS
- Analysis of the 4 SMS Components
- Hazard Identification and Risk Assessment
- Reporting procedures and responsibilities
- Appreciation of the many dimensions of Safety Culture

Participants will also develop additional skills and competencies to:
- Take appropriate role/steps in the implementation of SMS within the organisation
- Promote SMS and a Safety Culture within their area of influence
- Make decisions with appropriate consideration to safety information and safety issues
- Assist the organisation to improve safety and operational performance
- Assist the company to achieve its vision and aspirations and improve safety and operational performance

Audience: This course is suitable to Accountable, Safety and Quality Executives and Senior Managers.

Modules

The modules for the two-day SMS course are presented in the table below. For each the subjects covered, and the exercises are briefly described. This module description can be used as a lesson plan.

Module	Subjects to be covered	Exercises
Introduction	- Introductions - SMS Challenges - Training objectives - Eagle Aviation - Re-starting the Company	**In groups:** Trainee Introductions – Challenges of SMS
Module 1 : Introduction to SMS	- What is SMS - SMS Regulatory Background - Benefits of SMS - Importance of SMS - SMS Implementation - Basic Outline - Parameters and Requirements SMS implementation - SMS Blockers	**In groups:** Benefits of SMS **Video:** CASA Safety Video **Individual:** Aviation Safety and Financial Performance **In groups:** What are the Blockers of SMS **In groups:** How to overcome these Blockers
Module 2: Safety Culture	- The Kratis Model - Safety Culture – The 7 dimensions - Measure Safety Culture - Improve Safety Culture	**Video:** "Supersonic" part 1 **In Groups:** Safety Culture Dimensions in "Supersonic

Module 3 – Reporting – Just Culture	- Case study – Alaska - Importance of Reporting - What to report - What is Just Culture - Just Culture - Types of behaviour	**Video:** Alaska
		In groups:
		  a. Why is a good reporting system required?
		  b. Why do some people refrain from completing and submitting reports?
		Video: "Supersonic" part 2
		Individual: Categorise Justin's behaviour
		In Groups: Practical ways to improve the Safety Culture

Module 4: RM – Hazard Identification	- Importance of RM - Challenges of RM - Risk Management process - Hazard definition - Types of Hazards - Taxonomy of Hazards - SMISG	**Group:** Importance of RM **Group:** Challenges of RM **Video :** Lamborghini RM **Groups:** Identify some Hazards from each category **Groups:** Which are your biggest three hazards?

	• Sources for Hazard Identification
	    o Internal
	    o External
	• Hazard Identification
		Group: Sources for Hazard Identification
		In groups: Use SHELL for

Module 5: RM - Risk Assessment	• Risk definition • Risk Probability & Risk Severity • Safety Risk Assessment Matrix • The bow tie technique – Riding a Bicycle • Hazard - Undesirable Event • Threats – Consequences • Controls • Using the Bow-tie to Risk Assess	**Groups:** Bow-Tie RM. "Building on fire
Module 6 – Key People in SMS	• Key Safety Personnel • CEO - Safety Manager • Safety Review Committee (SRC) – terms of reference / duties and responsibilities. • Safety Action Group (SAG) – terms of reference / duties and responsibilities.	**In groups:** How can management commitment be demonstrated? **In groups:** SAG meeting simulation
Module 7 - Safety Assurance	• Safety Performance Monitoring and Measurement • Safety Assurance in an Organisation (sources of safety data) • Why measure performance? • Safety Performance Measurement – establishment of SPIs & SPTs - examples	**In groups:** Develop 2 Leading and 2 Lagging SPIs for your department

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Handout for the participant	Safety Culture - 1 each bw	English
Handout for the participant	Package Eagle exercise - 3 copies	English
Handout for the participant	profit & Loss - Print 1 each cut in two	English
Handout for the participant	Risk Assessment exercise	English
Handout for the participant	Focus of measurement - 1 each part	English
Handout for the participant	Eagle Handouts - 1 each part	English
Handout for the participant	SAG Meeting exercise Aug 2019 - 1 each	English
Test for the participant	SMS Test	English
Presentation	Introduction	English
Presentation	Module 1 Itroduction to SMS	English
Presentation	Module 2 Safety Culture	English
Presentation	Module 3 - Reporting - Just Culture	English
Presentation	Module 4 Risk Management – Hazard Identification	English
Presentation	Module 5 Risk Management – Risk Assessment	English
Presentation	Module 6 Key People in SMS	English
Presentation	Module 7 Safety Assurance	English

Advanced Risk Management

This section contains the advanced SMS training modules developed during the ORION project. For each module, trainers are encouraged to read the script of the presenter delivering the training to understand the material that is delivered.

Objectives of Training

The ORION Advanced Risk Management training objectives are to forge a link between learning and doing in the following way:

To understand – to be able to describe and discuss the concepts of Advanced Risk Management, including the achievements and limitations safety management systems; socio-technical approaches to operational systems, operations management and the management of change; the assessment of risk in operations and in the processes of change; the use of data analytics in proactively assessing risk; the strategic management of risk and evidence-based governance.

To apply - to interpret these concepts in relation to their own organization or other organisations with which they are familiar; and to identify strengths and weaknesses and opportunities for improvement both at operational level and in management systems and processes.

To analyse – to use the Cube methodology to conduct a socio-technical analysis of a particular operational situation or set of activities.

To evaluate – to use the CMO framework (Context, mechanism, Outcome) to prioritise key issues for change; to conduct a Risk assessment, and assess the Risk in Change.

To create – to initiate a new project using the ARK platform, focusing on the analysis of risk in an operational situation familiar to the student and identifying the potential for change.

Target Audience
The target audience primarily concerns safety and risk managers and those with managerial responsibility for implementing improvement and change in any industry or service.
A second target are senior managers responsible for strategic decision making and the strategic risk profile of the organization.
A third target are those with regulatory responsibility for safety, risk or quality of service.

Module	Subjects to be covered	Exercises
Module 0: Safety Management System Maturity Assessment	SMS assessment and gap analysis. Assessment of needs for further training or implementation of an SMS. Overview of ORION Advanced risk Management training	Recorded presentation Live tutorial SMS assessment conducted tailored to home organisation using SMS assessment standards and Safety management manuals
Module 1: Operational Risk & Organisational Hazard	Organisational capabilities to reduce operational risk. Human systems & sociotechnical principles. Critical sociotechnical mechanisms in complex dynamic operational contexts Engineering principles (system control & lifecycles) applied to sociotechnical system analysis and development.	Recorded presentation Live tutorial Reflection exercise of own organisations current operations and management Further reading

	Training and developing organisational capabilities to reduce operational risk	
Module 2: Proactive Risk Management	Complexity in operational systems Fostering an Obligation to Act The Cube - a Socio-technical analysis methodology The relationship between risk & value Moving from problem to solution	Recorded presentation Access to ARK risk management platform Live tutorial session Students Initiate own project. Further reading
Module 3: SMS Data Analytics	Organisational role of data analytics Data integration Data and risk Standard process for data mining Organisational skills for risk data analytics	Recorded presentation Live tutorial
Module 4: Monitoring & Measurement for Safety Assurance	Safety performance indicators following safety accident models. Leading and lagging performance measures built on operations management. Monitoring and measurement in support of risk management and system improvement initiative.	Recorded presentation Live tutorial Develop indicators for on-going projects where applicable
Module 5: Organisational Change and Strategy	Challenges in managing operational change Managing the risk in change Making links between risk and value A 5-stage roadmap towards Advanced Risk Management Benchmarking a model of system change.	Recorded presentation Access to ARK risk management platform Live tutorial session Students develop own project. Further reading

Module 0: Safety Management System Maturity Assessment

This session gives an introduction on current practice in assessing the maturity of safety management activities in an organisation. It is based on a standard safety management system (SMS) used in the aviation domain.

The background is an identified need to address challenges to both implement an SMS and to mature it after having implemented an SMS to the level of compliance. In addition to compliance the maturity scale aim for excellence when the SMS is truly effective.
In order to be effective an SMS need to be fully embedded in everyday practice and have good safety practice as a part of the norms and culture of the organisation. However, there is limited evidence base for implementation of SMS and there is limited training on how to mature an SMS towards excellence.

In the ORION project several industrial safety management activities has been assessed and analysed and it has been found that there are common gaps between. ORION has reviewed and developed basic SMS training that support training on what an SMS is and to learn its components and processes. This goes a long way. But ORION also identified the need for advanced training and has developed training that address implementation issues and how to mature after having reached compliance.

Objectives:
- After this session you should be able to initiate an SMS assessment and gap analysis.
- This could give you a way to assess the relevance of further training or implementation of an SMS.
- You may read more about the training offered in ORION in reports and you may also look at the training material offered.

Material
The table below lists all the documents that are used for the delivery of the course. Each line states the type of document, the name of the file and the languages that is available.

Type	Name	Languge
Presentation	ORION session 0 SMS maturity assessment PPT	English
Script of the presenter	Session 0 script ORION SMS maturity assessment	English,Italian, Swedish, Greek

Module 1: Operational Risk & Organisational Hazard

This module explores organisational hazards which are a real threat to its capability. It presents a general background of sociotechnical principles that are known to support work and introduce a model for analysis of human systems by which a system may be verified and validated to work well, including its improvement and development work intended to reduce operational risk.

It conducts a short review of the basic structure and processes in a common safety management system (SMS) and, how to assess this system with regards to lessons learnt about organisational hazards to develop and implement a safety management system beyond compliance towards excellence; an SMS that works well as a whole.

Objectives:
- Describe key organisational capabilities and the need to develop these to reduce operational risk.
- Verify human systems in development work with respect to sociotechnical principles.
- Understand critical sociotechnical mechanisms in complex dynamic operational contexts as well as development work based on a sociotechnical functional model.
- Verify systemic and systematic processes based on engineering principles like system control and lifecycles applied to sociotechnical system analysis and development.
- Describe the combined approach of training and developing to progressively develop key organisational capabilities to reduce operational risk that will allow you to initiate work to improve or maintain performance of your business and operations.

Material
The table below lists all the documents that are used for the delivery of the course. Each line states the type of document, the name of the file and the languages that is available.

Type	Name	Languge
Presentation	Organizational hazard_operational risk PPT july 24	English
Script of the presenter	Session 1 script ORION	English,Italian, Swedish, Greek

Module 2: Proactive Risk Management
This module tries to tackle the issue of complexity in operational systems. It points out the problem of having a system that is siloed, in which people manage their day-to-day work as best they can, but where the support for anticipation, prevention, feedback and learning and adjusting the system is very limited.

Objectives:
- The role of complexity in understanding operational systems
- Fostering an Obligation to Act to address that complexity
- Socio-technical analysis using the Cube methodology
- The relationship between risk and value
- Moving from problem to solution
- Introduction to the ARK platform

Material

The table below lists all the documents that are used for the delivery of the course. Each line states the type of document, the name of the file and the languages that is available.

Type	Name	Languge
Presentation	ORION governance 5	English
Script of the presenter	Proactive risk script 2	English,Italian, Swedish, Greek

Module 3: SMS Data Analytics
Suggested training delivery
1. The SMS DA is a one day Training course
2. It is intended primary for Digital Classrooms or Webinar formats for 3 to 30 subjects
3. The training can be run as single day session or re-scheduled into asynchronous parts and split accordingly depending by the Organisations involved and Trainees needs/availabilities
4. A wifi and internet connection is necessary for distance digital training sessions

Trainer competence
Trainer must be expert in Data Analytics and Broad knowledge on SMS applications

Trainees' competence (entry level)
1. Trainees are expected to know basics on SMS risk assessment concepts
2. Trainees are expected to know basics about the concept of databases, or descriptive statistics
3. Trainees are expected to be front line or higher-level managers
4. Trainees are not required any knowledge about data science or data analytics

Content
Content is slides presentations, video clips and digital exercises embedded into the slides. No additional material is required of the Trainees.

Scheduling
1. PART I and half PART II morning   expected 3 hours
2. PART II (second half) + PART III   expected 3 hours

Strategy
All exercises can be converted as homework assignments where some days are given to review the exercise within the organisation and then report the exercise on a later stage in PART III of the SMS DA course.

Reference to content related to other ORION organisational modules and the SMS classic modules on risk assessment has to be highlighted during the course

Material

The table below lists all the documents that are used for the delivery of the course. Each line states the type of document, the name of the file and the languages that is available.

Type	Name	Languge
Presentation	SMS_DA - PART I	English
Presentation	SMS_DA - PART II	English
Presentation	SMS_DA - PART III	English
Script of the presenter	Session_3 script ORION with figures	English,Italian, Swedish, Greek

Module 4: Monitoring & Measurement for Safety Assurance

This module discusses the role of measurement and monitoring in safety assurance. The safety assurance function is essential in a safety management system (an SMS). The basic structure and processes in a common safety management system (SMS) will be reviewed briefly. A more thorough discussion on components for monitoring and measurement is discussed in relation to the links between safety risk management and safety assurance in an SMS.

Objectives:
- Describe the logic behind safety performance indicators following safety accident models.
- Describe the logic behind leading and lagging performance measures built on operations management.
- Explain how these approaches may be combined in development work through monitoring and measurement in support processes for risk management and demonstrating evidence for hazard identification, solution and concept development as well as implementation and validating the system improvement initiative.
- Applied in case studies or projects monitoring and measurement according to this approach will allow you to initiate work to improve or maintain performance of your business and operations.
- This will need complementary sessions in data analytics, implementation and planning and performing a project

Material

The table below lists all the documents that are used for the delivery of the course. Each line states the type of document, the name of the file and the languages that is available.

Type	Name	Languge
Presentation	Monitoring and measurement in safety assurance final.pdf	English

Script of the presenter	ORION Monitoring and measurement for safety assurance Script Session 4	English,Italian, Swedish, Greek

Module 5: Organisational Change and Strategy

This module is about organisational change and strategy. This module is divided into on two sections: Section one looks at Managing implementation and change and section 2 deals with Developing a strategic approach to managing risk and change.

Objectives:
- Discuss the challenges in the management of operational change
- Describe how to manage the risk in change to achieve more reliability of outcome
- Explain the relationship between risk and value
- Summarise the five-stage roadmap towards Advanced Risk Management and
- Outline the Pettigrew and Whipp model of system change

Material

The table below lists all the documents that are used for the delivery of the course. Each line states the type of document, the name of the file and the languages that is available.

Type	Name	Languge
Presentation	ORION Change & Strategy 4	English
Script of the presenter	Change and strategy_v1_TM_200821.docx	English,Italian, Swedish, Greek