ICAO State Safety Programme (SSP) and Safety Management Systems (SMS) Introduction

RASG-PA Aviation Safety Seminar/Workshop
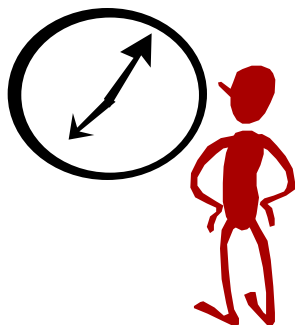*St. Jonhs', Antigua & Barbuda, 10-12 September 2013*

Eduardo Chacin

Regional Officer, Flight Safety

ICAO

Introduction of participants

→ **The 5 W's**

- **Who** are you ?

    - What is your preferred name in class?

- **Where** do you work?

- **What** is your job title, and

- **What** are your main responsibilities?

- **Why** are you attending this seminar/workshop?
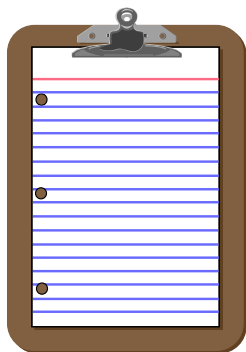
    - Please define your expectations

Punctuality

Participation
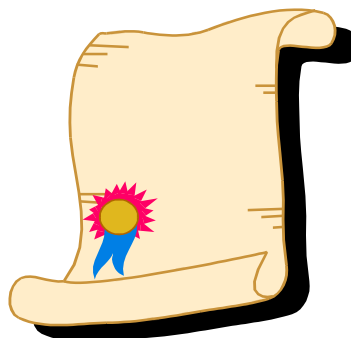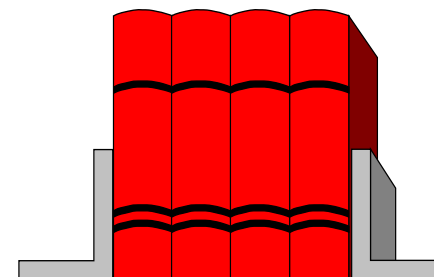
Phones

No smoking

Data forms

Certificates

Documentation

Course schedule

➤ 08:30 – 09:00 – Registration

➤ 09:00 – 10:45 – Session activity

➤ 10:45 – 11:15 – **Coffee/Tea break**

➤ 11:15 – 12:30 – Session activity

➤ 12:30 – 14:00 – **Lunch**

➤ 14:00 – 14:45 – Session activity

➤ 14:45 – 15:00 – **Coffee/Tea break**

➤ 15:00 – 16:00 – Session activity

Programme

1. Objective of the Workshop
2. ICAO Role
3. Safety Management Fundamentals
4. ICAO SARPs
5. Definitions and Concepts
6. SSP and ICAO SARPs
7. The ICAO SSP framework
8. SSP implementation
9. The role of SSP in supporting SMS implementation
10. Summary
11. Conclusions of SSP/SMS Implementation Workshop
12. Exercises

1. Objective of the Workshop

Objective

→ Introduce the framework for development and implementation of:

- SSP
- SMS

→ Introduce the combination of both elements:

- Prescriptive
- Performance-based
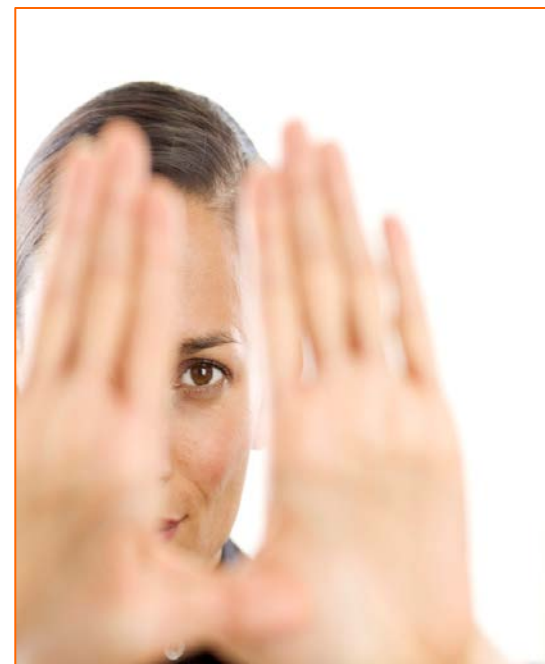
2. ICAO Role

ICAO

Promoting a safety and efficient industry

→ To meet the needs of the peoples of the world for a safe, regular, efficient and economical air transport (Chicago Convention, Article 44)

ICAO Strategic Objectives

→ Safety

→ Security

→ Environmental Protection & Sustainable Development of Air Transport

Strategic Approach

✈ Goal

- – Reduce the risk of loss of human life through continuously enhancing aviation safety

✈ Safety Targets

- – Safety targets will be defined according to risk criteria
- – Continually measured for significant change

✈ Safety Initiatives

- – Linked to safety targets
- – Specific metrics will monitor effectiveness

Goal

Safety Targets

Safety Initiatives

ICAO Safety Framework

✈ Safety Data

✈ Policy & Standardization
  – GASP Update
  – Safety Annex

✈ Safety Analysis
  – Evolving to a risk-based process

✈ Safety Monitoring
  – Continuous Monitoring Approach

✈ Implementation
  – Runway Safety

✈ Collaboration
  – States, Regional and International Organizations, Learning Institutions, etc.

Safety Management Guidance Material
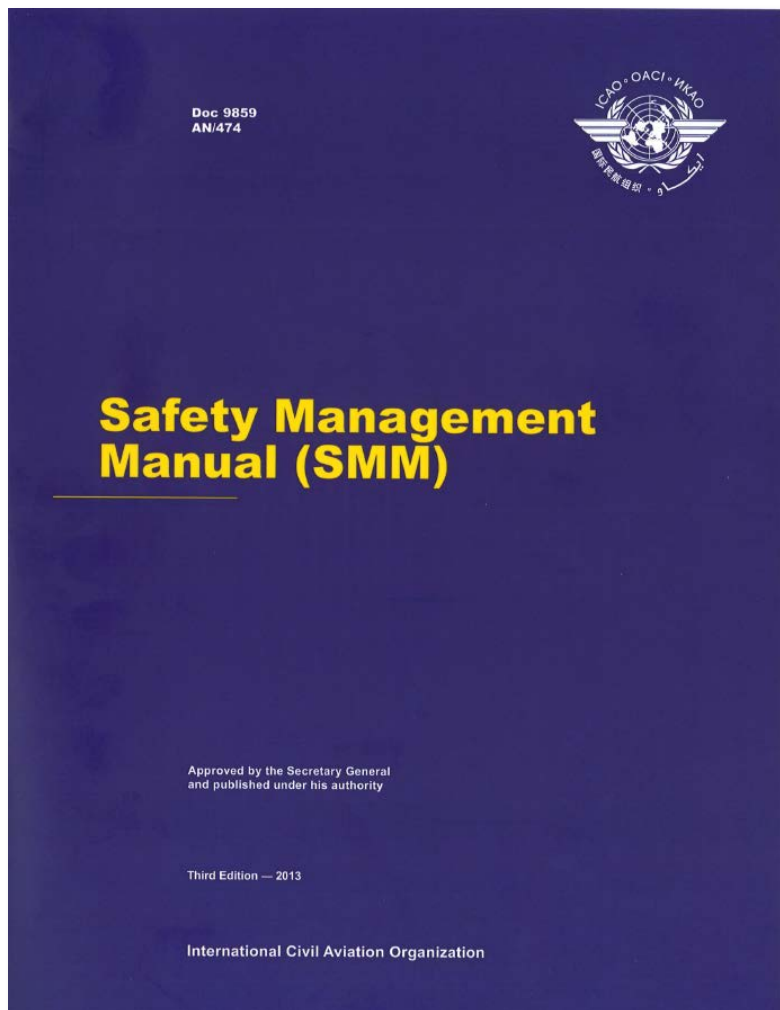
→ Safety Management Manual - Doc 9859

→ Third Edition – 2013

→ Detailed guidance for SMS / SSP implementation

International Standards
and Recommended Practices

Annex 19
to the Convention on
International Civil Aviation

Safety Management

This edition incorporates all amendments
adopted by the Council prior to 11 March 2006
and supersedes, on 23 November 2006, all previous
editions of Annex 1.

For information regarding the applicability
of the Standards and Recommended Practices,
see Foreword.

International Civil Aviation Organization

✈ Two phased process:

– Reorganization of existing SARPs and supporting guidance material

– In-depth review of SARPs to assess whether they need to be amended or expanded

GLOBAL AVIATION SAFETY PLAN

International Civil Aviation Organization

Visit: www.icao.int/

GASP

Global Aviation Safety Plan - GASP

→ High-level policy planning and implementation document guiding complementary and sector-wide air transport progress in conjunction with the ICAO Global Air Navigation Plan (GANP)

→ Global Plans define the means and targets by which ICAO, States and aviation stakeholders can anticipate and efficiently manage air traffic growth while proactively maintaining or increasing safety

Global Aviation Safety Plan – GASP cont.

→ Assist ICAO States and regions in their aviation safety policy, planning and implementation activities in several ways:

- Sets out the global air navigation safety objectives including specific milestones and priorities to be addressed by State and regional aviation safety planners

- Provides a familiar planning framework to assist States and regions to make improvements in safety through the use of the four Safety Performance Enablers: standardization, collaboration, resources and safety information exchange

- Outlines implementation strategies and best practice guidance material to assist States and regions in their efforts to tailor State and regional solutions to address the global objectives and priorities

GASP

Target Date	Broad Objective
Near-Term (by 2017)	Implementation of an effective safety oversight system
Mid-Term (by 2022)	Full implementation of the ICAO State safety programme framework
Long-Term (by 2027)	Advanced safety oversight system including predictive risk management

3. Safety Management Fundamentals

TECHNICAL FACTORS

HUMAN FACTORS

ORGANIZATIONAL FACTORS

TODAY

1950s   1970s   1990s   2000s

Organization — Workplace — People — Defences — Accident

Management decisions and organizational processes

Working conditions

Errors and violations

Technology
Training
Regulations

Latent conditions trajectory
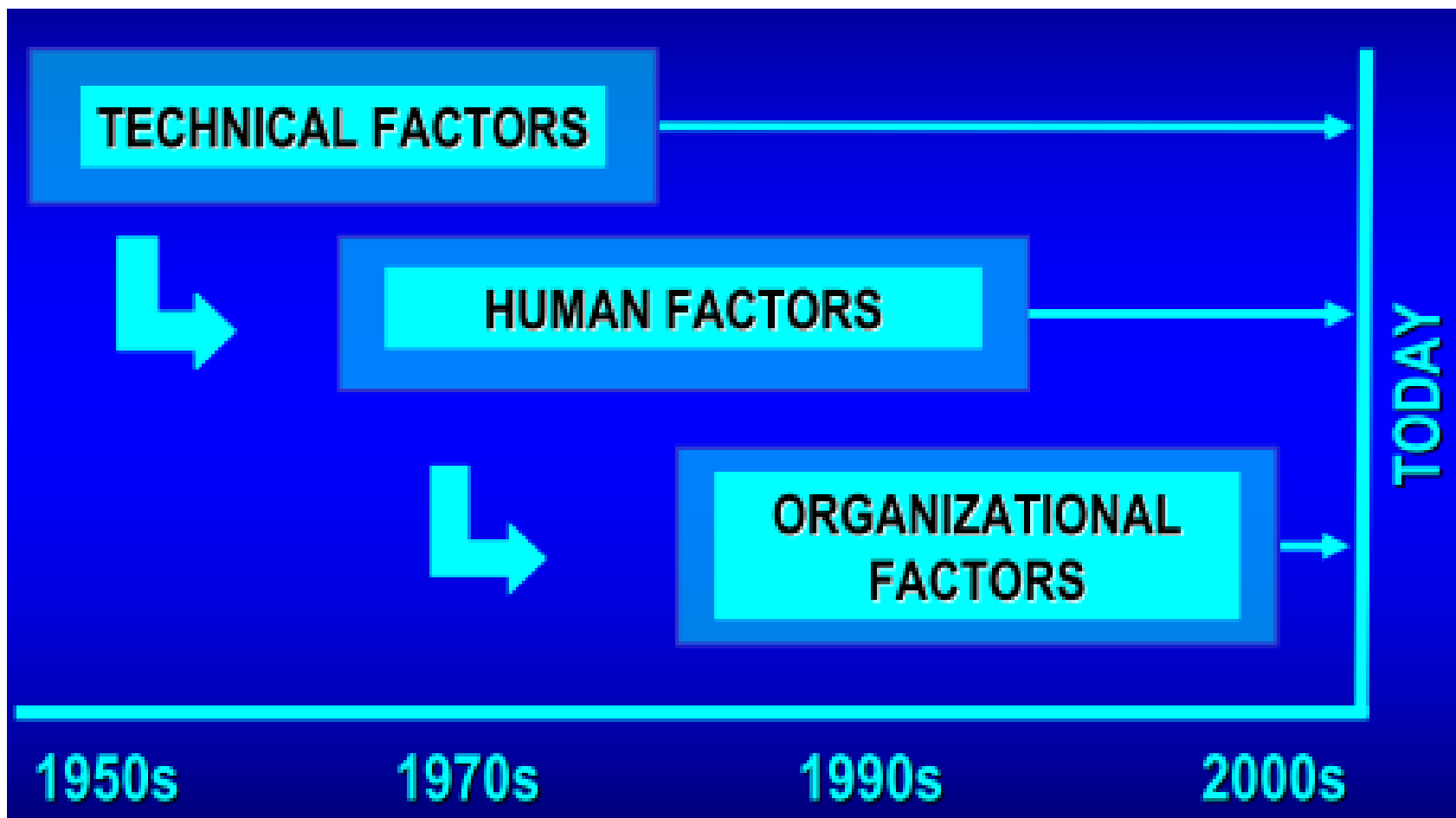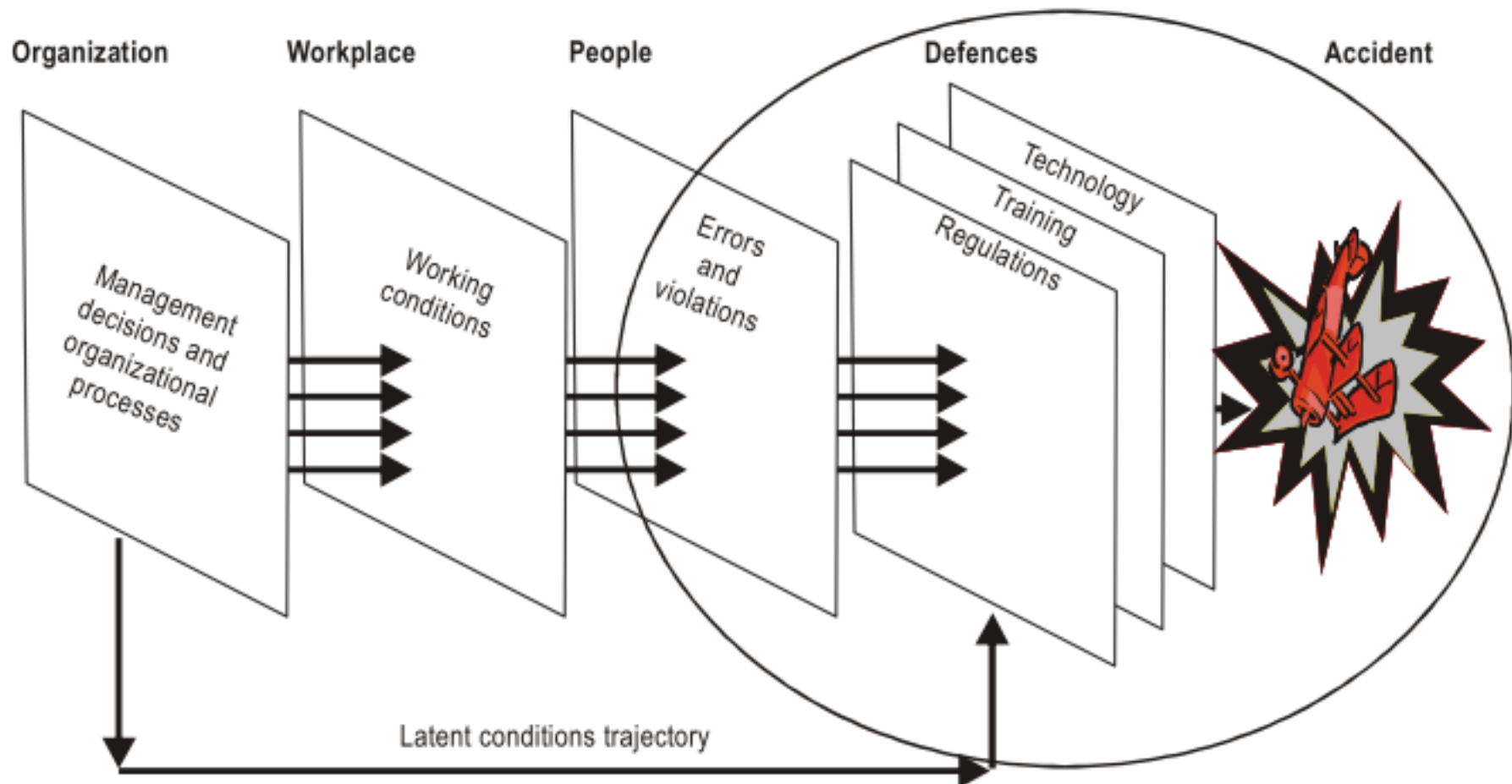
The organizational accident
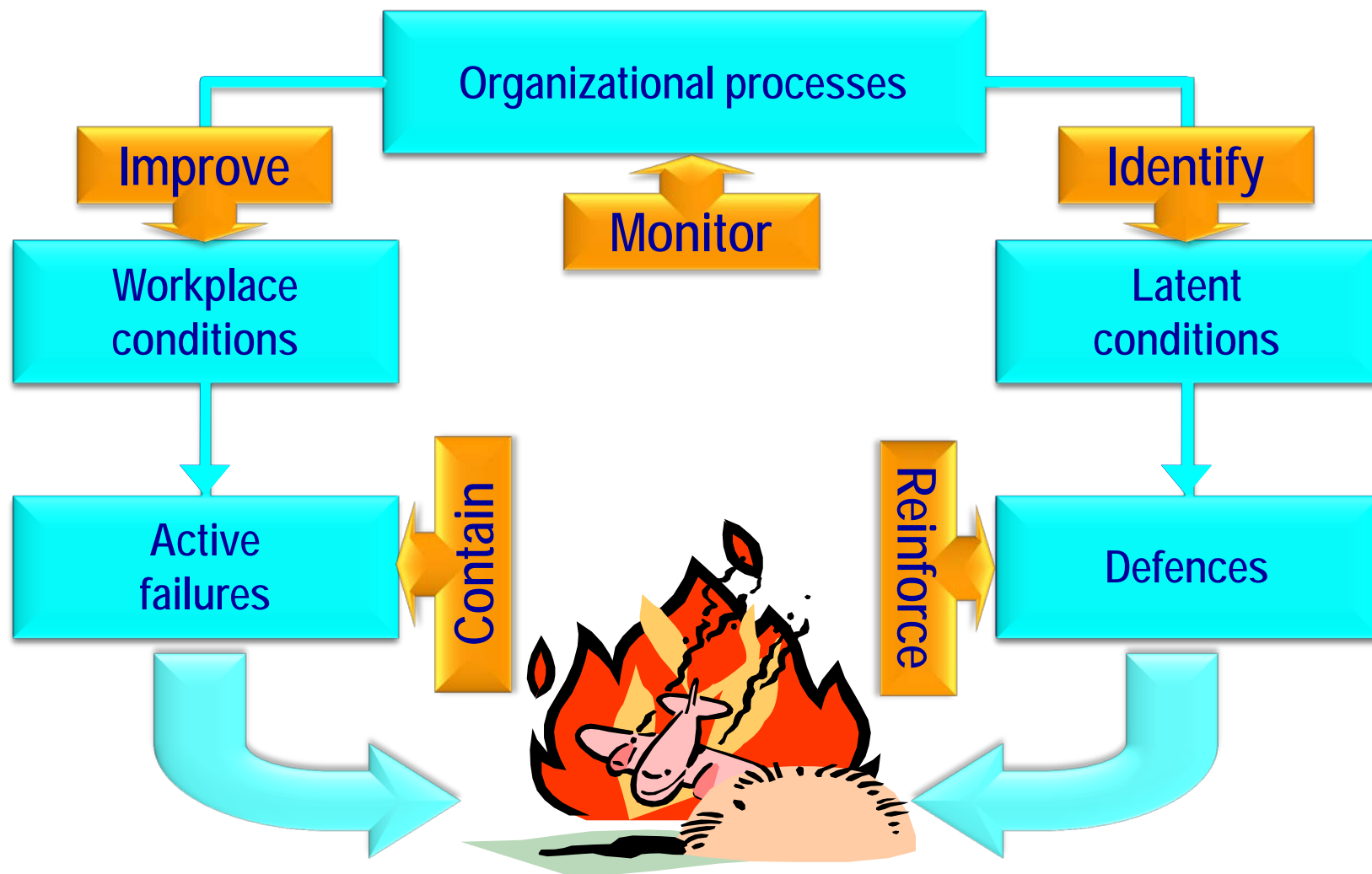
The practical drift
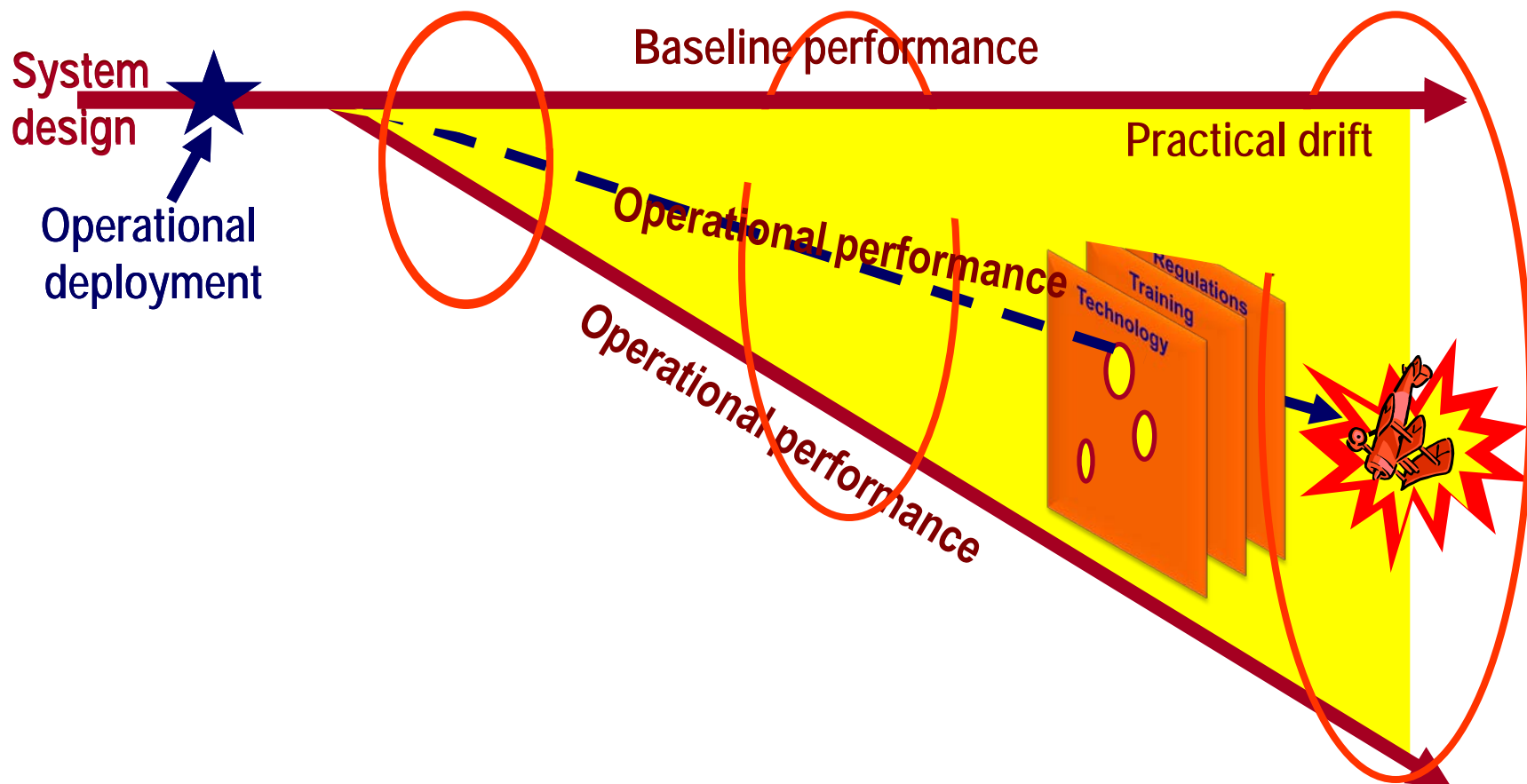
Workplace interaction

→ Aviation workplaces involve complex interrelationships among components

→ To understand operational performance, we must understand the interrelationship among components of the work place

SHEL MODEL

Software (S) (procedures, training, support, etc.); Hardware (H) (machines and equipment); Environment (E) (the operating circumstances in which the rest of the L-H-S system must function); and Liveware (L) (humans in the workplace)

Errors and Violations

→ Error: An action or inaction by an operational person that leads to deviations from organizational or the operational person's intentions or expectations

→ Violation: a deliberate act of willful misconduct or omission resulting in a deviation from established regulations, procedures, norms or practices

Safety Culture

→ **National culture** differentiates the characteristics of particular nations

→ **Organizational culture** refers to the characteristics and safety perceptions among members interacting within a particular entity

→ **Professional culture** differentiates the characteristics of particular professional groups

→ **Reporting Culture** emerges from personnel beliefs and attitudes toward the benefits and potential detriments associated with reporting systems and the ultimate effect on their acceptance or utilization of such systems

Effective safety reporting – Five basic characteristics

Information
People are knowledgeable about the human, technical and organizational factors that determine the safety of the system as a whole

Flexibility
People can adapt their reporting mode when facing unusual circumstances, shifting from the established mode to a direct mode thus allowing information to quickly reach the appropriate decision-making level

Willingness
People are willing to report their errors and experiences

Effective safety reporting

Learning
People have the competence to draw conclusions from safety information systems and the will to implement major reforms

Accountability
People are encouraged (and rewarded) for providing essential safety-related information. However, there is a clear line that differentiates between acceptable and unacceptable behaviour

To achieve its production objectives

→ In order to achieve its production objectives, the management of any aviation organization requires the management of many business processes

→ Managing safety is one such business processes

→ Safety management is a core business function (financial management, HR management, etc.)

→ There is no aviation organization that has been created to deliver only safety

→ This brings a potential dilemma for management

Management levels

Protection

Production

Resources +

Catastrophe

+ **Resources**

Bankruptcy

Management levels

Protection
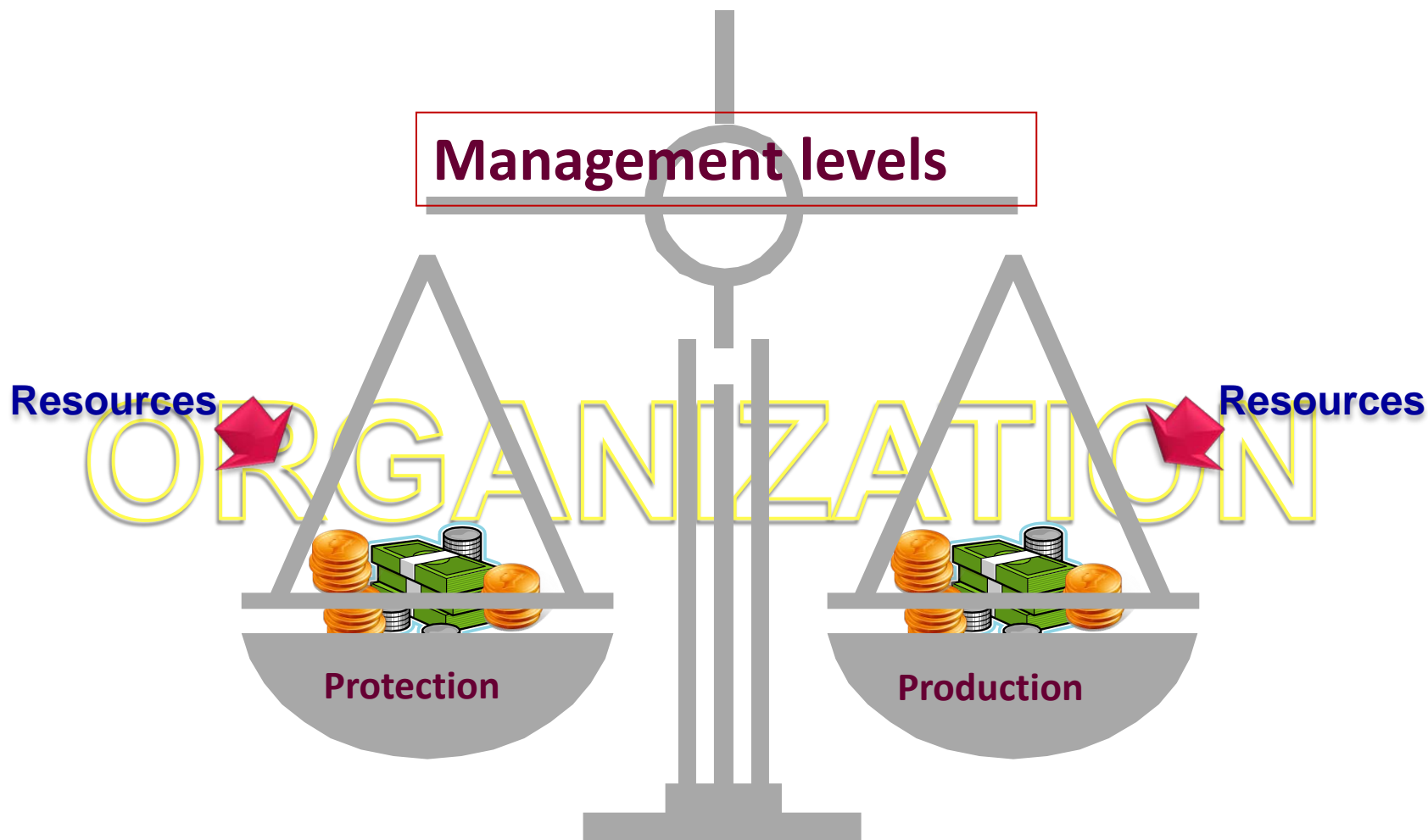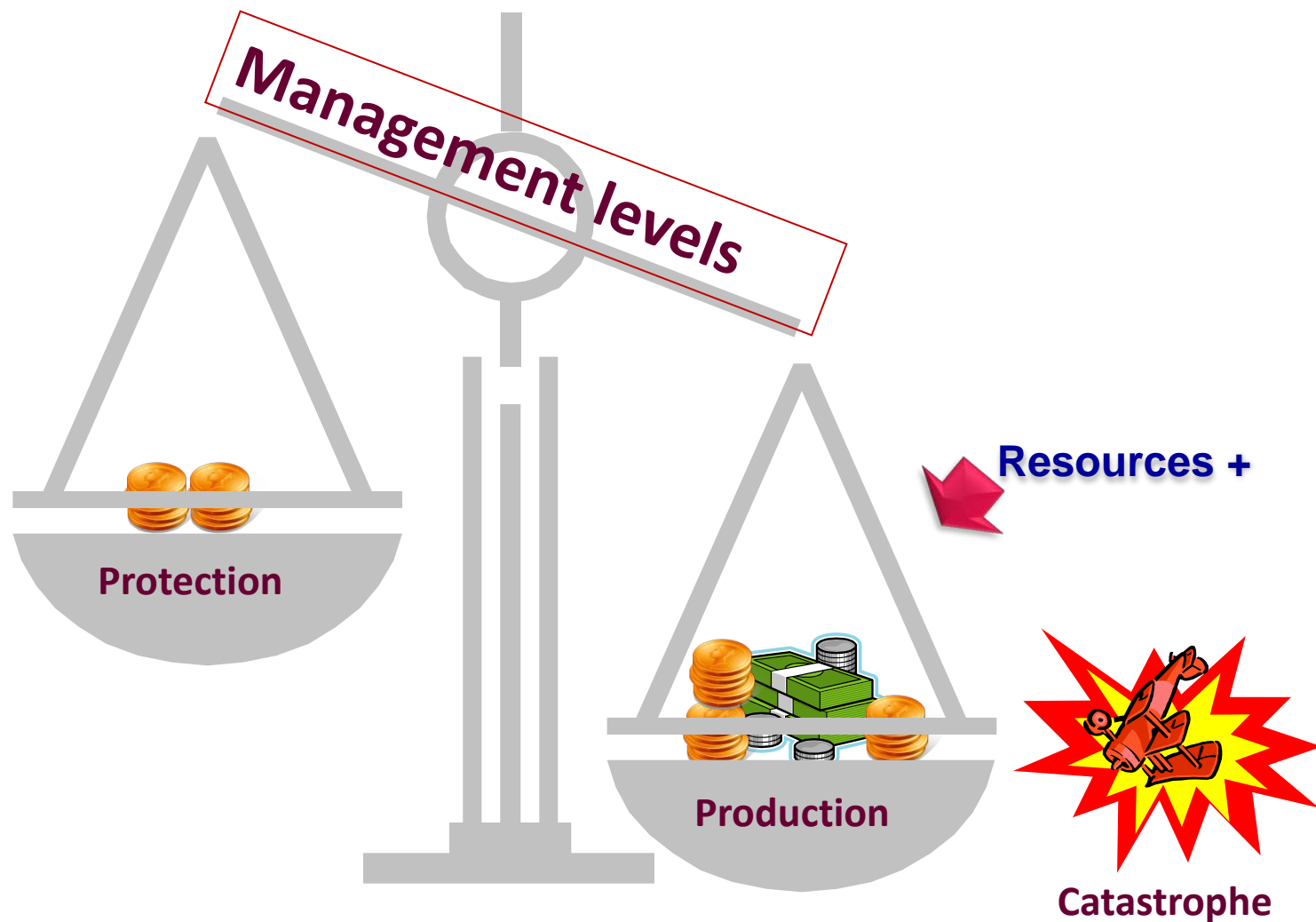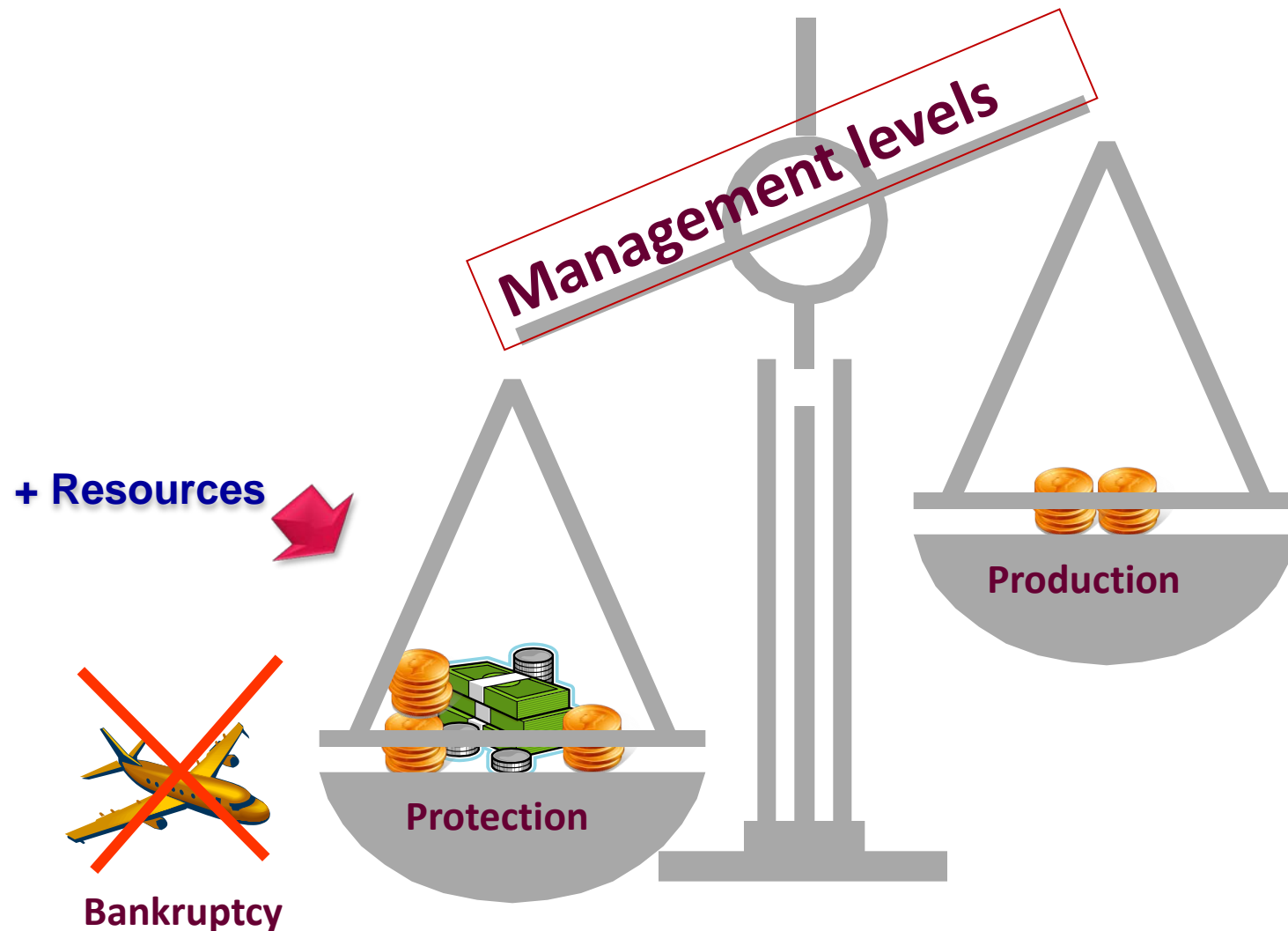
Production

Safety management – The response to the dilemma

→ Safety issues are a by-product of activities related to production/services delivery

→ An analysis of an organization's resources and goals allows for a balanced and realistic allocation of resources between protection and production goals

→ The product/service provided by an aviation organization must be delivered safely

4. ICAO SARPS

Safety Management principles

ICAO SARPS

Realistic implementation
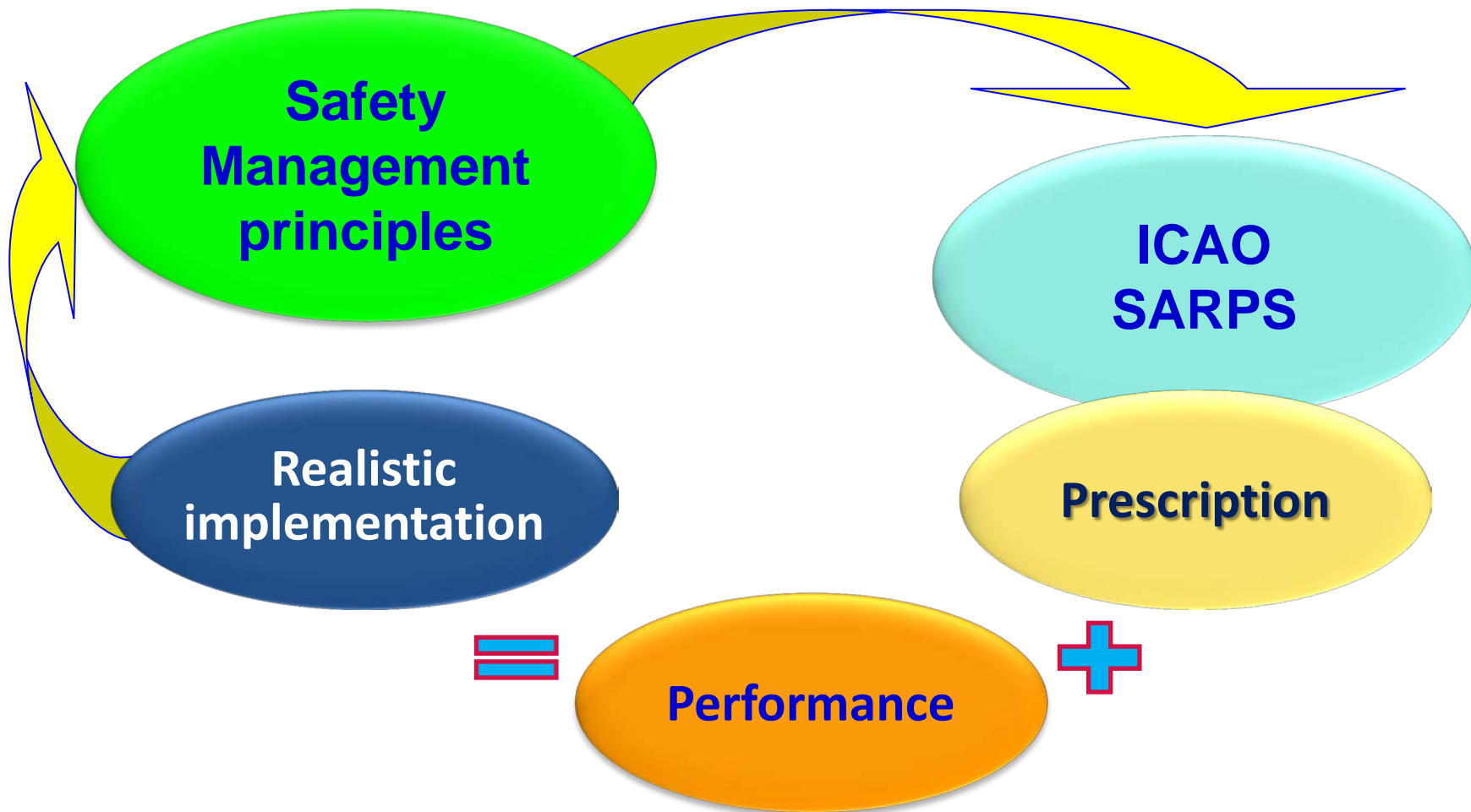
Prescription

Performance

→ **Prescriptive regulations**

- – Prescribe what the safety requirements are and how they are to be met

→ **Performance based regulations**

- – Specify the safety requirements to be met, but provide flexibility in terms of how safety requirements are met

Prescriptive & Performance based environment

Prescriptive based environment

Regulations as <u>administrative</u> controls

❖ Rigid regulatory framework

➢ Inspections

➢ Audits

✓ *Regulatory compliance*

Performance based environment

Regulations as <u>safety risk</u> controls

❖ Dynamic regulatory framework

➢ Data based identification

➢ Prioritization of safety risks

✓ *Effective safety performance*

→ **Two audience groups**

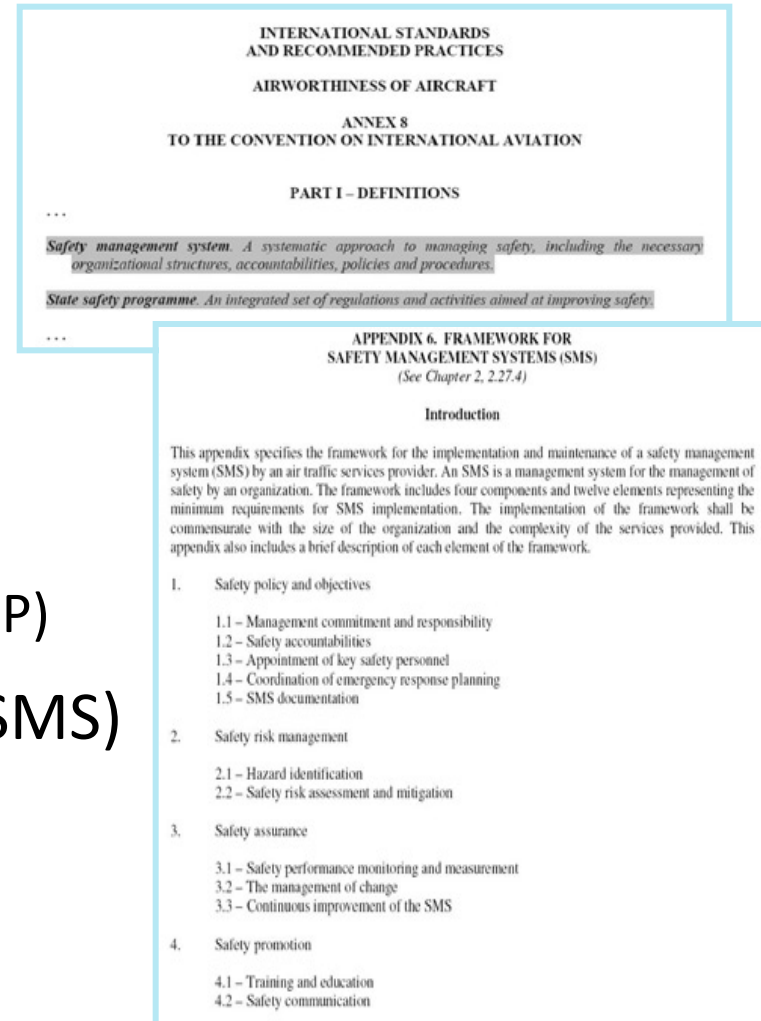– States

– Service providers

→ **Three distinct Standards**

– State safety programme (SSP)

- Acceptable level of safety (ALosP)

– Safety management system (SMS)

- Safety performance of the SMS

– Management accountability

INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

AIRWORTHINESS OF AIRCRAFT

ANNEX 8
TO THE CONVENTION ON INTERNATIONAL AVIATION

PART I – DEFINITIONS

...

Safety management system. A systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures.

State safety programme. An integrated set of regulations and activities aimed at improving safety.

...

APPENDIX 6. FRAMEWORK FOR
SAFETY MANAGEMENT SYSTEMS (SMS)
(See Chapter 2, 2.27.4)

Introduction

This appendix specifies the framework for the implementation and maintenance of a safety management system (SMS) by an air traffic services provider. An SMS is a management system for the management of safety by an organization. The framework includes four components and twelve elements representing the minimum requirements for SMS implementation. The implementation of the framework shall be commensurate with the size of the organization and the complexity of the services provided. This appendix also includes a brief description of each element of the framework.

1.   Safety policy and objectives

 1.1 – Management commitment and responsibility
 1.2 – Safety accountabilities
 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

→ States shall establish a State Safety Programme (SSP), in order to achieve an acceptable level of safety (ALosP) in civil aviation

Current SARPs for SSP / SMS

Safety Management SARPs for States		
Date	Denomination	Annex
Nov 2006	Safety Programme	6, 11,14
Nov 2010	SSP	1, 8,13
Nov 2010	SSP Framework (Attachment)	1, 6, 8,11,13,14

Safety Management SARPs for Service Providers		
Date	Denomination	Annex
Nov 2001	Safety Management Programme	11,14
Jan 2009	SMS	6, 11,14
Nov 2010	SMS	1
Nov 2010	SMS Framework (Appendix)	1, 6, 11,14
Nov 2013	SMS	8

SARPs: Standards and Recommended Practices

ICAO State Safety Programme - SSP

→ SSP provides the means to combine prescriptive and performance-based approaches to:

1. Safety rulemaking
2. Safety policy development
3. Safety oversight

→ SSP is a consequence of the growing awareness that safety management principles affect most activities of a civil aviation authority (CAA):

1. Safety rulemaking
2. Safety policy development
3. Safety oversight

CAA activities

1. **Safety rulemaking**: is based on comprehensive analyses of the State's aviation system

2. **Safety policies:** are developed based on hazard identification and safety risk management

3. **Safety oversight:** is focused towards the areas of significant safety concerns or higher safety risks

→ SSP development is based upon two management principles:

- – Safety Risk Management (SRM)
- – Safety Assurance (SA)

→ SSP is the bridge that closes the gap between:

- – Internal and external safety processes of a State
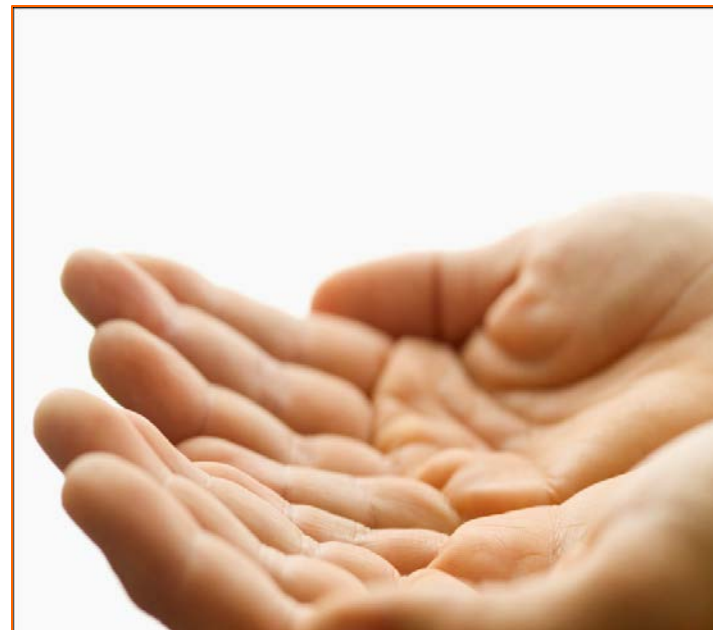- – Internal safety processes of service providers

5. Definitions and concepts

ICAO Doc 9859:

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

Safety facts

→ The elimination of accidents (and serious incidents) is unachievable

→ Failures will occur, in spite of the most accomplished prevention efforts

→ No human activity or human-made system can be guaranteed to be absolutely free from hazard and operational errors

→ Controlled safety risk and controlled error are acceptable in an inherently safe system

The traditional approach: preventing accidents

➤ Focus on outcomes (causes)

➤ Unsafe acts by operational personnel

➤ Attach blame/punish for failures to "perform safely"

➤ Address identified safety concern exclusively

➤ Regulatory compliance

Safety

The traditional approach:

→ Identifies:
  – What
  – Who
  – When

→ But not always discloses:
  – Why
  – How

Key definitions

→ **Hazard:** condition or an object with the potential to cause death, injuries to personnel, damage to equipment or structures, loss of material, or reduction of the ability to perform a prescribed function

→ **Consequence:** potential outcome(s) of the hazard

→ **Safety Risk:** the assessment, expressed in terms of predicted probability and severity, of the consequence(s) of a hazard taking as reference the worst foreseeable situation

→ **Probability:** the likelihood that an unsafe event or condition might occur

→ **Severity:** the possible effects of an unsafe event or condition, taking as reference the worst foreseeable situation

Hazard Identification Methodologies

→ **Reactive**: involves analysis of past outcomes or events. Hazards are identified through investigation of safety occurrences. Incidents and accidents are clear indicators of systems' deficiencies and therefore can be used to determine the hazards that were both contributing to the event or are latent

→ **Proactive:** involves analysis of existing or real time situations, which is the primary job of the safety assurance function with its audits, evaluations, employee reporting, and associated analysis and assessment processes. This involves actively seeking hazards in the existing processes

→ **Predictive:** involves data gathering in order to identify possible negative future outcomes or events, analyzing system processes and the environment to identify potential future hazards and initiating mitigating actions

State the generic hazard

(Hazard statement)

➢ Airport construction
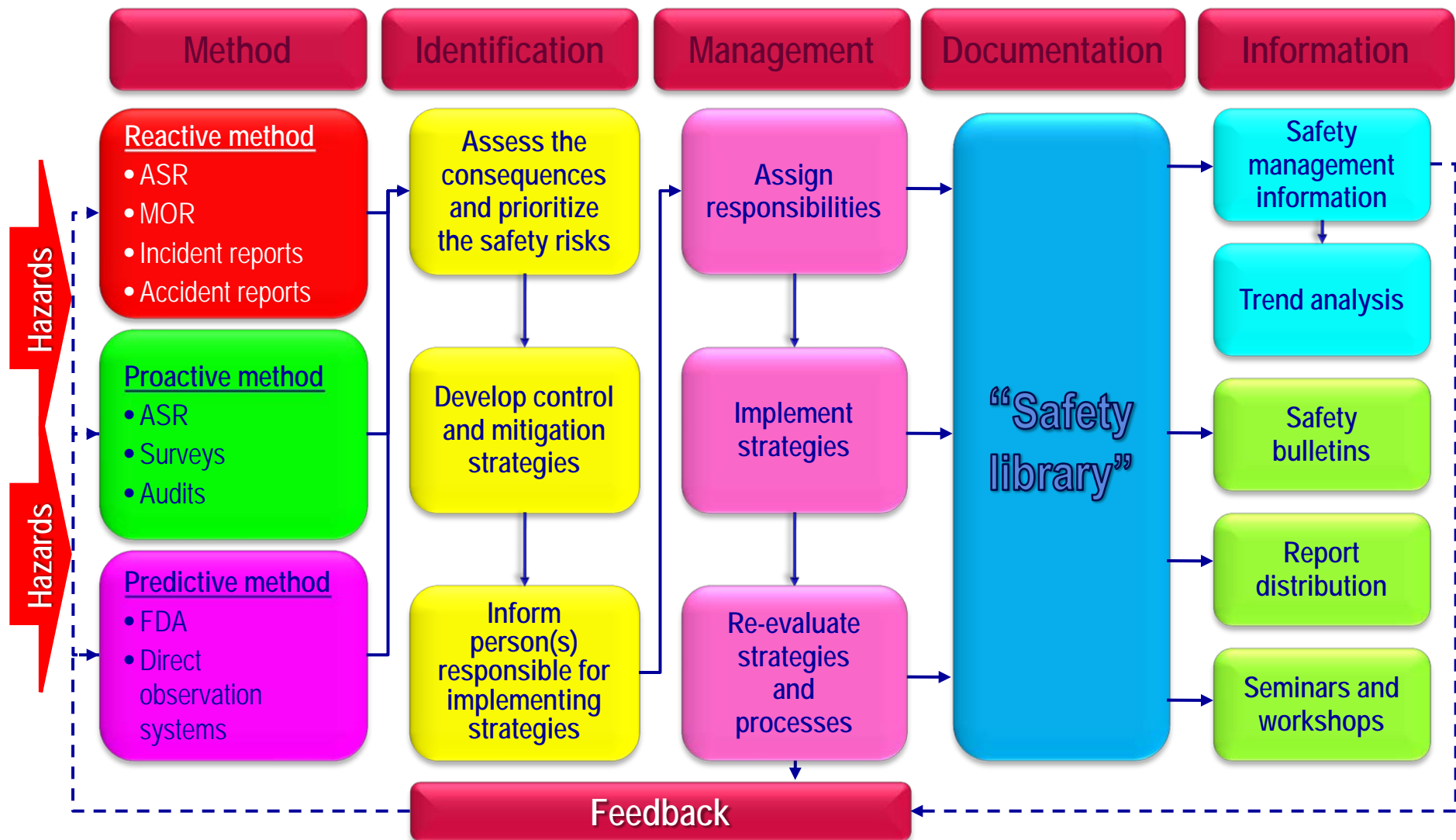
Identify specific components of the hazard

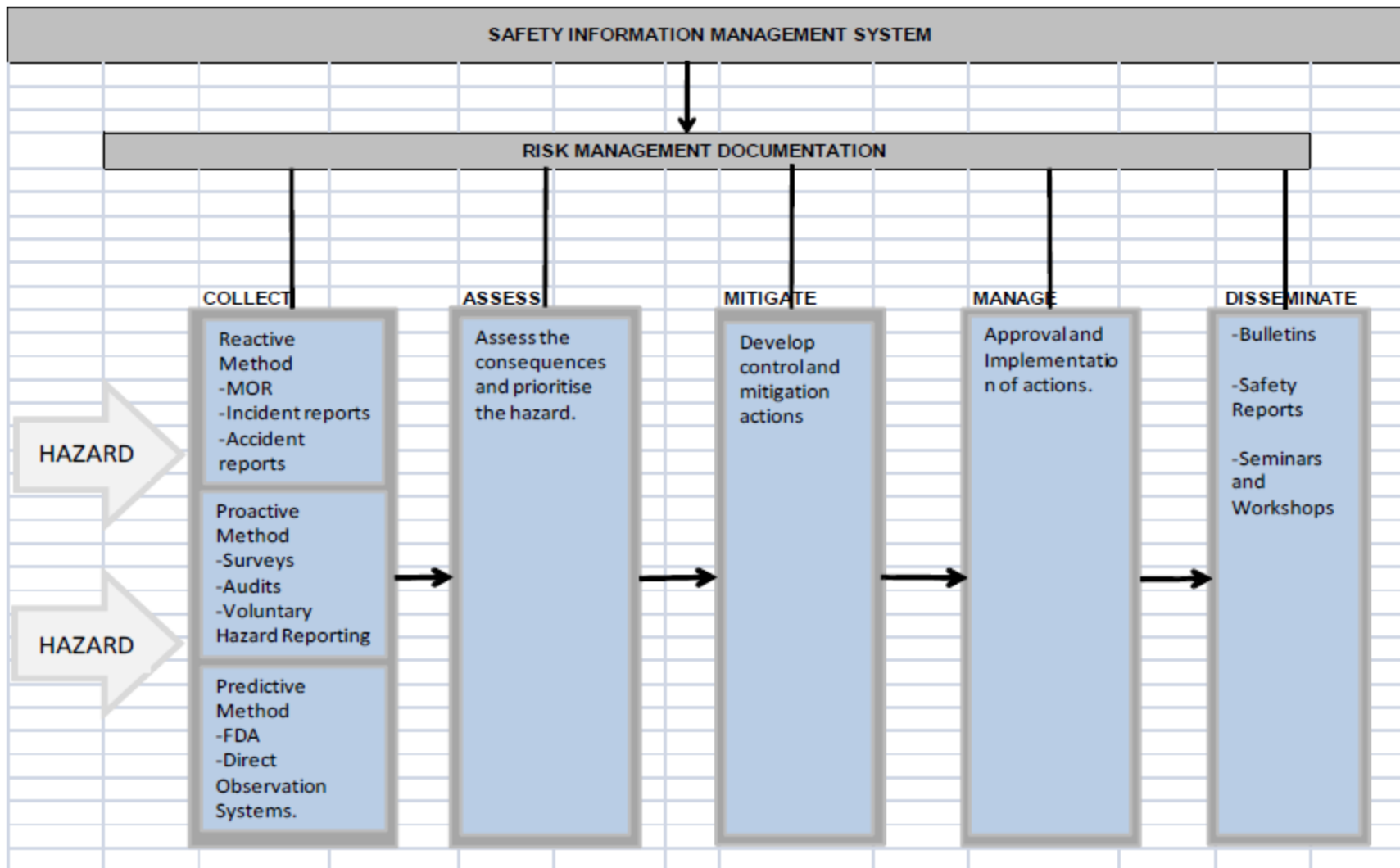➢ Construction equipment
➢ Closed taxiways
➢ Etc.

Naturally leading to specific consequence(s)

➢ Aircraft colliding with construction equipment
➢ Aircraft taking wrong taxiway
➢ Etc.

Method	Identification	Management	Documentation	Information

Hazards

Reactive method
- ASR
- MOR
- Incident reports
- Accident reports

Proactive method
- ASR
- Surveys
- Audits

Predictive method
- FDA
- Direct observation systems

Assess the consequences and prioritize the safety risks

Develop control and mitigation strategies

Inform person(s) responsible for implementing strategies

Assign responsibilities

Implement strategies

Re-evaluate strategies and processes

"Safety library"

Safety management information

Trend analysis

Safety bulletins

Report distribution

Seminars and workshops

Feedback

Hazard documentation & follow-up risk management process

→ Safety risk is the projected likelihood and severity of the consequences or outcomes from an existing hazard or situation

Safety Risk Probability

→ Safety risk probability is defined as the likelihood or frequency that a safety consequence or outcome might occur.

→ Safety risk severity is defined as the extent of harm that might reasonably occur as a consequence or outcome of the identified hazard

Safety Risk Tolerability

→ Describes the tolerability criteria for the particular organization

Suggested criteria	Assessment risk index	Suggested criteria
Intolerable region	5A, 5B, 5C, 4A, 4B, 3A	Unacceptable under the existing circumstances
Tolerable region	5D, 5E, 4C, 4D 4E, 3B, 3C, 3D 2A, 2B, 2C, 1A	Acceptable based on risk mitigation. It may require management decision.
Acceptable region	3E, 2D, 2E 1B, 1C, 1D, 1E	Acceptable

Safety risk management (SRM)

→ Definition:

  – The analysis and elimination, and/or mitigation to an acceptable level of the safety risks of the consequences of identified hazards

→ Objective:

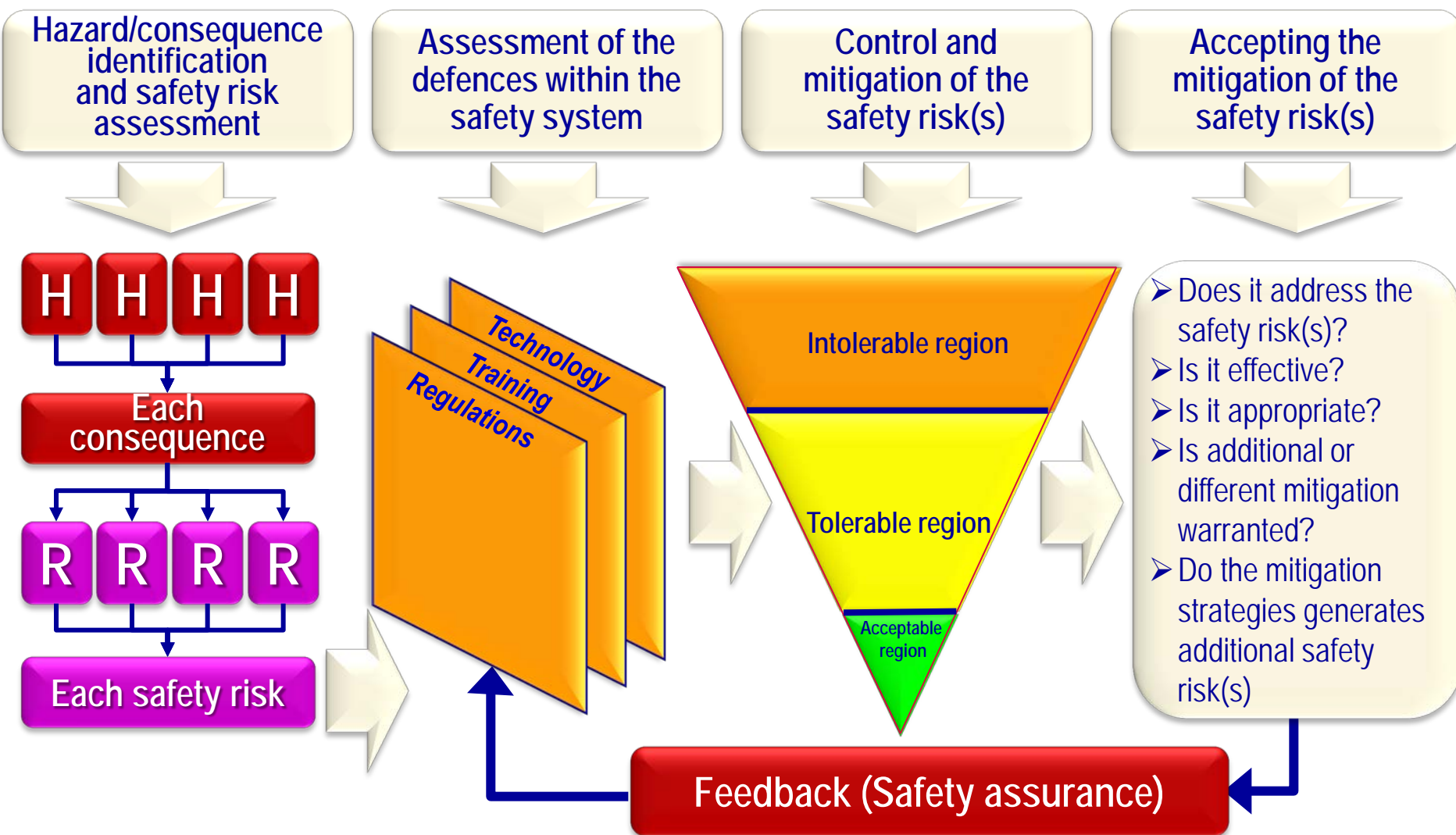 – A balanced allocation of resources to address all safety risks and viable safety risks control and mitigation

→ Importance:

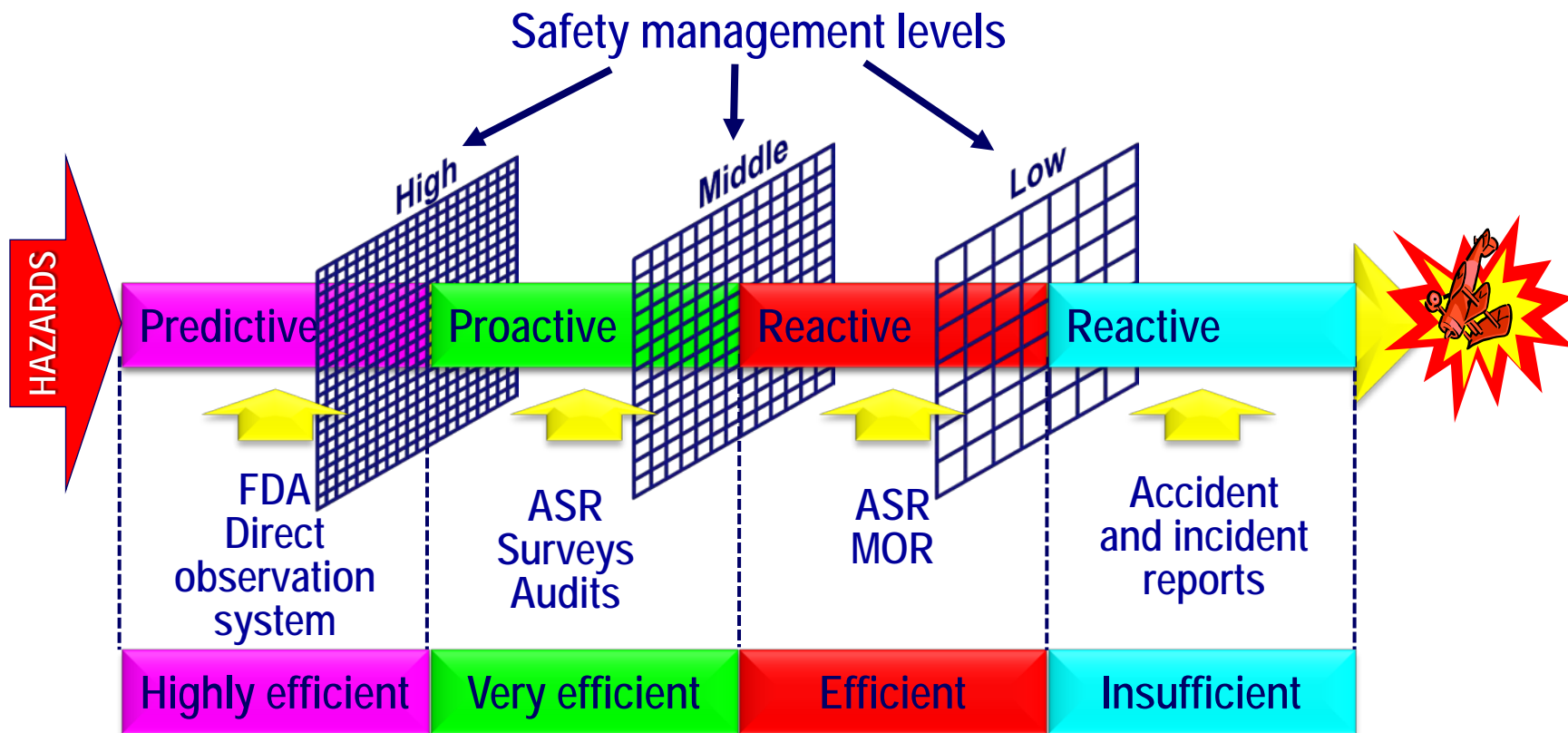 – Data-driven approach to safety resources allocation, thus defensible and easier to explain

Safety risk assessment matrix

Safety risk probability		Safety risk severity				
		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 mitigation at a glance

Hazard/consequence identification and safety risk assessment	Assessment of the defences within the safety system	Control and mitigation of the safety risk(s)	Accepting the mitigation of the safety risk(s)

H H H H

Each consequence

R R R R

Each safety risk

Technology
Training
Regulations

Intolerable region

Tolerable region

Acceptable region

- Does it address the safety risk(s)?
- Is it effective?
- Is it appropriate?
- Is additional or different mitigation warranted?
- Do the mitigation strategies generates additional safety risk(s)

Feedback (Safety assurance)

> ✈ It is the minimum degree of safety that must be assured by a system in actual practice

Another key concepts

→ **Level of safety:** degree of safety of a system, representing the quality of the system, safety-wise, expressed through safety indicators

→ **Safety indicators:** parameters that characterize and/or typify the level of safety of the system

→ **Value of safety indicators:** quantification of a safety indicator

→ **Safety targets:** concrete objectives to be achieved

→ **Value of safety targets:** quantification of a safety target

Selection of safety indicators

→ The selection of appropriate safety indicators is:

- An essential foundation for the development and implementation of ALosP

- A function of the detail to which the level of safety of the system is to be represented

→ Meaningful safety indicators must be representative of the elements that characterize system safety

A fundamental differentiation

→ Safety measurement
  – Not a continuous process
  – A spot check
  – Conducted following pre-specified timeframes

→ Safety performance measurement
  – Continuous process
  – Monitoring and measurement of selected operational activities necessary for the provision of services

Safety measurement

→ Strategic and generally associated to the SSP

→ Quantification of outcomes of selected high-level or high-consequence events

- Accident rates
- Serious incident rates

→ Quantification of selected high-level State functions

- Development/absence of primary aviation legislation
- Development/absence of operating regulations
- Level of regulatory compliance

→ A measure of achievement of high-level safety objectives of safety interventions and/or mitigations strategies

➔ Tactical and generally associated to an SMS

➔ Quantification of the outcomes of selected low-level, low- consequence processes

➔ A measure of the actual performance of safety interventions and/or mitigation strategies, beyond accident rates and regulatory compliance

Basic safety management SARPs

→ ALosP to be achieved shall be established by the State

→ When establishing ALosP, consideration must be given to:

- The level of safety risk that applies
- The safety risk tolerance
- The cost/benefits of improvements to the aviation system
- The public expectations in civil aviation system

→ Values of safety indicators and safety targets

- Initial ALosP: quantitative action statements on
  - High level/high consequence outcomes (safety measurement)

- Mature ALosP: quantitative action statements on
  - High level/high consequence events (safety measurement)
  - Low level/low consequence outcomes (safety performance measurement)

→ Once States develop safety data collection and analysis capabilities under the Safety Assurance component of the SSP, ALoSP should reflect a combination of:

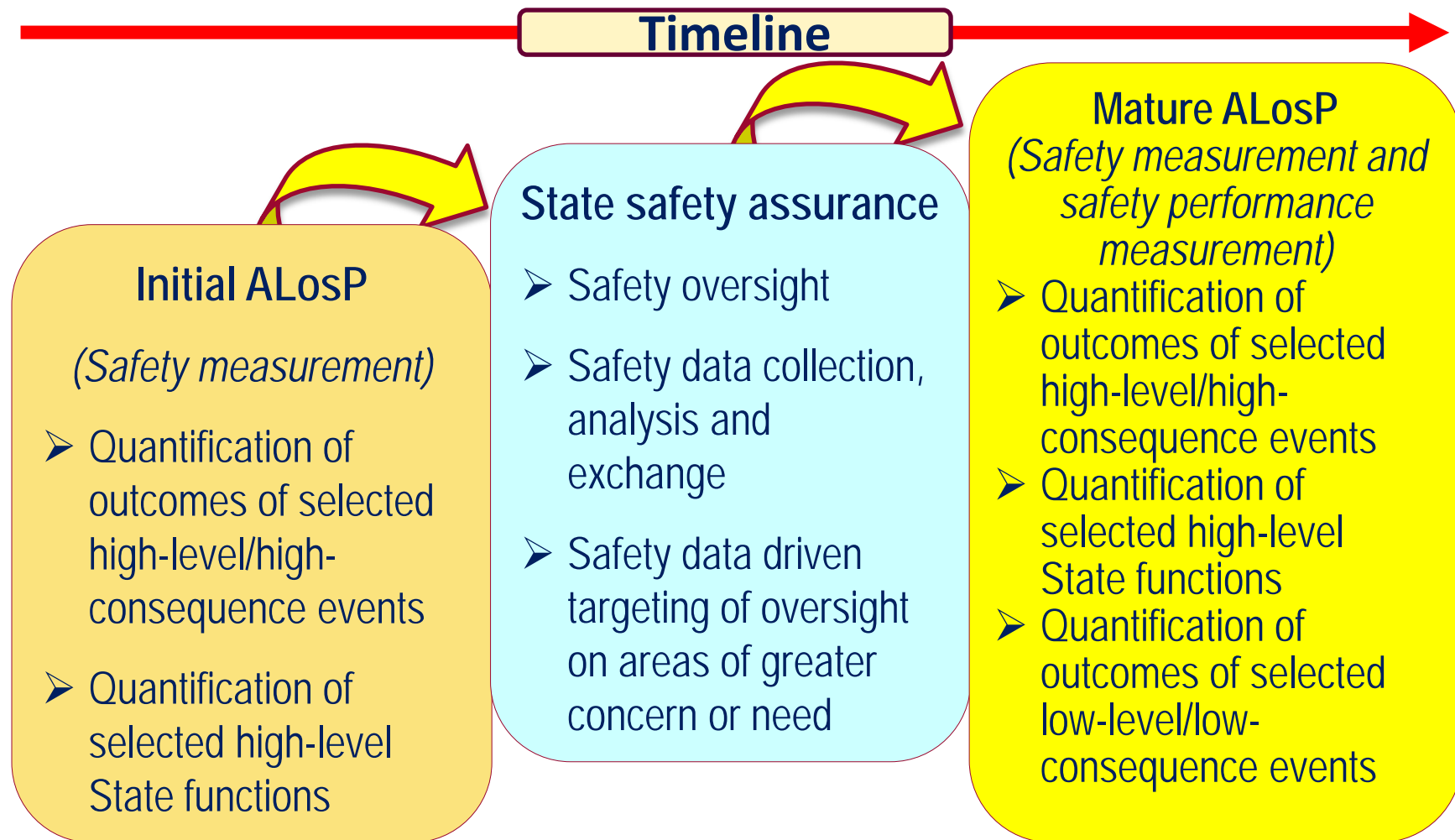- Safety measurement
- Safety performance measurement

ALoSP – Legal considerations

→ Establishing ALoSP related to the SSP:

- Does not replace legal, regulatory, or other already established requirements, but it must support compliance with them

- Leaves unaffected the obligations of States, and does not relieve States from compliance with SARPs
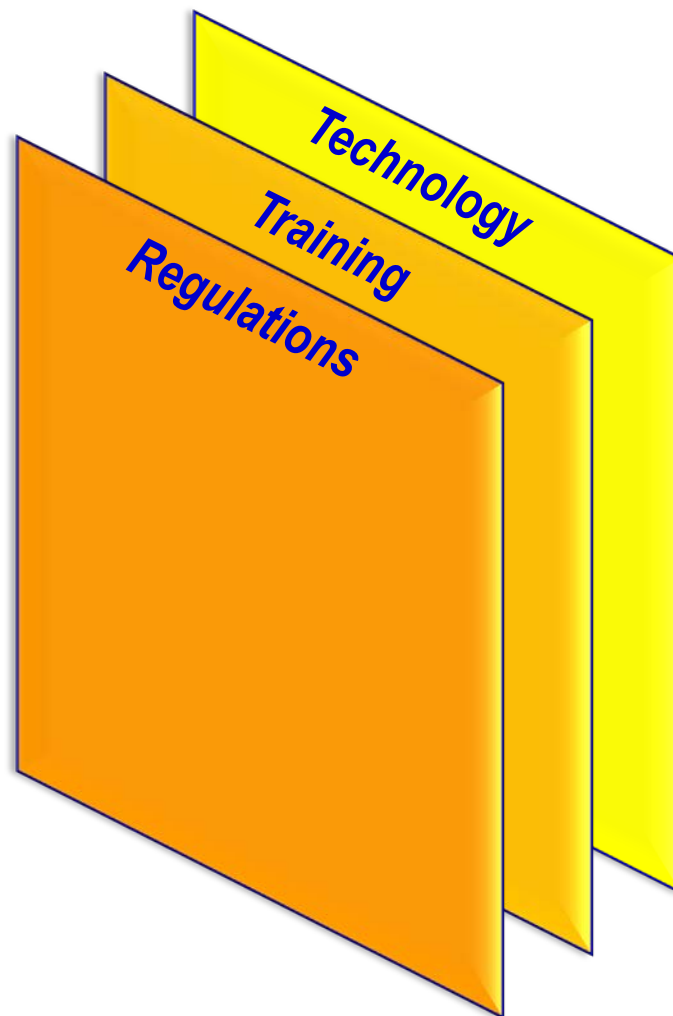
Timeline

Initial ALosP

(Safety measurement)

➤ Quantification of outcomes of selected high-level/high-consequence events

➤ Quantification of selected high-level State functions

State safety assurance

➤ Safety oversight

➤ Safety data collection, analysis and exchange

➤ Safety data driven targeting of oversight on areas of greater concern or need

Mature ALosP

(Safety measurement and safety performance measurement)

➤ Quantification of outcomes of selected high-level/high-consequence events

➤ Quantification of selected high-level State functions

➤ Quantification of outcomes of selected low-level/low-consequence events

→ Tools and means to deliver the safety targets of an SSP:

– Regulations

– Training

– Technology

Technology

Training

Regulations

September 2013

Initial ALosP

Service providers

SMS

Airport N° 1

Airport N° 2

Airport N° 3

Exchange of protected safety data

State Civil Aviation Authority

State Civil Aviation Authority

Safety data collection **processing system**

Protected safety data

➢ Capture

➢ Storage

➢ Process

➢ Analysis

Initial ALosP

State accepts and oversees individual service providers' SMS

STATE

SSP (ALoSP)

SMS

Set of activities

ATS Service provider	Aerodrome operator	Aircraft operator N° 1	AMO	Training organization
SMS	SMS	SMS	SMS	SMS
Safety performance	Safety performance	Safety performance	Safety performance	Safety performance

State agrees and supervises individual service provider's SMS safety performance

Set of activities

Safety performance	Safety performance	Safety performance	Safety performance	Safety performance
SMS	SMS	SMS	SMS	SMS
Aircraft operator N° 2	Aerodrome operator	Training organization	ATS Service provider	AMO

State accepts and oversees individual service providers' SMS

5. SSP and ICAO SARPs

→ SSP is an integrated set of regulations and activities aimed at improving safety

➔ States shall establish the SSP in order to achieve an acceptable level of safety (ALosP)

➔ ALosP will be set by the State

➔ SSP is a management system for the management of safety by the State

→ The implementation of an SSP must be commensurate with the size and complexity of the State's aviation system

✈ Requires coordination among multiple authorities responsible for individual elements of civil aviation functions in the State

→ **Responsibilities:** are functions and duties which describe the safety purpose of what an individual is required to do, with regard to the operation of the SSP

→ **Accountabilities:** are statements of what an individual is required to deliver, either directly or through supervision and management of others, including those to whom the individual has delegated responsibility, with regard to the operation of the SSP

Accountable person in an SSP

→ Shall have administrative responsibility and accountability for the implementation, coordination and maintenance of the SSP, and:

- Final authority on issues related to the allocation of resources within the State aviation organization that has been designated as the placeholder for the SSP

- Authority over service provider's certificate management aspects

- Responsibility for the coordination of the resolution of State's aviation safety issues under the SSP

→ The SMS is a systematic approach to managing safety, including the organizational structures, accountabilities, policies and procedures
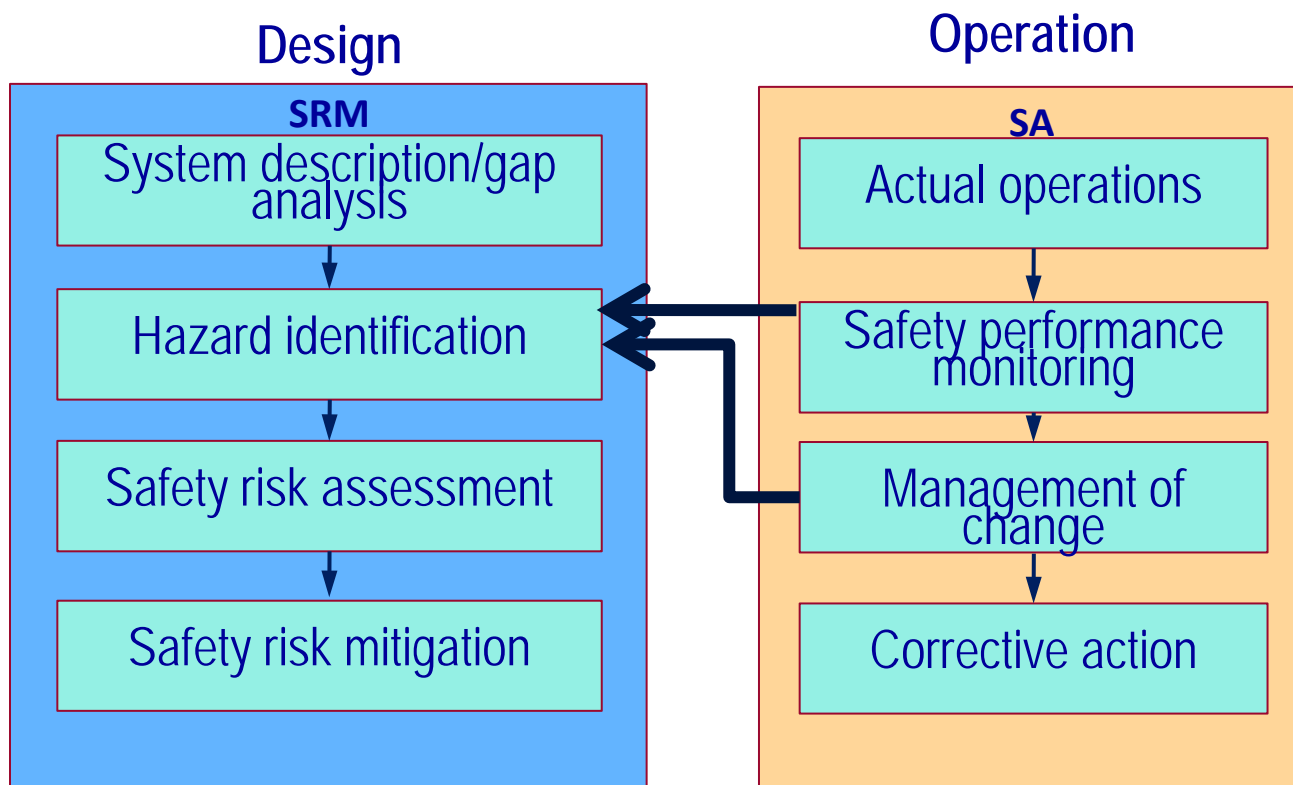
→ That a service provider implement the SMS acceptable to the State that:

- Identifies safety hazards

- Ensures the implementation of remedial action necessary to maintain agreed safety performance

- Provides for continuous monitoring and regular assessment of the safety performance

- Aims at a continuous improvement of the overall performance of the safety management system

SMS

→ A system to assure the safe operation of aircraft through effective management of safety risk

→ Designed to continuously improve safety by identifying hazards, collecting and analyzing data and continuously assessing safety risks

→ Seeks to proactively contain or mitigate risks before they result in aviation accidents and incidents

→ Commensurate with the organization's regulatory obligations and safety goals

Safety Risk Management (SRM) & Safety Assurance (SA)

→ SMS is necessary for an aviation organization to identify hazards and manage safety risks encountered during the delivery of its products or services

→ Service providers are responsible for establishing the SMS

→ States are responsible for the acceptance and oversight of service providers' SMS

Service providers and SMS

Organizations that are required to implement the SMS:

– Approved training organizations that are exposed to safety risks during the provision of their services

– Aircraft operators

– Approved maintenance organizations

– Organizations responsible for design and/or manufacture of aircraft

– Air traffic services providers

– Certified aerodromes

# Quality Management System & SMS

| QMS	SMS
Quality	Safety
Quality assurance	Safety assurance
Quality control	Hazard identification & Risk control
Quality culture	Safety culture
Compliance to requirements	Acceptable level of safety performance
Prescriptive	Performance-based
Standards & specifications	Organizational & human factors
Reactive > Proactive	Proactive > Predictive

→ The SMS shall clearly define lines of safety accountability throughout a service provider organization, including a direct accountability for safety on the part of senior management

(Accountability: Obligation or willingness to account for one's actions)

Basic safety management SARPs
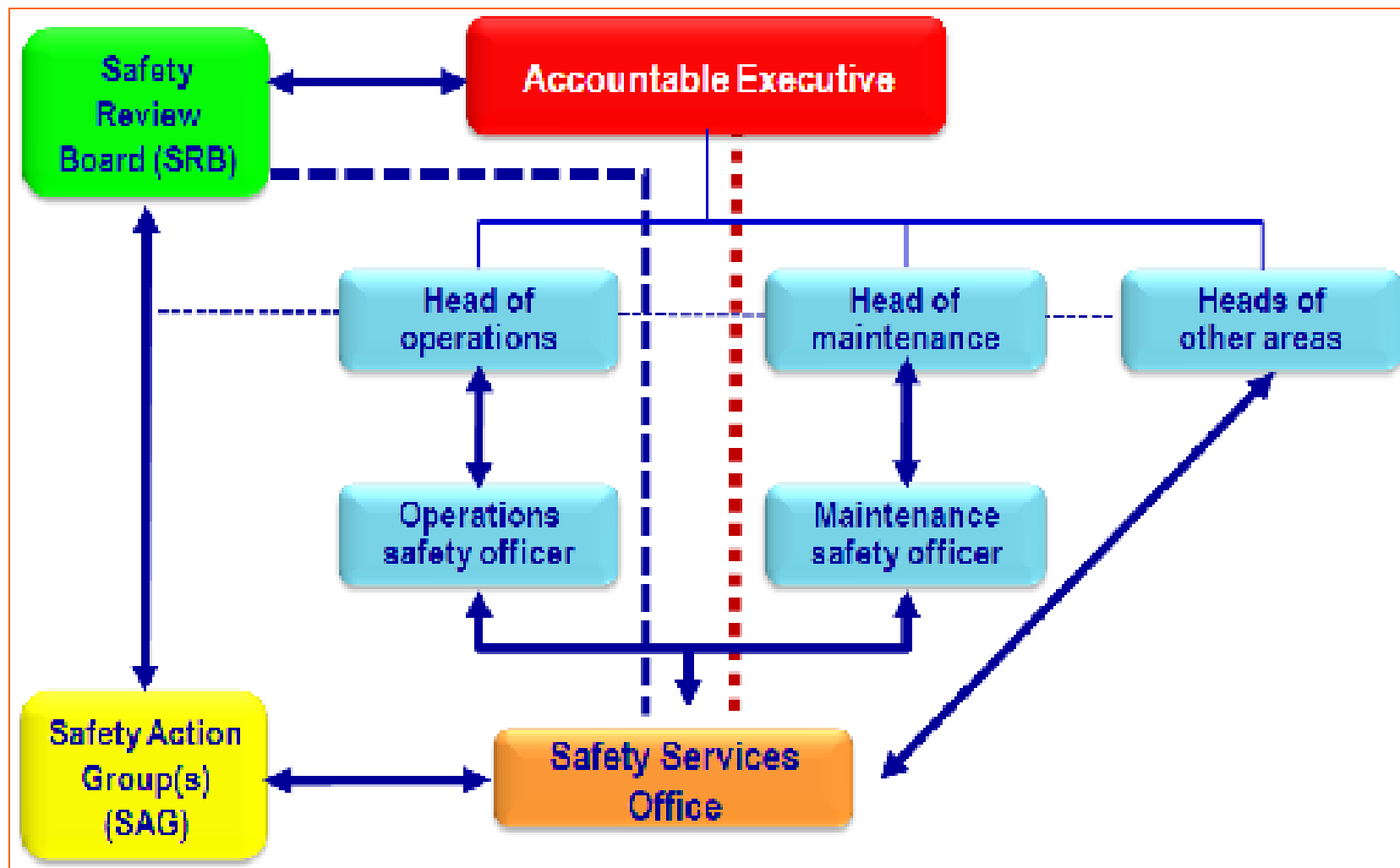
SSP – SMS relationship
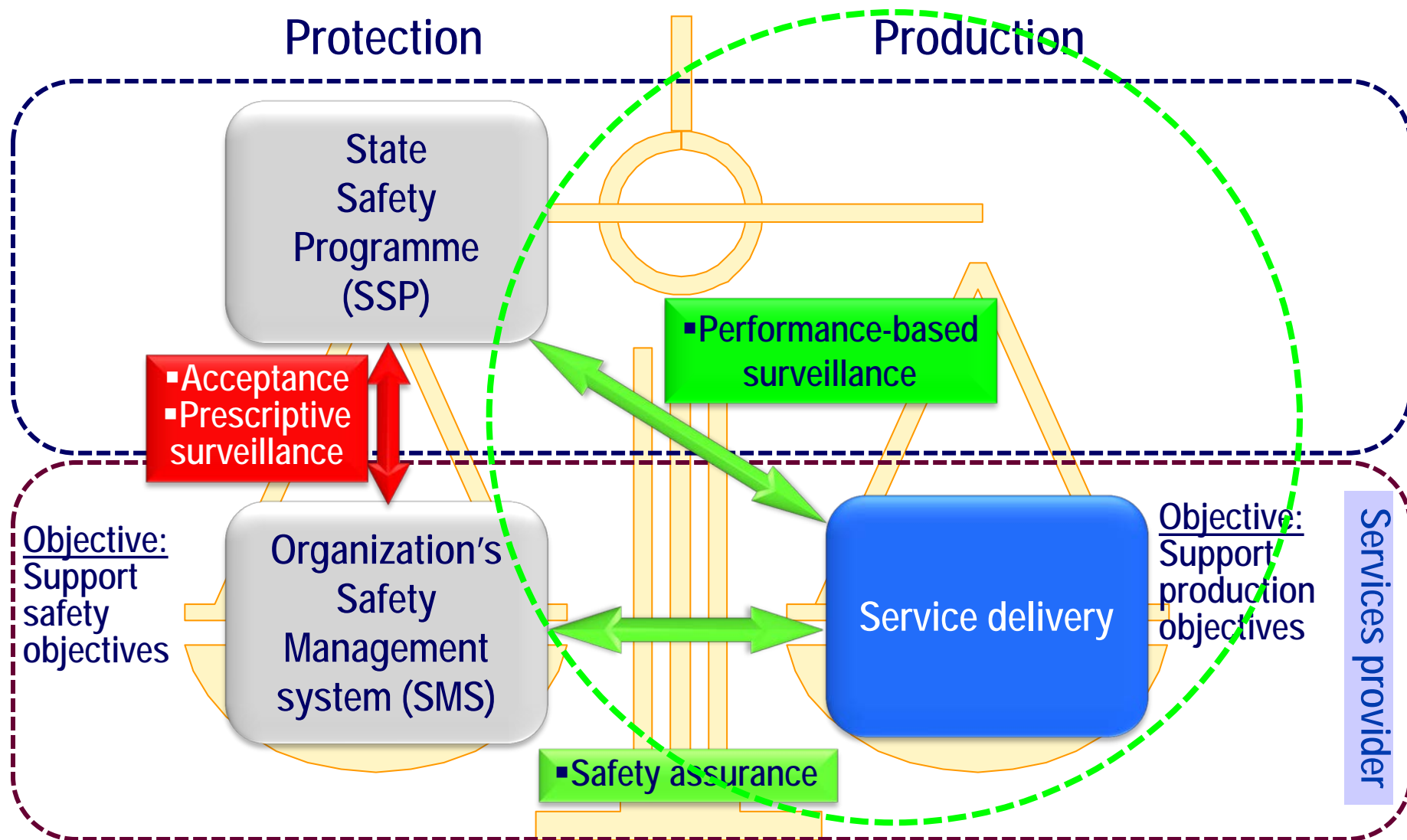
Summary

States:	Service providers:

→ States shall establish a State safety programme (SSP), in order to achieve an acceptable level of safety (ALoSP) in civil aviation
 	
→ ALoSP to be achieved shall be established by the State
	➢ States shall require, as part of their SSP, that a service provider implement an SMS acceptable to the State that:
	
	  ➢ Identifies safety hazards
	
	  ➢ Ensures the implementation of remedial action necessary to maintain agreed safety performance
	
	  ➢ Provides for continuous monitoring and regular assessment of the safety performance
	
	  ➢ Aims at a continuous improvement of the overall performance of the safety management system

6. The ICAO SSP framework

Core operational activities of an SSP

- → State safety risk management (SRM)
- → State safety assurance (SA)

→ Take place under the umbrella provided by:

  − State safety policy and objectives

  − Supported by the State safety promotion

The ICAO SSP framework

1. **State safety policy and objectives**
   1.1 State safety legislative framework
   1.2 State safety responsibilities and accountabilities
   1.3 Accident and incident investigation
   1.4 Enforcement policy
2. **State safety risk management**
   2.1 Safety requirements for service provider's SMS
   2.2 Agreement on the service provider's safety performance
3. **State safety assurance**
   3.1 Safety oversight
   3.2 Safety data collection, analysis and exchange
   3.3 Safety data-driven targeting of oversight on areas of greater concern or need
4. **State safety promotion**
   4.1 Internal training, communication and dissemination of safety information
   4.2 External training, communication and dissemination of safety information

→ Four components:

1. State safety policy and objectives
2. State safety risk management
3. State safety assurance
4. State safety promotion

→ Every component is composed of elements:

– Eleven elements in total

The components and elements of the SSP

1. The State safety policy and objectives component is composed of four elements:
    1. State safety legislative framework
    2. State safety responsibilities and accountabilities
    3. Accident and incident investigation
    4. Enforcement policy

State responsibility on safety policy and objectives

→ SSP can only be effectively implemented as part of an overall framework of accountabilities and responsibilities within the State

→ SSP must include:

- Explicit policies

- Procedures

- Management controls

- Documentation

- Corrective action processes to keep the State safety management efforts on track

2. The State safety risk management component is composed of two elements:

    1. Safety requirements for the service provider's SMS

    2. Agreement on the service provider's safety performance

State responsibility on safety risk management

→ Rulemaking and policy development is based on hazard identification and analysis of the safety risks of the consequences of hazards

– Regulations become safety risk controls when adopted by service providers' SMS

3. The State safety assurance component is composed of three elements:

    1. Safety oversight

    2. Safety data collection, analysis and exchange

    3. Safety-data-driven targeting of oversight of areas of greater concern or need

State responsibility on safety assurance

→ Surveillance activities under SSP are supported by hazard identification and safety risk analyses

- Surveillance of service providers is based on compliance monitoring as well as the assessment of safety performance of service providers' SMS
  - It is based on periodic audits and inspections
  - Assessment of safety performance of SMS leads to prioritized surveillance based upon the severity of the safety risks of the consequences of the hazards identified by the SMS
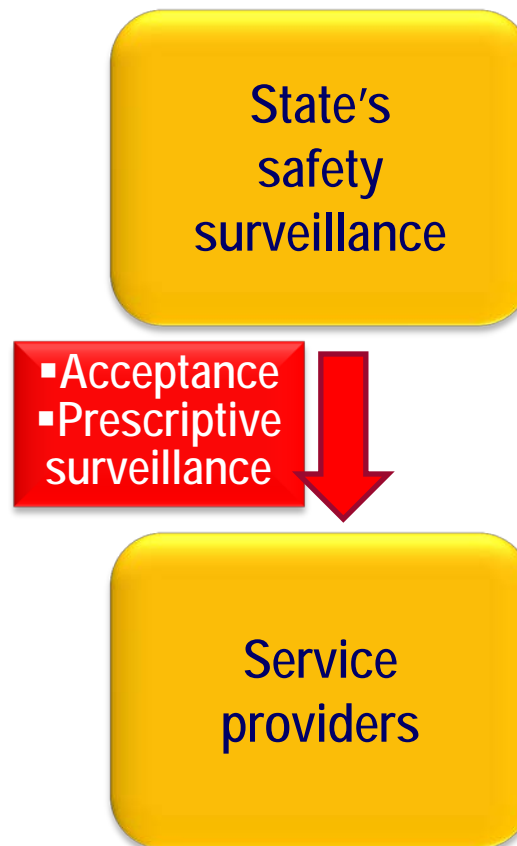
4. The State safety promotion component is composed of two elements:

   1. Internal training, communication and dissemination of safety information

   2. External training, communication and dissemination of safety information

State responsibility on safety promotion
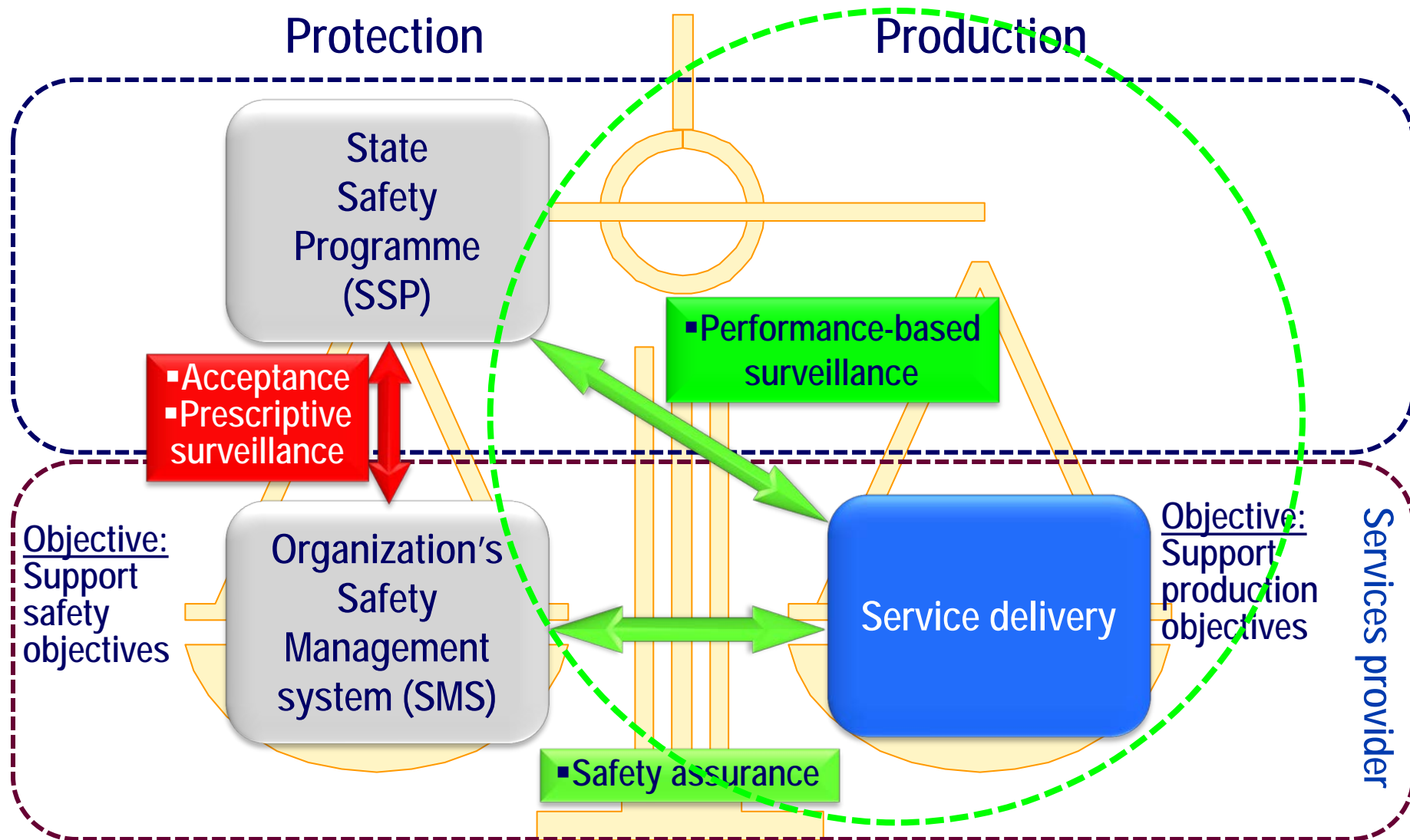
→ **State must provide its staff**

  – Competence and technical knowledge on subject matter

  – Additional knowledge regarding hazard identification and safety risk analysis

→ **State must communicate its SSP internally and externally**

Protection

Production

State Safety Programme (SSP)

- Acceptance
- Prescriptive surveillance

- Performance-based surveillance

Objective: Support safety objectives

Organization's Safety Management system (SMS)

Service delivery

Objective: Support production objectives

- Safety assurance

Services provider

ICAO SSP Framework

1. **State safety policy and objectives**
    1.1 State safety legislative framework
    1.2 State safety responsibilities and accountabilities
    1.3 Accident and incident investigation
    1.4 Enforcement policy
2. **State safety risk management**
    2.1 Safety requirements for service providers SMS
    2.2 Agreement on service provider safety performance
3. **State safety assurance**
    3.1 Safety oversight
    3.2 Safety data collection, analysis and exchange
    3.3 Safety data driven targeting of oversight on areas of greater concern or need
4. **State safety promotion**
    4.1 Internal training, communication and dissemination of safety information
    4.2 External training, communication and dissemination of safety information

Prescription

Performance

115

Summary

→ There are four elements of the SSP

→ There are eleven components of the SSP

→ The ICAO framework is intended as a principled guide for an SSP:

- – Development
- – Implementation
- – Maintenance

→ Safety management principles provides a plattform for parallel development of:

  – SSP by the State

  – SMS by the service providers

→ It allows that both to get ahead of safety risks

→ It allows to interact more effectively in the resolution of safety concerns

7. SSP implementation

ICAO

SSP Implementation

→ The availability of a framework provides a principled guide for SSP implementation

→ ICAO has developed guidance for the development of an SSP framework in order to facilitate SSP implementation

SSP – Two considerations

→ The implementation of the SSP is commensurate with the size and complexity of the State's aviation system

→ It may require coordination among multiple authorities responsible for individual element functions in the State

State – Wearing two hats?

→ When the State is responsible for the provision of specific services (e.g. aerodromes, air navigation services, etc.) the organization providing the service should develop and implement its SMS

→ Allows to assess the existence and maturity within the State of the elements of an SSP

 – Guidance in Appendix 3 to Chapter 11 of the SMS Manual

→ The components/elements identified as missing or deficient will form, together with those already existing or effective, the basis of the SSP implementation plan

SSP implementation plan

→ A "flight plan" that guides the development of the SSP

→ Allows States to:

  – Identify those tasks underlying the strategy leading to the implementation of the SSP

  – Coordinate the activities by the various State aviation organizations under the SSP in support of the implementation plan

Why a phased approach to SSP?

→ To manage the workload associated with the implementation of the SSP

→ To prevent the "compliance by ticking boxes"

→ Three implementation phases are proposed based on:

  – The results of the gap analysis

  – The sequential application of the different components and elements of the SSP framework

Initial SSP

➢ **Plan and draft**

    ➢ State Safety Policy

    ➢ SSP implementation team

    ➢ Assign responsibilities

    ➢ Coordination with other

Initial SSP

➢ Collect and evaluate

- ➢ Selection of safety indicators (initial ALosP)
- ➢ Confidential reporting systems
- ➢ Acceptance on service providers 'SMS
- ➢ Inspections, audits, surveys

Mature SSP

➢ **Collect and evaluate** (Cont.)

  ➢ State safety data collection and analysis capabilities

  ➢ Agreement on safety performance indicators

  ➢ ALoSP with safety measurement +safety performance measurement

SSP

➢**Additional requirements**

➢ During all the implementation phases, the State must determine if additional safety arrangements are required to implement and maintain the organization's SSP

Four phases of SSP implementation - Example

Phase1 (12 mths)	Phase 2 (12 mths)	Phase 3 (24 mths)	Phase 4 (24 mths)
1. **SSP element 1.2(i):** a. Identify SSP Place Holder Organization and Accountable Executive b. Establish SSP Implementation Team c. Perform SSP Gap Analysis d. Develop SSP Implementation Plan e. Establish SSP coordination mechanism f. SSP Documentation including the State's SSP framework, its components and elements.	1. **SSP element 1.1:** National aviation legislative framework 2. **SSP element 1.2(ii):** a. Safety management responsibilities & accountabilities b. State Safety Policy & Objectives 3. **SSP element 1.3:** Accident and serious incident investigation 4. **SSP element 1.4(i):** Establish basic enforcement (penalty) legislation 5. **SSP element 3.1(i):** State safety oversight and surveillance of its service providers 6. **SSP element 2.1(i):** SMS education & promotion for service providers	1. **SSP element 1.4(ii):** Enforcement Policy/ Legislation to include: a. Provision for service providers operating under an SMS, to deal with and resolve safety and quality deviations internally b. Conditions and circumstances under which the State may intervene with safety deviations c. Provision to prevent use or disclosure of safety data for purposes other than safety improvement d. Provision to protect the sources of information obtained from voluntary/ confidential reporting systems. 2. **SSP element 2.1(ii):** Harmonized regulations requiring SMS implementation 3. **SSP element 3.2(i):** a) Safety data collection & exchange systems b) Establish high consequence State safety performance indicators and target/ alert levels	1. **SSP element 2.2:** Service provider safety performance indicators 2. **SSP element 3.1(ii):** Incorporation of service providers' SMS and safety performance indicators as part of routine surveillance program 3. **SSP element 3.2(ii):** a. Implement voluntary/ confidential safety reporting systems b. Establish lower consequence safety/ quality indicators with target/ alert level monitoring as appropriate c. Promote safety information exchange with and amongst service providers and other States. 4. **SSP element 3.3:** Prioritize inspections and audits based on the analysis of safety risk or quality data where applicable 5. **SSP element 3.1(iii)** Establish internal review mechanism covering the SSP to assure continuing effectiveness and improvement

SSP element 4.1, 4.2: Internal SSP & SMS training. Promotion of external SMS training. Internal & external communication and dissemination of safety information are progressively implemented through Phase 1 to 4.

Note: Phase period (eg 12 months for Phase 1) is an approximate timeframe only. Actual implementation period depends on scope/ complexity of a State's aviation system, actual gaps within each element and organization structure.

8. The role of the SSP supporting the SMS implementation

The elements of SMS

❶ **Safety policy and objectives**

1.1 – Management commitment and responsibility

1.2 – Safety accountabilities

1.3 – Appointment of key safety personnel

1.4 – Coordination of emergency response planning

1.5 – SMS documentation

❷ **Safety risk management**

2.1 – Hazard identification

2.2 – Risk assessment and mitigation

❸ **Safety assurance**

3.1 – Safety performance monitoring and measurement

3.2 – The management of change

3.3 – Continuous improvement of the SMS

❹ **Safety promotion**

4.1 – Training and education

4.2 – Safety communication

Regulation on SMS

→ A regulation on SMS should address the provision of SMS guidance or advisory materials by the State

→ Such guidance materials should also include any provision for a phased SMS implementation approach

→ The CAA's process for acceptance of individual service provider SMS and agreement of their proposed safety performance should also be made known in such requirements or guidance materials as appropriate

The role of the SSP in supporting SMS implementation

→ Generate a context that supports the implementation of an SMS by service providers

→ SMS cannot perform effectively either in a regulatory vacuum or in an exclusively compliance-oriented environment

→ SMS can flourish only under the enabling umbrella provided by an SSP

→ SSP is a fundamental enabler of the implementation of an effective SMS

SSP and SMS components

SSP components

❶ State safety policy and objectives

❷ State safety risk management

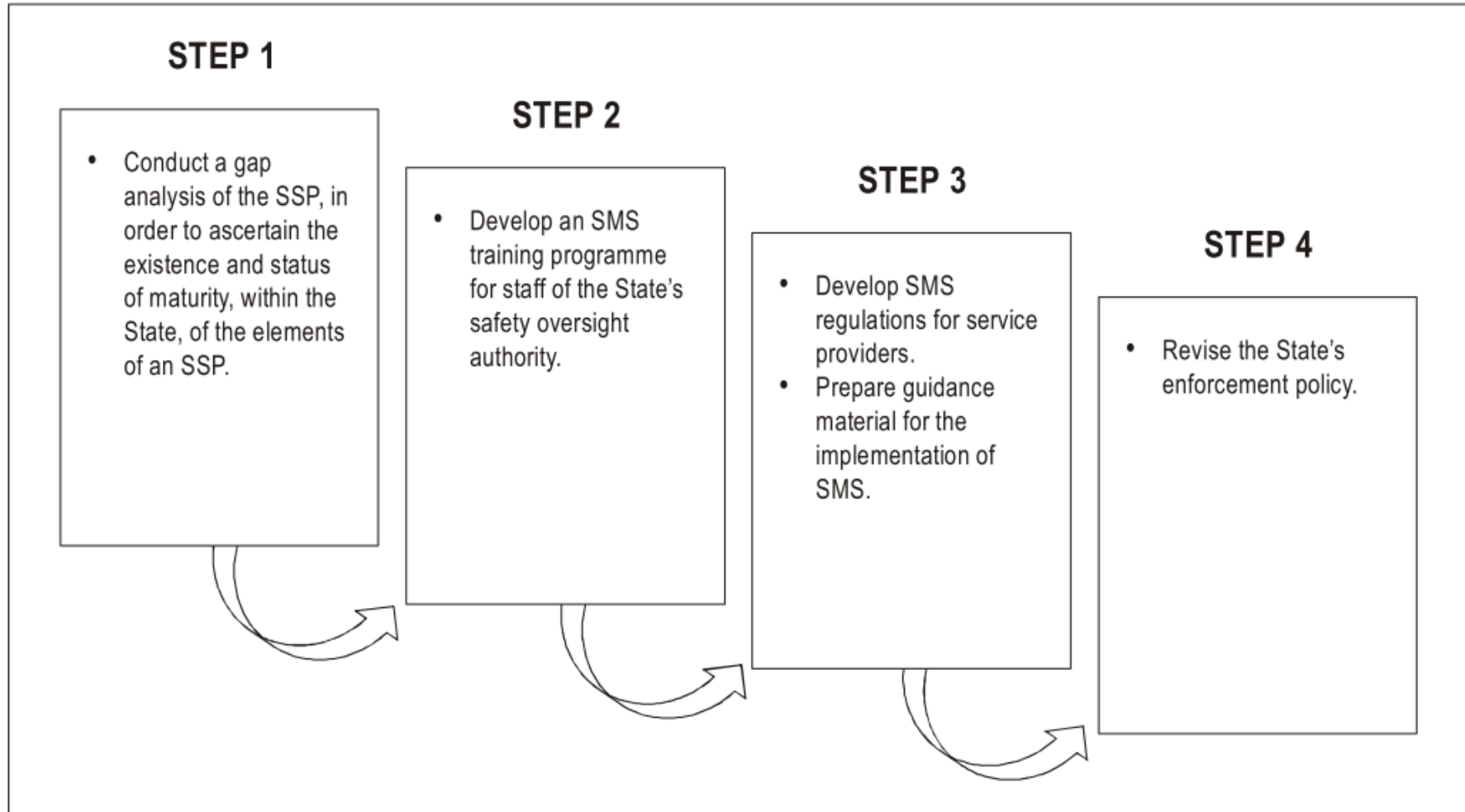❸ State safety assurance

❹ State safety promotion

SMS components

❶ Safety policy and objectives

❷ Safety risk management

❸ Safety assurance

❹ Safety promotion

STEP 1
- Conduct a gap analysis of the SSP, in order to ascertain the existence and status of maturity, within the State, of the elements of an SSP.

STEP 2
- Develop an SMS training programme for staff of the State's safety oversight authority.

STEP 3
- Develop SMS regulations for service providers.
- Prepare guidance material for the implementation of SMS.

STEP 4
- Revise the State's enforcement policy.

Reasons for a phase approach to SMS implementation

→ Provision of a manageable series of steps to follow in implementing an SMS, including allocation of resources

→ Need to allow implementation of SMS framework elements in various sequences, depending upon the results of each service provider's gap analysis

→ Initial availability of data and analytic processes to support reactive, proactive and predictive safety management practices

→ Need for a methodical process to ensure effective and sustainable SMS implementation

Four phases of SMS implementation

Phase I	Phase II	Phase III	Phase IV
1. SMS element 1.1(i): a. Identify SMS Accountable Executive b. Establish SMS Implementation Team c. Define scope of the SMS d. Perform SMS Gap Analysis **2. SMS element 1.5(i):** a. Develop SMS Implementation Plan **3. SMS element 1.3:** a. Establish a key person/ office responsible for the administration and maintenance of the SMS. **4. SMS element 4.1(i):** a. Establish SMS training program for personnel, with priority for SMS implementation team. **5. SMS element 4.2(i):** a. Initiate SMS/ Safety communication channels	**1. SMS element 1.1(ii):** a. Establish Safety Policy & Objectives **2. SMS element 1.2:** a. Define safety management responsibilities & accountabilities across relevant departments of the organization b. Establish SMS/ Safety coordination mechanism/ committee c. Establish departmental/ divisional SAGs where applicable **3. SMS element 1.4:** a. Establish Emergency Response Plan **4. SMS element 1.5(ii):** a. Initiate progressive development of an SMS Document/ Manual & other supporting documentation	**1. SMS element 2.1(i):** a. Establish voluntary hazards reporting procedure **2. SMS element 2.2:** a. Establish safety risk management procedure **3. SMS element 3.1(i):** a. Establish occurrence reporting & investigation procedure b. Establish safety data collection & processing system for high consequence outcomes c. Develop high consequence SPIs & associated targets & alert settings **4. SMS element 3.2:** a. Establish Management of Change procedure that includes safety risk assessment **5. SMS element 3.3(i):** a. Establish internal quality audit programme b. Establish external quality audit programme	**1. SMS element 1.1(iii):** a. Enhance existing disciplinary procedure/ policy with due consideration of unintentional errors/ mistakes from deliberate/ gross violations **2. SMS element 2.1(ii):** a. Integrate hazards identification from occurrence investigation reports with the voluntary hazard reporting system b. Integrate hazard identification & risk management procedures with sub-contractor or customer SMS where applicable **3. SMS element 3.1(ii):** a. Enhance safety data collection & processing system to include lower consequence events b. Develop lower consequence SPIs & associated targets/ alert settings **4. SMS element 3.3(ii):** a. Establish or integrate SMS audit into existing internal & external audit programs b. Establish other operational SMS review/ survey programs where appropriate **5. SMS element 4.1(ii):** a. Ensure SMS training program for all relevant personnel is completed **6. SMS element 4.2(ii):** a. Promote safety information sharing & exchange internally and externally
SMS element 1.5: SMS Documentation (Phase I to IV)			
SMS element 4.1, 4.2: SMS Training, education & communication (Phase I & thereafter)			

9. Summary

ICAO

Summary

→ Aviation is the safest mode of transportation

→ There is no perfect safety system

→ Successful safety management requires the active participation of all levels of management and supervision

→ A clear understanding of the relationship between an SSP and an SMS is essential for concerted safety management action within States

➔ States and service providers have safety responsibilities

➔ ICAO standards requiere States to establish a SSP

➔ SSP is an integrated set of regulations and activities aimed at improving safety

➔ States are required to establish an ALoSP to be achieved

➔ Services providers are required to establish SMS

→ The basic objective of a State, through its SSP, is to ensure public safety during service delivery by service providers

→ It is achieved by defining the ALoSP for the SSP and through the control of safety risks within the State by the two "operational components" of the SSP: Safety Risk Management (SRM) and Safety Assurance (SA)

→ ICAO is supporting the implementation of SSP and SMS

10. Conclusions of SSP/SMS Implementation WS

ICAO NACC Regional Office, December 2011

Metodología

→ Siguiendo la metodología propuesta por el facilitador de la OACI, los participantes identificaron dichas problemáticas

→ Los participantes trabajaron en 3 grupos y se dividieron la tarea de analizar y proponer acciones recomendadas las cuales se presentan en las tablas siguientes

→ Los participantes debatieron sobre las acciones recomendadas presentadas por los grupos

Introducción

→ Participaron en el Taller: autoridades de aviación civil, proveedores de servicio: tránsito aéreo, líneas aéreas, aeródromos, organizaciones de mantenimiento aeronáutico y la OACI

→ A lo largo de las presentaciones los participantes identificaron diferentes barreras para la implementación exitosa tanto del SSP como del SMS

				Group # I						
#	**Problem**	**Reference**	**Recommended Action**	**Impact**	**Changeability**	**Indicator**	**Priority**	**Responsible**	**Time Frame**	**Notes**
1	COMO MANEJAR EL GRAN VOLUMEN DE DATOS Y/O INFORMACIÓN DE SEGURIDAD OPERACIONAL	SMS/2.1,2.2,3.1	Definición de un formato único en software amigable, hardware con capacidad adecuada	ALTO	FÁCIL	P1	2	DIRECTOR/JUNTA DE CONTROL DE SEG-OPERACIONAL	1 AÑO	Se deberá difundir la cultura del reporte no punitivo y confidencial
2	LO RELACIONADO CON EL CONTRATO Y SUPERVISIÓN DE LOS PROVEEDORES DE SERVICIOS EN LOS AEROPUERTOS Y ACUERDOS ENTRE LÍNEAS AÉREAS (BENCHMARKING/ISAGO/CODESHARE/IOSA)	SMS/1,2,3,4.	DEFINICIÓN DEL PROVEEDOR DE SERVICIOS CERTIFICADO ACORDE CON OACI	ALTO	DIFÍCIL	P3	2	RESPONSABLE DEL SMS/OPERACIONES	6 MESES	
3	LOS DIFERENTES AOCs/FUSIONES/ALIANZAS/CLONE AIRLINES EN LAS REGIONES CAR/SAM	SSP/2.1	DEFINIR UN SMS ESTANDARIZADO APLICABLE A LOS DIFERENTES AOCs	ALTO	DIFÍCIL	P3	1	DIRECTOR/JUNTA DE CONTROL DE SEGURIDAD OPERACIONAL	2 AÑOS	
4	CASO DE MRO PERTENECIENTE A UNA LÍNEA AÉREA/SMS CORPORATIVO	SMS/1,2,3,4./SSP/2.1	UN SMS PROPIO DEL PRESTADOR DE SERVICIO, ACORDE CON EL SMS DEL CLIENTE EN LO APLICABLE	ALTO	DIFÍCIL	P3	1	COORDINADOR SMS DE MANTTO DEL MRO	3 AÑOS	
5	LA COORDINACIÓN CON OTROS SMSs DE OTROS PROVEEDORES DE SERVICIOS	SSP/2.2	EMPATAR LAS POLÍTICAS Y PROCEDIMIENTOS	ALTO	MODERADO	P2	1	LOS RESPONSABLES DEL SMS	6 MESES	

			Group # II							
#	Problem	Reference	Recommended Action	Impact	Changeability	Indicator	Priority	Responsible	Time Frame	Notes
1	Falta de tratamiento multidiciplinario para la implementación del SSP/SMS (inclusión)	1.2 – Responsabilidades de seguridad operacional 4.2 – Comunicación de seguridad	• Definir alcance del SMS (Áreas Involucradas) • Identificar personas líderes de cada área. • Definición de responsabilidades de cada área para la Implementación del SMS/SSP por parte del ejecutivo responsable. • Definir canales de comunicación adecuados entre áreas (Comités de Seguridad en cada nivel Organizacional)	3	MODERATE	P2	2	• Ejecutivo Responsable • SMS/SSP Manager	3 meses	
2	Software (SRM, Safety Library)	1.5 – Documentación del SMS (SMS) 3.2 – Colección, análisis e intercambio de datos de Seguridad Operacional. (SSP)	• Identificar las herramientas necesarias de acuerdo al alcance de cada organización. • Asignar el presupuesto necesario para adquirí herramientas • Generar políticas bajo las cuales se debe desarrollar la ejecución del las herramientas (TI) • Definición del personal responsable por la administración de las herramientas. • Capacitación del personal encargado de la administración de las herramientas. • En caso de contar con herramientas se debe garantizar la integración de las bases de datos de las herramientas. • Definir taxonomías estandarizadas para la clasificación de los peligros en las herramientas.	3	DIFFICULT	P3	4	• Ejecutivo Responsable • SMS/SSP Manager	12 meses	

#										
3	Capacitación (Train the trainers)	4.1 – Entrenamiento y educación (SMS/SSP)	• Definición de perfil de selección de los instructores. • Identificar y seleccionar los instructores de acuerdo al perfil • Evaluación y certificación del instructor	3	3 EASY	P1	5	• SMS/SSP Manager • Cabezas responsables de las áreas • Centro de Instrucción	1 Mes	
4	Cultura del reporte/cultura nacional	1.1 – Responsabilidad y compromiso de la dirección 4.2 – Comunicación de seguridad (SMS/SSP)	• Definición de implementación de una política de reportes no punitiva enforzada por el ER • Definición del sistema de reportes. • Promoción de la cultura del reporte a través de medios de comunicación definidos	3	DIFFICULT	P3	3	• Ejecutivo Responsable • SMS/SSP Manager • Cabezas responsables de las áreas	4 Años	
5	Publicación de política y objetivos	1.1 – Responsabilidad y compromiso de la dirección	• Definir medios adecuados para la comunicación y difusión de las políticas y objetivos • Definir un sistema de gestión documental que garantice la recepción y lectura de la política y objetivos	2	EASY	P4	1	• Ejecutivo Responsable • SMS/SSP Manager	2 meses	
6	Estandarización									Open

Grupo III

							Group # III			
#	Problem	Reference	Recommended Action	Impact	Chang eabilit y	Indicat or	Priori ty	Responsib le	Time Frame	Notes
1	Falta de Recursos (SSP)	1. Políticas y objetivos	a-Descentralizar la autoridad. b-Facilitación de instructores/personal	3	1	P3	2	Estado	Primera etapa (a):3 años Segunda etapa (b): 6 años	Dificultad a raíz de cuestiones políticas, cambio de administraciones. Proceso de autorización de normas y transmitir el espíritu de la necesidad de la aviación.
2	Accident Investigati on Group (SSP)	1. Políticas y objetivos	Descentralizar la autoridad. Facilitación de instructores/personal Uso de tecnologías	3	1	P3	6	Estado	Primera etapa (a):3 años Segunda etapa (b): 6 años	
3	Norma (Tiempo) / Cambio	1. Políticas y objetivos	Autoridad tenga acercamiento proactivo con los prestadores de servicio	3	2	P2	4	Autoridad	2 años	El impacto-beneficio hacia la industria comercial y ejecutiva
4	Inclusión de grupos	4. Promoció n de la seguridad	Foros, talleres, mesas de trabajo	2	1	P4	5	Estado e industria	1 año	
5	Compromi so (accounta ble person)	4. Promoció n de la seguridad	Concientización Sensibilización	3	2	P2	1	Industria	1 año	

6	Competencias del personal	1. Políticas y objetivos	Reclutamiento Especialización Desarrollo profesional	3	2	P2	3	Estado e industria	Constante	
7	Recursos (SSP)	1. Políticas y objetivos	a-Descentralizar la autoridad. b-Facilitación de instructores/personal	3	1	P3	2	Estado	Primera etapa (a):3 años Segunda etapa (b): 6 años	Dificultad a raíz de cuestiones políticas, cambio de administraciones. Proceso de autorización de normas y transmitir el espíritu de la necesidad de la aviación. Acciones tomadas derivadas de la degradación de categoría.
8	Accident Investigation Group (SSP)	1. Políticas y objetivos	Descentralizar la autoridad. Facilitación de instructores/personal Uso de tecnologías	3	1	P3	6	Estado	Primera etapa (a):3 años Segunda etapa (b): 6 años	
9	Norma (Tiempo) / Cambio	1. Políticas y objetivos	Autoridad tenga acercamiento proactivo con los prestadores de servicio	3	2	P2	4	Autoridad	2 años	El impacto-beneficio hacia la industria comercial y ejecutiva
10	Inclusión de grupos	4. Promoción de la seguridad	Foros, talleres, mesas de trabajo	2	1	P4	5	Estado e industria	1 año	

Conclusiones

➔ Los participantes al término del evento manifestaron su conformidad con dicho taller, considerando que se cumplió el objetivo fijado

➔ Asimismo, consideraron que el mismo les será de mucha utilidad para la implementación exitosa del SSP/SMS en sus respectivas organizaciones

➔ Los participantes instaron a la OACI a continuar impartiendo este tipo de talleres

Questions?

For additional información:

Contact:
echacin@icao.int

Visit: www.icao.int

Thank You!

ICAO