



International Civil Aviation Organization

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# Safety Management Overview

Presented by H. Sudarshan  
ICAO Headquarters, Montreal

Workshop on development of  
National Performance Framework for Air Navigation Systems  
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International Civil Aviation Organization

# ICAO Safety Management Overview

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- Part II - ICAO Safety management SARPs
- Part III - ICAO SMS/SSP framework
- Part IV - The way forward

## Objectives



- **To review with senior management:**
  - The principles and differences underlying the concept of SSP
  - The ICAO safety management SARPS related to safety management by States and service providers
  - The ICAO SMS and SSP frameworks, their components and elements as the means to implement the SSP and;
  - The role of ICAO in supporting the implementation of SSP by States

## Part I – SSP, an evolutionary approach

### Before safety management



#### → Traditional approach

- Preventing accidents  
Accident investigation - Focus on outcomes (causes)
- Regulatory compliance



## Management systems and execution programmes



- ✈ **Management systems** support senior-level *[data-based]* strategic decision making
  - ✓ The SMS is a management system that supports the safety decision making process by service providers
  - ✓ The SSP is a management system that supports the safety decision making process by States

Safety management

## Management systems and execution programmes



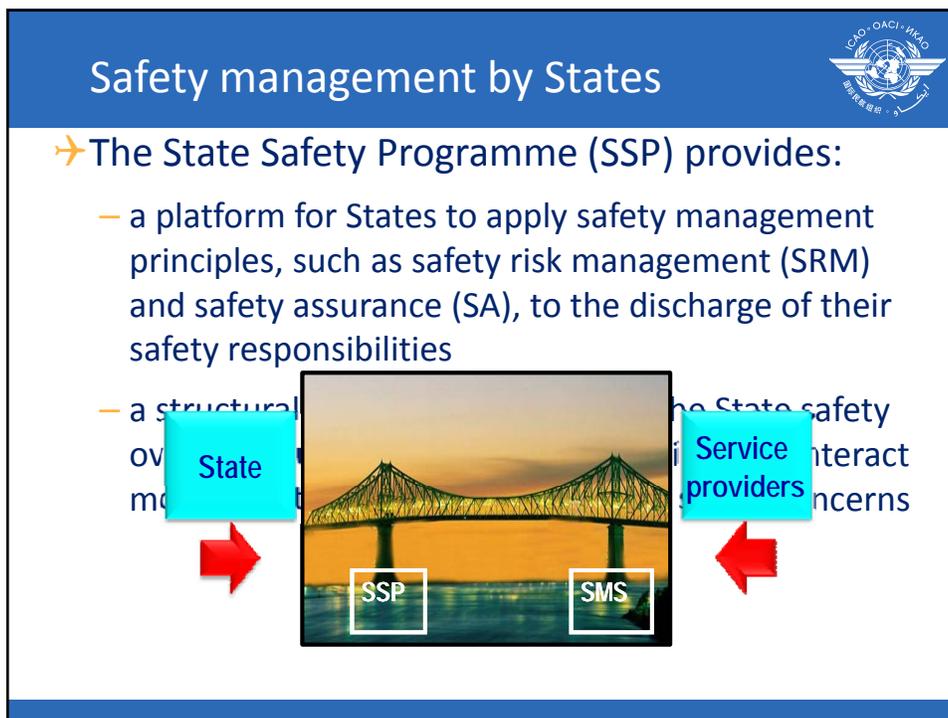
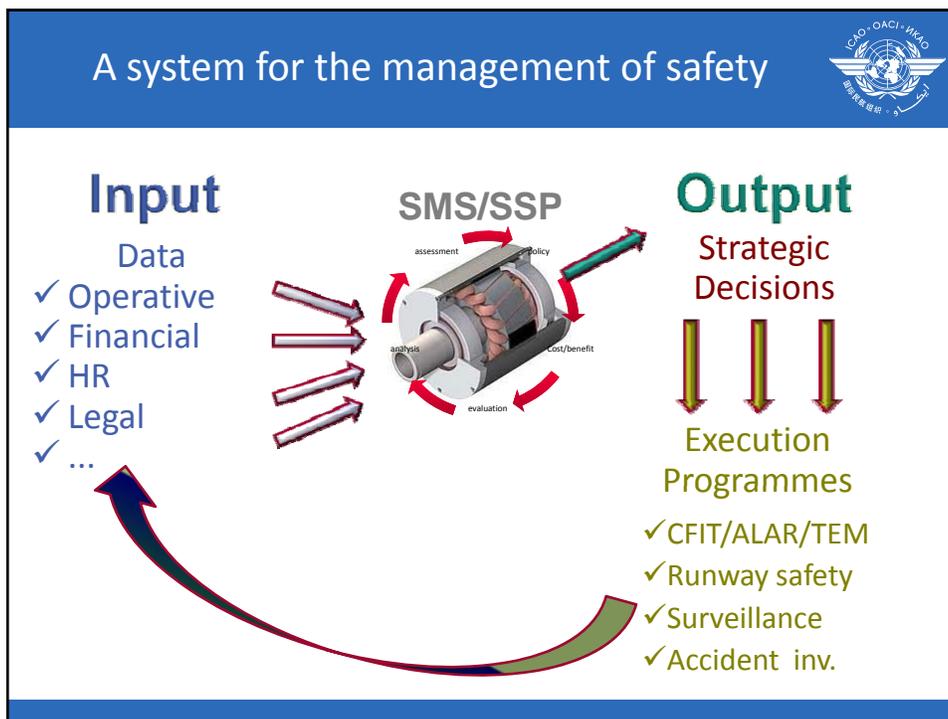
- ✈ **Execution programmes** are subcomponents of management systems that implement strategic decision making
  - Once safety decisions are made, they are executed through *safety programmes* as part of the SMS or SSP

SMS



SSP





## Safety Risk Management (SRM): What is wrong?



### → Safety Risk Management

- Processes and procedures aimed at hazard identification and initial mitigation of safety risks

### → Objectives

- Capture of data on safety deficiencies and hazards in the operational context
- Development of initial information on safety deficiencies and hazards
- Information-based deployment of initial mitigation strategies for safety deficiencies and the consequence(s) of hazards

## Safety Assurance (SA): Does the fix work?



### → Safety assurance

- Processes and procedures that assure (generate confidence) that hazard identification and initial mitigation of safety deficiencies and the consequences of hazards perform as planned/expected

### → Objectives

- Storage of safety data
- Continuous analyses of safety data
- Safety data-based continuous monitoring of the effectiveness of initial mitigation strategies
- Re-deployment of alternative mitigation strategies

## An key management axiom



### → Objectives

- Storage of safety data
- Continuous analyses of safety data
- Safety data-based continuous monitoring of the effectiveness of initial mitigation strategies

→ To achieve these Objectives, it important to underline the management axiom that “one cannot manage what one cannot measure”.

## Safety measurement



- 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

## Safety performance measurement



- ➔ Quantification of the outcomes of selected low-level, low- consequence processes (generally associated to an SMS):
  - Number of FOD events per number of ramp operations
  - Number of ground vehicle events in taxiways per number of airport operations
  - ...
- ➔ A measure of the actual performance of safety interventions and/or mitigation strategies, beyond accident rates and regulatory compliance

## A contemporary regulatory environment



- ➔ The notion of safety performance is an essential ingredient of the effective operation of an SSP/SMS
- ➔ It requires a performance-based regulatory environment, in order to monitor the actual performance of an SSP/SMS

## Part II – Safety management requirements

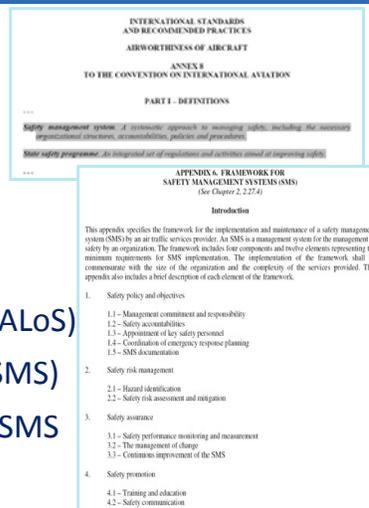
### The big picture

#### → Two audience groups

- States
- Service providers

#### → Three distinct requirements

- State safety programme (SSP)
  - Acceptable level of safety (ALoS)
- Safety management System (SMS)
  - Safety performance of the SMS
- Management accountability



## Basic safety management SARPs – Part I



- *States shall establish a **State safety programme (SSP)**, in order to achieve an acceptable level of safety (ALoS) in civil aviation*
  - What is an SSP? - An integrated set of regulations and activities aimed at improving safety
  - An SSP is a management system for the management of safety by the State



## Basic safety management SARPs – Part II



- *States shall require, as part of their State safety programme (SSP), that a [service provider] implement a **safety management system (SMS)** acceptable to the State that, as a minimum:*
  - *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; and*
  - *aims at a continuous improvement of the overall performance of the safety management system*

## Basic safety management SARPs – Part III



- A safety management system (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



Part III – SMS/SSP Framework



## ICAO SMS Framework

- Safety Policy & Objectives**
  - Management commitment & responsibility
  - Safety accountabilities
  - Appointment of key safety personnel
  - Coordination of emergency response planning
  - SMS documentation
- Safety Risk Management**
  - Hazard identification
  - Risk assessment and mitigation
- Safety Assurance**
  - Safety performance monitoring and measurement
  - The management of change
  - Continuous improvement of the SMS
- Safety Promotion**
  - Training & Education
  - Safety Communication

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## ICAO SSP Framework

- State Safety Policy & Objectives**
  - State safety legislative framework
  - State safety responsibilities & accountabilities
  - Accident and incident investigation
  - Enforcement policy
- State Safety Risk Management**
  - Safety requirements for service providers SMS
  - Agreement on service providers safety performance
- State Safety Assurance**
  - Safety oversight
  - Safety data collection, analysis and exchange
  - Safety data driven targeting of oversight on areas of greater concern or need
- State Safety Promotion**
  - Internal training, communication & information dissemination
  - External training, communication & information dissemination

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## SSP -a combined architecture

→ The integration in the SRM and SA components of an SSP requires that activities and controls carried out by the State will be based in a combined **prescription** and **performance based** architecture

<p><b>SMS</b></p> <p><b>Safety Risk Management</b></p> <p>Hazard identification</p> <p>Risk assessment and mitigation</p> <p><b>Safety Assurance</b></p> <p>Safety performance monitoring and measurement</p> <p>The management of change</p> <p>Continuous improvement of the SMS</p>	<p><b>SSP</b></p> <p><b>State Safety Risk Management</b></p> <p>Safety requirements for service providers SMS</p> <p>Agreement on service providers safety performance</p> <p><b>State Safety Assurance</b></p> <p>Safety oversight</p> <p>Safety data collection, analysis and exchange</p> <p>Safety data driven targeting of oversight on areas of greater concern or need</p>
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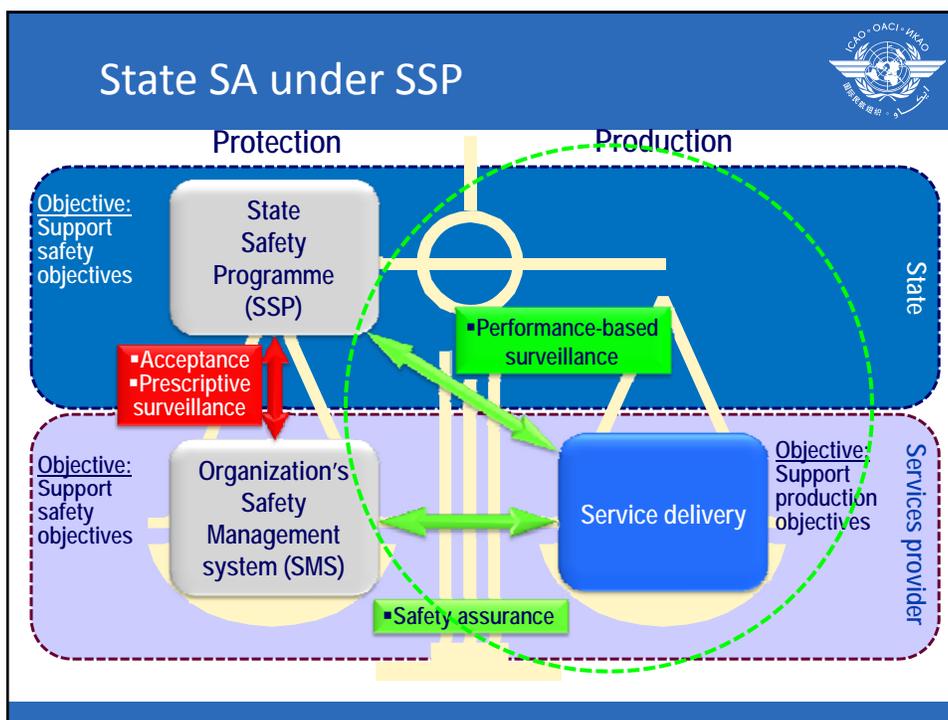
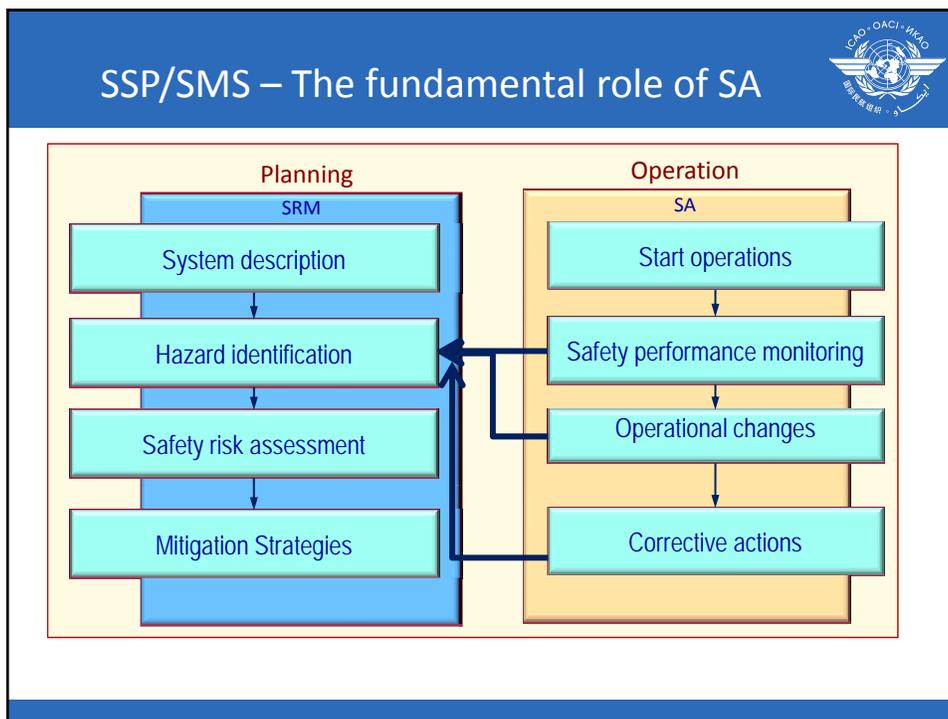


## An example of a combined architecture

<b>Values of safety targets</b>	<ol style="list-style-type: none"> <li>1. <i>[Reduce by/maximum]</i> non-conforming approaches (NCA) at 5 international airports per <i>[number]</i> arrivals by <i>[date]</i></li> <li>2. <i>[Reduce by/maximum]</i> Cat B and C runway incursions in 5 international <i>[State]</i> airports per <i>[number]</i> by <i>[date]</i></li> <li>3. ...</li> </ol>
<b>Action plans</b>	<ol style="list-style-type: none"> <li>1. Constant Descend Arrivals (CDA) procedure implemented – Arrival procedures charts designed for stabilized approaches</li> <li>2. Installation of ASDE/X in 5 international <i>[State]</i> airports</li> <li>3. ....</li> </ol>
<b>Values of safety indicators</b>	<ol style="list-style-type: none"> <li>1. <i>[Number]</i> non-conforming approaches (NCA) at 5 international airports <i>[State]</i> per <i>[number]</i> operations</li> <li>2. <i>[Number]</i> of Cat B and C runway incursions in 5 international airports <i>[State]</i> per <i>[number]</i> operations</li> <li>3. ...</li> </ol>
<b>State</b>	Will comply all applicable international standards

PERFORMANCE

PRESCRIPTION



## Part IV – The way forward

### States – when implementing SSP



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



## States – when implementing SSP



- SSP may require coordination among multiple authorities responsible for individual element functions in the State
- A phased approach is proposed based on the need of managing the workload associated to its implementation



## ICAO - A new strategic approach



### → Mandate

- Safety Management Standards and related guidance material
- Revisions to the Global Aviation Safety Plan
- Integrated Safety Trend Analysis & Reporting System
- Support SSP / SMS Implementation

# Implementation ICAO Regional Offices



North American Central American and Caribbean (NACC) Office  
Mexico City

South American (SAM) Office  
Lima

ICAO Headquarters  
Montreal

Western and Central African (WACAF) Office  
Dakar

European and North Atlantic (EUR/NAT) Office  
Paris

Middle East (MID) Office  
Cairo

Eastern and Southern African (ESAF) Office  
Nairobi

Asia and Pacific (APAC) Office  
Bangkok

**Thank you**  
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