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

CAR/SAM Regional Workshop on the use of Aeronautical Studies in the Aerodrome Certification Process
Mexico City, Mexico, 21 -24 August 2012

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ICAO
Programme

1. Objective
2. Background
3. Introduction
4. Definitions and concepts
5. SSP and ICAO SARPs
6. The ICAO SSP framework
7. SSP implementation
8. The role of SSP in supporting SMS implementation
9. Summary
10. Conclusion of SSP/SMS Implementation Workshop
1. Objective
Objective

Introduce the framework for development and implementation of:
- SSP
- SMS

Introduce the combination of both elements:
- Prescriptive
- Performance-based
2. Background
ICAO Role

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

2011 – 2013:

- Safety
- Security
- Sustainability
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

Global Safety Initiatives
- Linked to global safety targets
- Specific metrics will monitor GSI effectiveness
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.
ICAO GASP & ISSG GASR

GASP: Global Aviation Safety Plan
ISSG: Industry Safety Strategy Group
GASR: Global Aviation Safety Roadmap

Visit: www.icao.int/fsix/
Global Aviation Safety Plan - GASP

ียว High-level policy document
- Guiding efforts of the States, industry and international organizations

ียว Update scheduled for 2012
- Introduce safety management principles to create a strategic approach to implementation of Global Safety Initiatives (GSIs)
- In parallel and harmony with the update of the Global Aviation Safety Roadmap (GASR)
Current Global Safety Initiatives (GSIs)

- (GSI-1) CONSISTENT IMPLEMENTATION OF INTERNATIONAL STANDARDS AND INDUSTRY BEST PRACTICES
- (GSI-2) CONSISTENT REGULATORY OVERSIGHT
- (GSI-3) EFFECTIVE ERRORS AND INCIDENTS REPORTING
- (GSI-4) EFFECTIVE INCIDENT AND ACCIDENT INVESTIGATION
- (GSI-5) CONSISTENT COORDINATION OF REGIONAL PROGRAMMES
- (GSI-6) EFFECTIVE ERRORS AND INCIDENTS REPORTING AND ANALYSIS IN THE INDUSTRY
- (GSI-7) CONSISTENT USE OF SAFETY MANAGEMENT SYSTEMS (SMS)
- (GSI-8) CONSISTENT COMPLIANCE WITH REGULATORY REQUIREMENTS
- (GSI-9) CONSISTENT ADOPTION OF INDUSTRY BEST PRACTICES
- (GSI-10) ALIGNMENT OF INDUSTRY SAFETY STRATEGIES
- (GSI-11) SUFFICIENT NUMBER OF QUALIFIED PERSONNEL
- (GSI-12) USE OF TECHNOLOGY TO ENHANCE SAFETY
Objective of Updated GASP

- Strategic coordination of global safety activities
- Guide the prioritization and allocation of aviation safety resources
- Measureable achievement of global safety targets
Proposed Global Safety Initiatives (GSIs)

- GSI 1: Implementation of International Standards and Recommended Practices
- GSI 2 - Establishment and Management of a Regulatory Oversight System
- GSI 3 - Maintaining Sufficient Number of Qualified Personnel
- GSI 4 - Establishment and Management of Accident and Incident Investigation Capabilities
- GSI 5 - Establishment and Management of a Safety Reporting System
- GSI 6 - Alignment and Coordination of Regional Programmes
- **GSI 7 - Implementation of State Safety Programme (SSP)**
- GSI 8 - Use of Technology to Enhance Safety
- GSI 9 - Continuous Monitoring and Improvement of State’s Aviation Safety System
Recommendation 2/5

- ICAO should develop, in close collaboration with States, international and national organizations, a new Annex dedicated to safety management responsibilities and processes which would address the safety management responsibilities of States framed under the State Safety Programme (SSP)

- The new Safety Management Annex should facilitate the provision of State and air carrier safety information to the travelling public, in addition to specifying the high level safety responsibilities of States.
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
Safety Management Guidance Material

Safety Management Manual (SMM)

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Third Edition — 2012

International Civil Aviation Organization

→ Safety Management Manual - Doc 9859

→ Third Edition – 2012 (Unedited advance version)

→ Detailed guidance for SMS / SSP implementation

→ ICAO Safety Management website
  - http://legacy.icao.int/fsix/
  - http://www2.icao.int/en/ism/Pages/GuidanceMaterials.aspx
3. Introduction
Evolution of Safety Thinking
Workplace interaction

Aviation workplaces involve complex interrelationships among components.

To understand operational performance, we must understand the interrelationship among components of the workplace.

**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).
Prescription & Performance

Safety Management principles

Realistic implementation

ICAO SARPS

Prescription

Performance

2012 ICAO
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 administrative controls
  - Rigid regulatory framework
    - Inspections
    - Audits
  - Regulatory compliance

**Performance based environment**

- Regulations as safety risk controls
  - Dynamic regulatory framework
    - Data based identification
    - Prioritization of safety risks
  - Effective safety performance

21-22/06/2012
Two audience groups
- States
- Service providers

Three distinct Standards
- State safety programme (SSP)
  - Acceptable level of safety (ALoS)
- Safety management system (SMS)
  - Safety performance of the SMS
- Management accountability
States shall establish a State Safety Programme (SSP), in order to achieve an acceptable level of safety (ALoS) in civil aviation.
### Current SARPs for SSP / SMS

**Safety Management SARPs for States**

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<th>Annex</th>
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<td>SSP Framework (Attachment)</td>
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**Safety Management SARPs for Service Providers**

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<td>SMS Framework (Appendix)</td>
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<td>Nov 2013</td>
<td>SMS</td>
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SARPs: Standards and Recommended Practices
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
4. Definitions and concepts
What is the objective of a business organization?

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
The management dilemma
The management dilemma

Management levels

Protection

Production

Resources +

Catastrophe
The management dilemma

Management levels

+ Resources

Bankruptcy

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
Concept of safety

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.
Safety approach

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
The traditional approach:

- Identifies:
  - What
  - Who
  - When

- But not always discloses:
  - Why
  - How
Key definitions

✈ **Hazard:** condition or object with the potential of causing injuries to personnel, damage to equipment or structures, loss of material, or reduction of 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
Other important definitions

- **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 analysis

A. State the generic hazard (Hazard statement)
   - Airport construction

B. Identify specific components of the hazard
   - Construction equipment
   - Closed taxiways
   - Etc.

C. Naturally leading to specific consequence(s)
   - Aircraft colliding with construction equipment
   - Aircraft taking wrong taxiway
   - Etc.
Documentation of hazards

Method
- Reactive method
  - ASR
  - MOR
  - Incident reports
  - Accident reports
- Proactive method
  - ASR
  - Surveys
  - Audits
- Predictive method
  - FDA
  - Direct observation systems

Identification
- Assess the consequences and prioritize the safety risks

Management
- Assign responsibilities
- Implement strategies
- Re-evaluate strategies and processes

Documentation
- “Safety library”

Information
- Safety management information
- Trend analysis
- Safety bulletins
- Report distribution
- Seminars and workshops

Feedback
- Trend analysis
- Re-evaluate strategies and processes

Inform person(s) responsible for implementing strategies

Assess the consequences and prioritize the safety risks

Develop control and mitigation strategies

Assign responsibilities

Implement strategies

Re-evaluate strategies and processes

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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
The safety risk is unacceptable as it currently stands.

The safety risk is acceptable based on mitigation. Cost benefit analysis is required.

The safety risk is acceptable as it currently stands.
Safety risk index/t tolerability

<table>
<thead>
<tr>
<th>Safety risk probability</th>
<th>Safety risk severity</th>
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<tbody>
<tr>
<td></td>
<td>Catastrophic</td>
</tr>
<tr>
<td>Frequent</td>
<td>5A</td>
</tr>
<tr>
<td>Occasional</td>
<td>4A</td>
</tr>
<tr>
<td>Remote</td>
<td>3A</td>
</tr>
<tr>
<td>Improbable</td>
<td>2A</td>
</tr>
<tr>
<td>Extremely improbable</td>
<td>1A</td>
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</tbody>
</table>
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)

Does it address the safety risk(s)?

Is it effective?

Is it appropriate?

Is additional or different mitigation warranted?

Do the mitigation strategies generate additional safety risk(s)?

Feedback (Safety assurance)

Intolerable region

Tolerable region

Acceptable region

Each consequence

Each safety risk

Technology

Training

Regulations

2012

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System performance in the real world

Baseline

Practical drift

Defence

Regulations

Training

Technology

Operational performance

Operational deployment

System design

System
Managing safety – “Navigating the drift”

Navigational aids for managing safety

Reactive  Proactive  Predictive

Baseline

Practical drift

Organization

Operational performance
Navigational aids

**Reactive method**
The reactive method responds to the events that already happened, such as incidents and accidents.

**Proactive method**
The proactive method looks actively for the identification of safety risks through the analysis of the organization's activities.

**Predictive method**
The predictive method captures system performance as it happens in real-time normal operations to identify potential future problems.
Strategies – Levels of intervention & tools

Safety management levels
- High
  - Predictive
    - FDA Direct observation system
    - Highly efficient
  - Proactive
    - ASR Surveys Audits
    - Very efficient
- Middle
  - Reactive
    - ASR MOR
    - Efficient
  - Reactive
    - Accident and incident reports
    - Insufficient
Acceptable Level of Safety (ALoS)

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
The selection of appropriate safety indicators is:

- An essential foundation for the development and implementation of ALoS
- 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
Safety performance measurement

- 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

⇒ ALoS to be achieved shall be established by the State

⇒ When establishing ALoS, 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
Expressing the ALoS

Values of safety indicators and safety targets

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

- Mature ALoS: 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, ALoS should reflect a combination of:

- Safety measurement
- Safety performance measurement
Establishing ALoS 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
Transition from initial to mature ALoS

**Initial ALoS**
*(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 ALoS**
*(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
Delivering ALoS – Safety action plans

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

- Regulations
- Training
- Technology
System today

Service providers

Airport N° 1
Airport N° 2
Airport N° 3

State Civil Aviation Authority

State Civil Aviation Authority

Safety measurement
Capture
Storage
Initial ALoS

Service providers

State Civil Aviation Authority

Airport N° 1

SMS

Airport N° 2

Airport N° 3

Safety measurement

Capture

Storage

Initial ALoS
Initial ALoS

Service providers

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 ALoS

2012 ICAO
Mature ALoS

Service providers

State Civil Aviation Authority

Exchange of protected safety data

Airport N° 1

Airport N° 2

Airport N° 3

Safety data collection & processing system

Protected safety data
- Capture
- Storage
- Process
- Analysis

Initial ALoS
State accepts and oversees individual service providers’ SMS

**Set of activities**
- ATS Service provider
- Aerodrome operator
- Aircraft operator N° 1
- AMO
- Training organization

**SMS**
- Safety performance

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

**Set of activities**
- Aircraft operator N° 2
- Aerodrome operator
- Training organization
- ATS Service provider
- AMO

State accepts and oversees individual service providers’ SMS

**SMS**
- Safety performance
5. SSP and ICAO SARPs
SSP definition

(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 (ALoS)
ALoS 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 and accountabilities in an SSP

- **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
SMS State requirement

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
The SMS is a systematic approach to managing safety, including the organizational structures, accountabilities, policies and procedures.
SMS

✈️ 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
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
Objective: Support safety objectives

- Acceptance
- Prescriptive surveillance

Objective: Support production objectives

- Performance-based surveillance

SSP – SMS relationship

Protection

State Safety Programme (SSP)

Production

Service delivery

Safety assurance

Organization’s Safety Management system (SMS)
Summary

<table>
<thead>
<tr>
<th>States:</th>
<th>Service providers:</th>
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<tbody>
<tr>
<td>States shall establish a State safety programme (SSP), in order to achieve an acceptable level of safety (ALoS) in civil aviation</td>
<td>States shall require, as part of their SSP, that a service provider implement an SMS acceptable to the State that:</td>
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<td>ALoS to be achieved shall be established by the State</td>
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6. The ICAO SSP framework
Core operational activities of an SSP

✈ State safety risk management (SRM)
✈ State safety assurance (SA)
Core operational activities of an SSP cont.

- 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 providers SMS
   2.2 Agreement on service providers 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
The components and elements of the SSP

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
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
The components and elements of the SSP

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
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
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
State Safety Assurance (SA) Today: Prescriptive Surveillance

- State’s safety surveillance
  - Acceptance
  - Prescriptive surveillance
- Service providers
State Safety Assurance (SA) under SSP

Objective:
- Support safety objectives

State Safety Programme (SSP)

- Acceptance
- Prescriptive surveillance

Organization’s Safety Management system (SMS)

- Safety assurance

Service delivery

- Performance-based surveillance

Objective:
- Support production objectives
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 providers 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
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 platform 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
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.
SSP gap analysis

- 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
SSP implementation plan – Phase I

- Plan and draft
  - State Safety Policy
  - SSP implementation team
  - Assign responsibilities
  - Coordination with other
SSP implementation plan – Phase II

Initial SSP

- Collect and evaluate
  - Selection of safety indicators (initial ALoS)
  - 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
  - ALoS with safety measurement + safety performance measurement
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.
SSP implementation plan – Summary

**Timeline**

**PHASE I**
Initial SSP Plan and Draft
Elements: 1.1, 1.2, 1.3, 1.4, 2.1, 3.2 and 4.1

**PHASE II**
Initial SSP Collect and evaluate
Elements: 2.1, 3.1, 3.2; 4.1 and 4.2

**PHASE III**
Mature SSP Collect and evaluate
Elements: 2.2, 3.2, 3.3 and 4.1

Develop SSP documentation – Element 3.2

Establish means for safety communication – Elements 4.1 and 4.2

Develop and deliver training – Elements 4.1 and 4.2
8. The role of the SSP supporting the SMS implementation
The elements of SMS

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
Safety Risk Management (SRM) and Safety Assurance (SA) – Summary

**Design**

- **SRM**
  - System description/gap analysis
  - Hazard identification
  - Safety risk assessment
  - Safety risk mitigation

**Operation**

- **SA**
  - Actual operations
  - Safety performance monitoring
  - Management of change
  - Corrective action
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
The role of the SSP in supporting SMS implementation

- 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

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

SMS components

1. Safety policy and objectives
2. Safety risk management
3. Safety assurance
4. Safety promotion
The role of the SSP in supporting SMS implementation
Why a phased approach to SMS?

- To provide a manageable series of steps to follow in implementing an SMS
- To effectively manage the workload associated with SMS implementation
- To pre-empt a “ticking boxes” exercise
- Four implementation phases are proposed
- Each phase is based upon the introduction of specific SMS elements
Summary of the role of the SSP in supporting SMS implementation

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.
SMS implementation phases – Summary

PHASE I
Planning SMS
Elements: 1.1; 1.2; 1.3 and 1.5; [and 1.4]

PHASE II
Implementation of reactive safety management processes
Elements: 2.1 and 2.2

PHASE III
Implementation of proactive and predictive safety management processes
Elements: 2.1 and 2.2

PHASE IV
Implementation of operational safety assurance
Elements: 1.1; 3.1; 3.2; 3.3; 4.1 and 4.5

Timeline
- Develop documentation – Element 1.5
- Develop and establish means for safety communication – Element 4.2
- Develop and deliver training – Element 4.1
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 require States to establish a SSP

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

States are required to establish an ALoS 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 ALoS 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.
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.
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<td>SMS/2.1,2,3,1</td>
<td>Definición de un formato único en software amigable, hardware con capacidad adecuada</td>
<td>ALTO</td>
<td>FÁCIL</td>
<td>P1</td>
<td>2</td>
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<td>Se deberá difundir la cultura del reporte no punitivo y confidencial</td>
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<td>LO RELACIONADO CON EL CONTRATO Y SUPERVISIÓN DE LOS PROVEEDORES DE SERVICIOS EN LOS AEROPUERTOS Y ACUERDOS ENTRE LÍNEAS AÉREAS (BENCHMARKING/ISAGO/CO DESHAIRE/IOSA)</td>
<td>SMS/1,2,3,4,5,6</td>
<td>DEFINICIÓN DEL PROVEEDOR DE SERVICIOS CERTIFICADO ACORDE CON OACI</td>
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<td>DEFINIR UN SMS ESTANDARIZADO APLICABLE A LOS DIFERENTES AOCs</td>
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<td>CASO DE MRO PERTENECIENTE A UNA LÍNEA AÉREA/SMS CORPORATIVO</td>
<td>SMS/1,2,3,4,5,6</td>
<td>UN SMS PROPIO DEL PRESTADOR DE SERVICIO, ACORDE CON EL SMS DEL CLIENTE EN LO APLICABLE</td>
<td>ALTO</td>
<td>DIFÍCIL</td>
<td>P3</td>
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<td>COORDINADOR SMS DE MANTTO DEL MRO</td>
<td>3 AÑOS</td>
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<td>LA COORDINACIÓN CON OTROS SMS DE OTROS PROVEEDORES DE SERVICIOS</td>
<td>SSP/2.1</td>
<td>EMPATAR LAS POLÍTICAS Y PROCEDIMENTOS</td>
<td>ALTO</td>
<td>MODERADO</td>
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<td>LOS RESPONSABLES DEL SMS</td>
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| 1  | Falta de tratamiento multidisciplinario para la implementación del SSP/SMS (inclusión) | 1.2 – Responsabilidad 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 adquirir 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 |
<p>| 6 | Estandarización | | | | | | | |</p>
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<td>1. Políticas y objetivos</td>
<td>a-Descentralizar la autoridad. b-Facilitación de instructores/personal</td>
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<td>1</td>
<td>P3</td>
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<td>Dificultad a raíz de cuestiones políticas, cambio de administraciones. Proceso de autorización de normas y transmitir el espíritu de la necesidad de la aviación.</td>
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<td>4. Promoción de la seguridad</td>
<td>Foros, talleres, mesas de trabajo</td>
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<td>5</td>
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<td>Inclusión de grupos</td>
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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:

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Visit: www.mexico.icao.int

Thank You!