

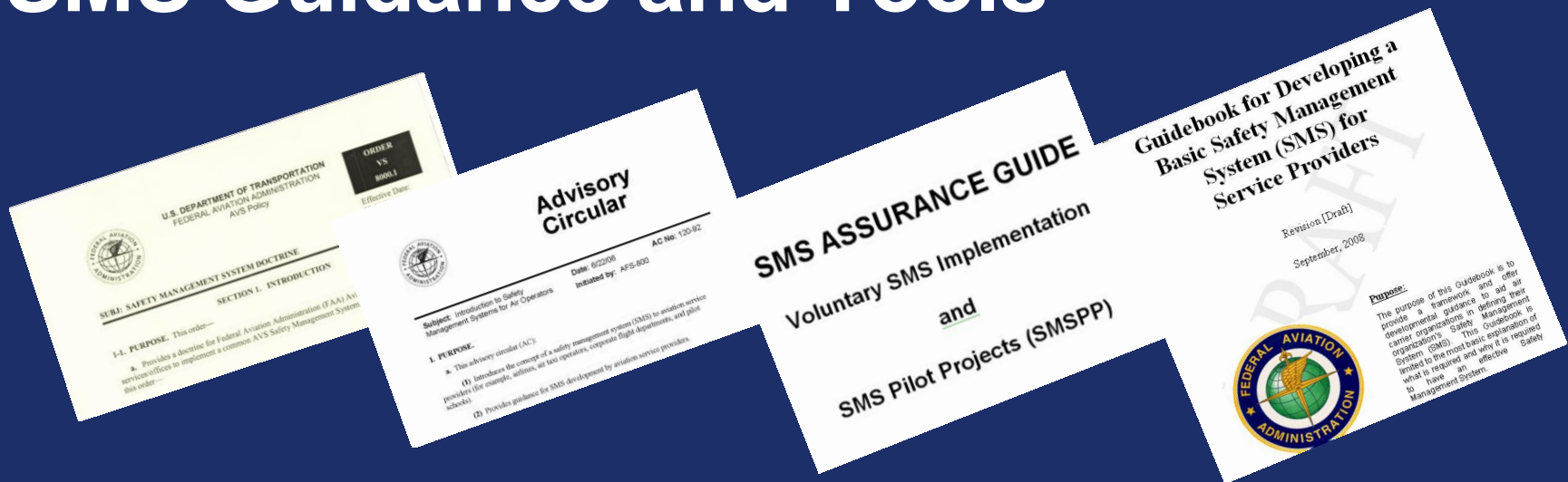
# SMS Guidance and Tools



Federal Aviation  
Administration



# SMS Guidance and Tools



- VS 8000.369: FAA SMS Guidance
- VS 8000.367: AVS Requirements Document
- SMS Standard: AC 120-92 Appendix 1
- Voluntary Implementation Guidance

# International Civil Aviation Organization (ICAO) Annex 6

- This is the document that brought “official” life to the international aviation arena’s awareness of SMS.
- Chapter 3.2.1 - States shall establish a safety programme .....
- Chapter 3.2.4 - From 1 January 2009, States shall require .....

# ICAO Doc 9859

## The ICAO Safety Management Manual

- This manual follows Annex 6, Part 1, above, and provides more detailed guidance and standardization for member states when implementing SMS

# Order VS 8000.369

## FAA Safety Management Guidance (Doctrine)

- High level concepts
- Three Levels of the ATS
- Four Components (“Pillars”)

# Order VS 8000.367

## AVS SMS Requirements

- **Chapter 5: Service Provider Safety Assurance**
  - Design Assurance
  - Performance Assurance
- **Appendix B: Service Provider SMS requirements**

# AC 120-92

## Introduction to SMS for Operators

- **Appendix 1: SMS Functional Framework**
- **Based on structure of VS 8000.367**  
**Appendix B**
- **Patterned after ISO Standards**



# Change to AC 120-92

- **Re-organized Appendix I to follow ICAO Framework**
- **Will be a stand-alone document while AC 120-92 change is in coordination**





# ICAO and FAA SMS Framework



## Elements:

### Elements:

1.1 Safety Policy

### Elements:

4.1 Competencies and Training

Process 4.1.1 Personnel requirements

Process 4.1.2 Training

4.2 Communication and Awareness

3.2 Management of Change

3.3 Continual Improvement



# **SAFETY MANAGEMENT SYSTEM (SMS) FRAMEWORK**

For:

**AVIATION SERVICE PROVIDERS**

**(For use by aviation service providers participating in the Safety Management System Pilot Project (SMSPP) and for voluntary implementation of Safety Management Systems)**

**Federal Aviation Administration  
Flight Standards Service - SMS Program Office**

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### **Component 2.0 Safety Risk Management (SRM)**

**A) Performance Objective:** The service provider will develop processes to understand the critical characteristics of its systems and operational environment and apply this knowledge to the identification of hazards, risk decision-making, and the design of risk controls.

**B) General Design Expectations:**

- 1) Safety Risk Management (SRM) will, at a minimum, include the following processes:
  - a) System and task analysis;
  - b) Hazard Identification;
  - c) Safety Risk Analysis;
  - d) Safety Risk Assessment; and
  - e) Safety Risk Control and Mitigation.
- 2) The SRM process will be applied to:
  - a) Initial designs of systems, organizations, and/or products;
  - b) The development of operational procedures;
  - c) Hazards that are identified in the safety assurance functions (described in Component 3.0, B); and
  - d) Planned changes to the operational processes.
- 3) The service provider will establish feedback loops between assurance functions described in Process 3.1.1, B to evaluate the effectiveness of safety risk controls.
- 4) The Service provider will define a process for risk acceptance that:
  - a) Defines acceptable and unacceptable levels of safety risk.
  - b) Establishes descriptions for:
    - (1) Severity levels, and
    - (2) Likelihood levels.
  - c) The service provider will define specific levels of management that can make safety risk acceptance decisions.
  - d) The service provider will define acceptable risk for hazards that will exist in the

## **Element 2.2 Risk Assessment and Control**

### **Process 2.2.1 Analyze Safety Risk**

A) **Performance Objective:** The service provider will determine and analyze the severity and likelihood of potential events associated with identified hazards and identified factors associated with unacceptable levels of severity or likelihood.

B) **Design Expectations:**

- 1) The safety risk analysis process will include:
  - a) Existing safety risk controls;
  - b) Triggering mechanisms; and;
  - c) Safety risk of reasonably likely outcomes from the existence of a hazard, to include estimation of the:
    - (1) Likelihood; and
    - (2) Severity.
    - (3) Risk likelihood and severity may be expressed in quantitative or qualitative terms.

### **Process 2.2.2 Assess Safety Risk**

A) **Performance Objective:** The service provider will assess each identified hazard and define risk acceptance procedures and levels of management that can make safety risk acceptance decisions.

B) **Design Expectations:**

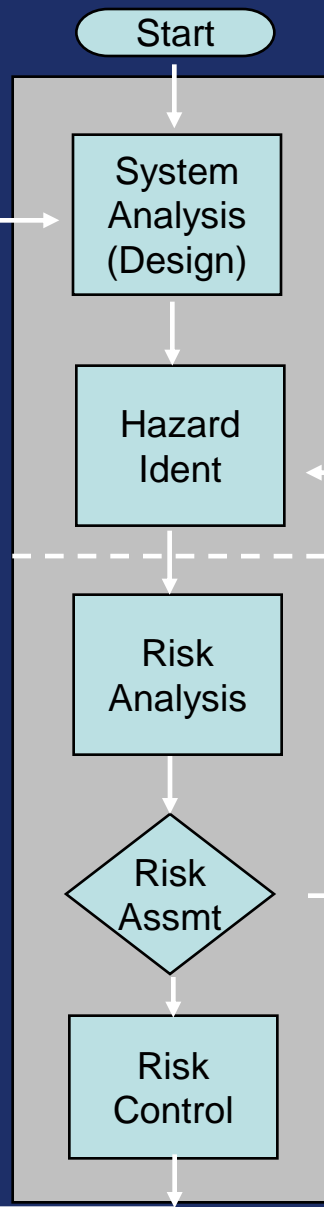
Each hazard will be assessed for its safety risk acceptability using the safety risk acceptance process described in Component 2.0 B) 4).

### **Process 2.2.3 Control/Mitigate Safety Risk**

A) **Performance Objective:** The service provider will design and implement a risk control for each identified hazard for which there is an unacceptable risk to reduce the potential for death, serious physical harm, or damage to equipment or property to acceptable levels. For each Risk Control the residual or substitute risk will be analyzed before implementation.

Page Break

# SRM



**Inputs:** 2.0(B)(2)(a),(b) & (d)  
•New System  
•System Change  
•New Operational Procedure

2.1.1

2.1.2

**Inputs:** 2.0(B)(2)(c)  
From SA: 3.1.8(B)(3)

2.2.1

2.2.2

**Outputs:** To SA 3.0(B)(1)(b)

2.2.3

## 2.1 Hazard Identification & Analysis

## 2.2 Risk Assessment & Control

Evaluate Controls  
2.2.3(B)  
(2) & (3)

## ***Element 3.1 Safety Performance Monitoring and Measurement***

### ***Process 3.1.1 Continuous Monitoring***

A) **Performance Objective:** The service provider will monitor operational data, including products and services received from contractors, to identify hazards, measure the effectiveness of safety risk controls, and assess system performance.

B) **Design Expectations:**

- 1) The service provider will monitor operational data (e.g., duty logs, crew reports, work cards, process sheets, and reports from the employee safety feedback system specified in Process 3.1.6) to:
  - a) Determine conformity with safety risk controls (described in Process 2.2.3);
  - b) Measure the effectiveness of safety risk controls (described in Process 2.2.3);
  - c) Assess system performance; and
  - d) Identify hazards.
- 2) The service provider will monitor products and services received from subcontractors.

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### ***Process 3.1.2 Internal Audits by Operational Departments***

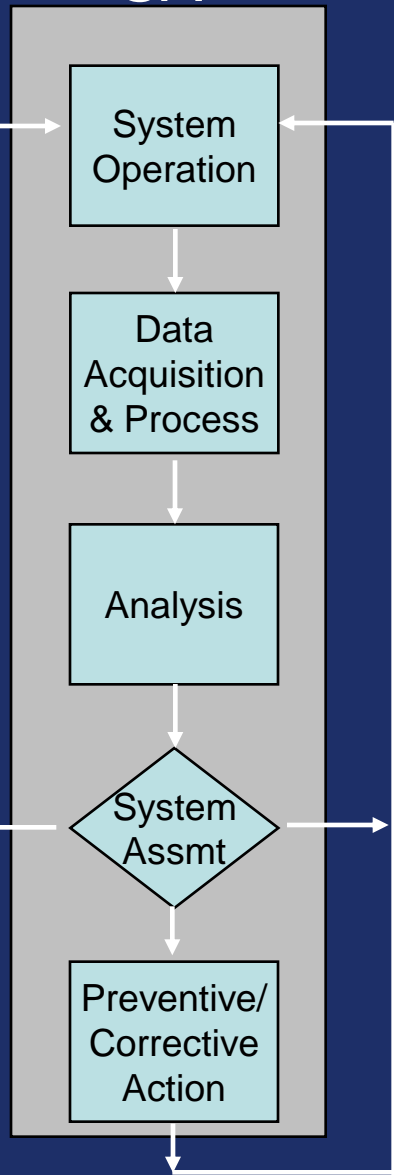
A) **Performance Objective:** The service provider will perform regularly scheduled internal audits of operational processes, including those performed by contractors, to determine the performance and effectiveness of risk controls.

B) **Design Expectations:**

- 1) Line management of operational departments will ensure that regular internal audits of safety-related functions of the organization's operational processes (production system) are conducted. This obligation will extend to any subcontractors that they may use to accomplish those functions. (Note: The Internal Audit is a primary means of output measurement under Component 1.0, B, 3) c) and 4) e)).
- 2) Line management will ensure that regular audits are conducted to:
  - a) Determine conformity with safety risk controls; and
  - b) Assess performance of safety risk controls.
- 3) Planning of the audits program will take into account:

# 3.1 Safety Performance Monitoring and Measurement

SA



**Inputs:**  
From SRM 2.2.2(B) & 2.2.3 (B)(2)(b)  
To SA:  
3.0(B)(1)(b)

**Outputs:** 3.1.8(B)(3)  
To SRM 2.0(B)(2)(c)

Per 2.1.1 including Risk Controls per 3.1.3

- 3.1.1 Continuous Monitoring
- 3.1.2 Internal Audits
- 3.1.3 Internal Evaluation
- 3.1.4 External Evaluation
- 3.1.5 Investigations
- 3.1.6 Employee Reporting

3.1.7 Analysis of Data { How is this going to be analyzed? By whom?

- 3.1.8 System Assessment
- 3.1.10 Management Review

3.1.9 \* Note: Each data source should be traceable through analysis (3.1.7(B)(1)), assessment and Corrective Action (3.1.9(B)(1)) where necessary.





# **SAFETY MANAGEMENT SYSTEM (SMS) ASSURANCE GUIDE**

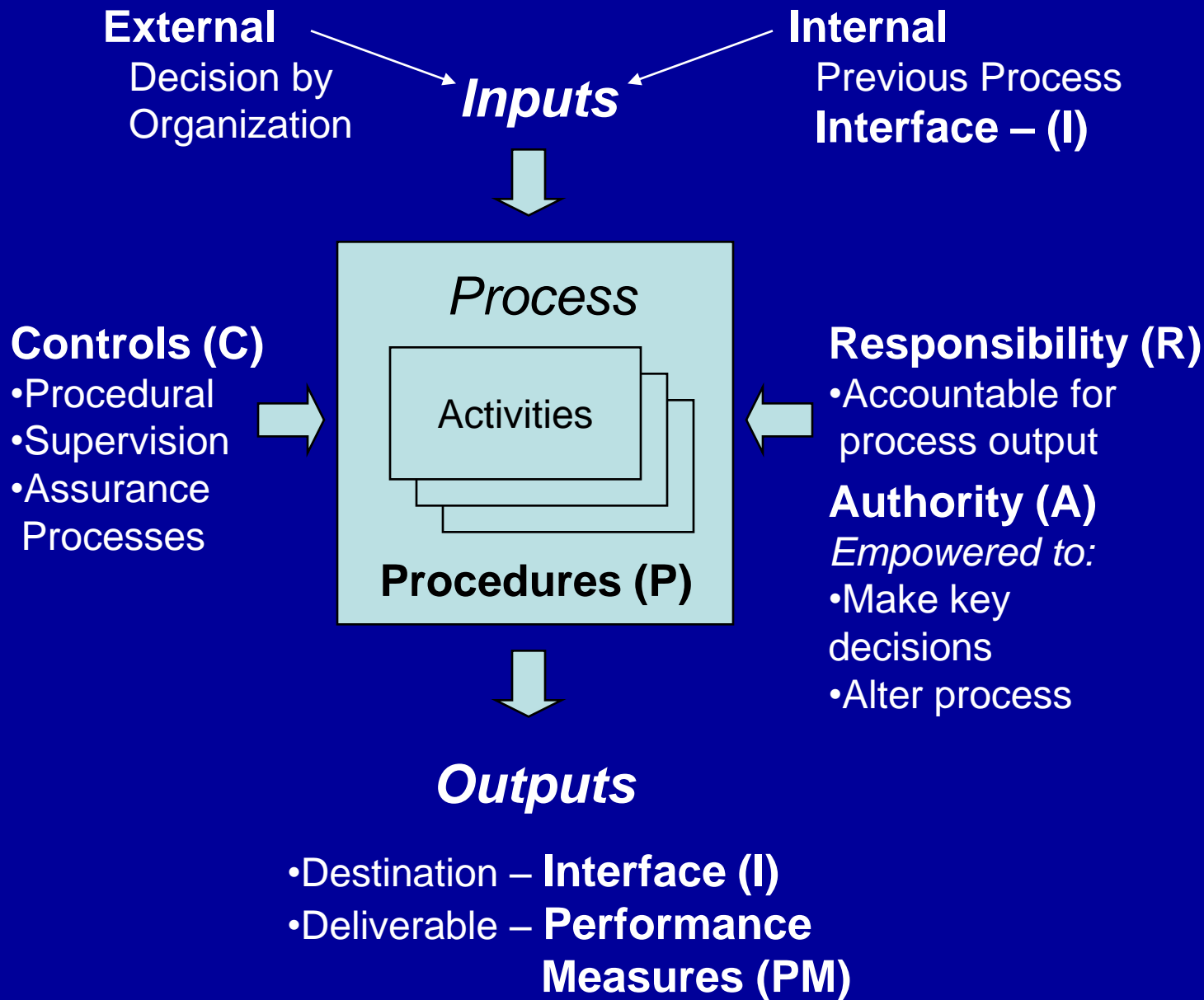
**For:**

**Voluntary Implementation of Service Provider  
SMS Programs**

**Federal Aviation Administration**







**Process 2.1.2 Identify Hazards**

**Performance Objective**

The service provider will identify and document physical harm or damage to equipment or property in accordance with the SMS Framework 1.5 B) 1) a) Old - SMS

**Design Expectations**

**Input**

Does the service provider's documented process obtain the necessary information identified from the SMS Framework 1.5 B) 1) a) Old - SMS

**Management Responsibility**

Does the service provider's documented identification process?

**Procedure**

Does the service provider's hazard identification process cover the entire scope of the system?

**Outputs and Measures**

Does the service provider's documented process and the analysis and assessment of the identified hazards?

**Bottom Line Assessment**

Has the service provider identified an unacceptable level of physical harm or damage to equipment or property?

Each Element/Process has a Performance Objective that defines the expected outcome

Design expectations are then defined that outline characteristics

Inputs tell us where the process starts:

Management Responsibility tells us:  
•Who is accountable for process

Finally, the "Bottom Line Assessment" takes us back to the objective – will/does the process achieve its intended outcome? (Affirmation)

measures)

•Destination of the output (Interfaces)  
Some critical processes also have Controls

## Process 3.1.4 External Auditing of the SMS

### Performance Objective

The service provider will include the results of audits performed by oversight organizations in its analysis of data.



<b>Design Expectations</b>
<b>Input</b>
Does the service provider's documentation identify inputs (interfaces) for the External Auditing process obtained from the Risk Control/Mitigation process (2.2.3) and from the FAA and/or other external agencies? <i>SMS Framework 1.5 B) 1) ¶ Old – SMS Standard (I)</i>
<b>Management Responsibility</b>
Does the service provider's documentation clearly identify who is responsible for the quality of the external auditing process? <i>SMS Framework 1.2 A) Old – SMS Standard 5.5.D (RIA)</i>
<b>Procedure</b>
Does the service provider have documentation that ensures it includes the <u>results</u> of oversight organization audits in the analyses conducted under SMS Process 3.1.7? <i>SMS Framework 3.1.4 B) 1) Old – SMS Standard 6.3.4 (PII)</i>
<b>Outputs and Measures</b>
Does the service provider's documentation include the identification of <u>interfaces</u> between the External Audit process, Analysis of Data process (3.1.7) and the FAA and/or other external agencies? <i>SMS Framework 1.5 B) 1) ¶ Old – SMS Standard 5.3, 5.4, and 5.5 (I)</i>
Does the service provider's documentation include methods to periodically measure performance objectives and expectations? Measures (or objective evidence) should validate conformance to expectations (outputs) of the external auditing process. <i>See note at 3.1.3 &amp; SMS Framework 1.0 B) 2) and 3); 3.1.3 B) 1) Old – SMS Standard 4.9.B.2.b (PMI)</i>
<b>Controls</b>
Does the service provider ensure procedures are followed for safety related operations and activities? Documentation should establish and maintain supervisory and operational controls. <i>SMS Framework: 1.0 B) 4) ¶ Old – 4.7 (C)</i>
Does management document their periodic review of supervisory and operational controls, to ensure the effectiveness of the external auditing process? Controls should be used to identify and maintain compliance with current safety related, regulatory, and other requirements. <i>SMS Framework 3.1.3 B) 1) and 3.1.10 A) &amp; B) Old – SMS Standard 4.9.B.2.b (C)</i>

### Bottom Line Assessment

Has the service provider included the results of audits performed by oversight organizations in its

Preliminary <b>Air Carrier</b> Gap Analysis Tool									
Note: This tool is designed to be used with SMS Assurance Guide, Rev 1, and should be viewed <b>electronically</b>									
Participant:					Location:				
Assurance Guide Question	Overall Assmt Rating	Fit Ops. Assmt Rating	Dispatch Assmt Rating	MTC Assmt Rating	Cabin Assmt Rating	Ground Assmt Rating	Cargo Assmt Rating	Training Assmt Rating	
<b>Component 1.0 Safety Policy and Objectives</b>									
<i>Policy: General Expectations</i>									
<b>Performance Objective</b>									
A service provider will develop and implement an integrated, comprehensive, SMS for its entire organization and will incorporate a procedure to identify and maintain compliance with current safety related, regulatory, and other requirements.									
<b>Element 1.1 Safety Policy</b>									
<b>Performance Objective</b>									
Top Management will define the service provider's safety policy and convey the expectations and objectives to its employees.									
<b>Element 1.2 Management Commitment and Safety Accountabilities</b>									
<b>Performance Objective</b>									
Top Management will define, document, and communicate the roles, responsibilities, and authorities regarding safety throughout its organization.									
<b>Element 1.3 Key Safety Personnel</b>									
<b>Performance Objective</b>									
The service provider will appoint a management representative to manage, monitor and coordinate the SMS processes throughout its organization.									
<b>Element 1.4 Emergency Preparedness and Response</b>									
<b>Performance Objective</b>									



**Detailed Air Carrier Gap Analysis Tool Assessments and Summary**  
 Note: This tool is designed to be used with SMS Assurance Guide, Rev 1, and should be viewed **electronically**  
 Participant: Location:

Assurance Guide Question	Company's Documentation Source	Overall Assmt Rating	Fit Ops. Assmt Rating	Dispatch Assmt Rating	MTC Assmt Rating	Cabin Assmt Rating	Ground Assmt Rating	Cargo Assmt Rating	Training Assmt Rating
<b>Element 1.1 Safety Policy</b>									
<b>Performance Objective</b> Top Management will define the service provider's safety policy and convey the expectations and objectives to its employees.									
<b>Design Expectations</b>									
<b>Management Accountability</b>									
Does top management define the service provider's safety policy? <i>SMS Framework 1.1 B) 1) Old – SMS Standard 4.2.A (P/R/A)</i>									
<b>Procedure</b>									
Does the service provider's safety policy include the following— (P)									
A commitment to implement SMS? <i>SMS Framework 1.1 B) 2) a) Old – SMS Standard 4.2.B.1 (P)</i>									
A commitment to continually improving the level of safety? <i>SMS Framework 1.1 B) 2) b) Old – SMS Standard 4.2.B.2 (P)</i>									
A commitment to the management of safety risk? <i>SMS Framework 1.1 B) 3) c) Old – SMS Standard 4.2.B.3 (P)</i>									
A commitment to comply with all applicable regulatory requirements? <i>SMS Framework 1.1 B) 4) d) Old – SMS Standard 4.2.B.4 (P)</i>									
A commitment to encourage employees to									



# AC XX-XX (“120-XX”) Voluntary Implementation of SMS

- Implementation process to go with AC 120-92
- Similar to ICAO and TC (Canada) processes
- Will be a stand-alone Implementation Guide until formal program is approved or rules are issued

# Interim Guidance for Level 1

- **Based on feedback from SMSPP**
- **Will form core of new Implementation Guide**

# What's coming

- **Implementation Guide**
- **SMS Guidebook**
- **AC 120-92A**
- **Safety Attribute Inspection Tool**





# Reengineering of Tools and Development of Guidance

- Effort to simplify assessment tools
- Systemic process flow
- Each question analyzed for interpretive problems
- Based on SMSPP experience
- Guidance will be combined into Development Guidance (DG) sections in SMS Guidebooks