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# **Overview of Safety Management Systems**

## **Facilitator's Guide**

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# PREPARATION

## *About This Training*

The purpose of the Introduction to Safety Management Systems training is to provide participants with an understanding of building blocks of a safety management system (SMS) and the relationship of SMS and system safety.

## *Training Format*

The Introduction to SMS training content is delivered in two ways:

- A short facilitated lesson, to introduce the general concepts
- A two-part video presentation, supported with facilitated discussions during and immediately following the video.

Note that this training may also be completed independently through eLMS.

This Preparation section provides guidance for planning the training session and preparing to deliver it.

## *Planning for the Training*

Follow the steps below to plan the training.

### **Step 1. Determine who will deliver the training.**

The training session can be delivered by any of the following people, alone or in combination:

- The local office manager
- A representative from AFS-900

To request support from an AFS-900 representative, contact Don Arendt at [Don.Arendt@faa.gov](mailto:Don.Arendt@faa.gov).

Provide a copy of the following items to the person(s) who will deliver the training to allow time for adequate preparation:

- The information for preparing to deliver the training session (see page iii)
- The lesson plan
- The Overview of Safety Management Systems DVD.

## **Step 2. Schedule a time and location for the training session.**

Select a time and date that is convenient for the person(s) who is delivering the training and that fits most participants' schedules.

Select a location that:

- Is large enough to comfortably seat all participants and the instructor(s)
- Allows participants to be able to clearly view the video
- Limits outside distractions (e.g., ringing phones, people traffic)

A large conference room, a training room, or a small auditorium are good options.

## **Step 3. Gather necessary materials and equipment**

You will need the following materials and equipment for the training:

- The PowerPoint slides that accompany the lesson plan
- A computer to launch the PowerPoint presentation
- The Overview of Safety Management Systems DVD
- A DVD player
- Equipment from which to view the slides and video (i.e., a large monitor or a projector)
- White board or chart paper and markers (optional; instructors may wish to post discussion questions and/or answers)
- Sufficient copies of the participant guide

Note: Test the equipment to ensure the DVD runs properly well in advance of the session.

Also, tell participants to bring AC 120-92 with them to the training session.

## ***Preparing to Deliver the Overview of Safety Management Systems Training***

If you are delivering the training, follow these steps to prepare yourself:

**Step 1. Review the DVD.** This will help you see how the information in the lesson plan supports the content and will help you anticipate questions that might arise. Refer to Appendix A for a list of the key points covered in the video.

**Step 2. Review this lesson plan.** Study the lesson plan in detail so you understand how the information is organized and how the discussions support the information.

Consider practicing your delivery to ensure you are familiar with the lesson organization, the supporting materials (e.g., the video and participant guide), and the timing and pacing of the lesson.

**Step 3. Consider your audience.** Consider how familiar the audience is with system safety and its related concepts. You may wish to tailor the presentation based on the audience's background (e.g., by spending more or less time on certain topics).

## LESSON PLAN INFORMATION SHEET

Sponsor	Training Policy	Training Provider
AFS-900		
<b>Course # &amp; Name:</b>	FAA27100028, Overview of Safety Management Systems	
<b>Lesson Title &amp; Tag:</b>	Introduction to Safety Management Systems	
<b>Lesson Number:</b>	1	
<b>Version:</b>	1	
<b>Version Date:</b>	12/20/07	
<b>Duration (includes breaks):</b>	3 hours	

### Lesson Overview:

This lesson provides guidance for introducing foundational information about safety management systems and for introducing, showing, and debriefing the Overview of Safety Management Systems video.

### Visuals:

- Supporting PowerPoint slides (Intro\_to\_SMS.ppt)
- Overview of Safety Management Systems DVD

### Handouts:

- HO-01: Participant Guide

### Computer File Names:

**Lesson Plan:** Intro\_to\_SMS\_LP 12-20.doc

### Instructor References (as revised):

#### Advisory Circular

- AC 120-92, Introduction to Safety Management Systems for Air Operators

PROMPTS	CONTENT	NOTES
	<p data-bbox="396 233 886 275"><b>I. INTRODUCTION</b></p> <p data-bbox="396 331 716 373"><b>A. MOTIVATION</b></p> <p data-bbox="396 405 1219 709">Since the mid-1990s, the FAA has continued to implement system safety-based oversight systems. However, oversight alone can only go so far. A complete systems approach can only succeed through the combined efforts of regulators (FAA) and process owners – certificate holders.</p> <p data-bbox="396 779 1170 995">Safety Management Systems (SMS) apply risk management and quality management to problems of managing safety and provide operators with a structured framework to meet this responsibility.</p> <p data-bbox="396 1064 1198 1325">In 2005, The International Civil Aviation Organization (ICAO) circulated a proposal to add requirements for SMSs to Annex 6, <i>Operation of Operation of Aircraft</i> and to harmonize these requirements with existing requirements for airports and air traffic organizations.</p> <p data-bbox="396 1394 1214 1610">In 2006, ICAO published requirements for air operators and aviation maintenance organizations to establish safety management systems so that their safety strategies and practices are managed just like any other business objective.</p>	

PROMPTS	CONTENT	NOTES
	<p>The United States concurred with the ICAO proposal to add SMS requirements to Annex 6, along with 70 of the 71 countries that replied to the 2005 proposal letter.</p> <p>ICAO Annex 6 requires member states to have requirements in place as of January 1, 2009. A recent proposal may extend this date and apply SMS requirements to other types of aviation organizations. The FAA intends to implement this requirement – and we will therefore be responsible for overseeing our operator's safety management systems.</p> <p><b>B. OVERVIEW</b></p> <p>In this session we'll review some of the key building blocks of SMS and discuss its relationship to system safety.</p> <p>You'll also view a video that provides more information about SMS and illustrates some of the key processes through an example.</p> <p>This training is intended to be an introduction to SMS; it is not the only SMS training you will receive.</p>	

PROMPTS	CONTENT	NOTES
	<p>The participant guide is for you to use as a reference both during the training and to take away with you. Let me quickly review what is in it:</p> <ul style="list-style-type: none"> <li>• The guide is organized by the key sections of the training.</li> <li>• In the first section, I'll review some key SMS concepts. You'll see a copy of the slides that support this review.</li> <li>• The next section corresponds with the video. You'll see a summary of the key points covered in each video segment. There's also space for you to take notes for each segment.</li> <li>• We'll stop the video part of the way through to discuss what you've heard so far. If you turn to page 10, you'll see that it corresponds with the discussion that we'll have.             <ul style="list-style-type: none"> <li>- You can see that I'll be asking you a few recall questions – so listen for that information in the video.</li> <li>- But mostly you can use this page to jot down any information that you feel is particularly useful from our discussion.</li> </ul> </li> </ul>	<p>Hand out HO-01, Participant Guide. Walk participants through how it is organized.</p> <p>Answer any questions about the participant guide.</p>

PROMPTS	CONTENT	NOTES
<p>Slide 1-2</p>	<p><b>II. BODY</b></p> <p><b>A. WHY SMS?</b></p> <p>Most of the operators that we oversee manage safety separately from their main business operations. And it has often been reactive, as a result of an incident or accident.</p> <p>Although this separate focus on safety has contributed toward the reduced number of aviation accidents, as operations become more complex and global, operators must continually evaluate whether their traditional ways of looking at safety are adequate.</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;"><b>SMS Goals</b></p> <ul style="list-style-type: none"> <li>• Operators manage safety just like every other part of their business</li> <li>• Safety becomes a critical component in all aspects of operational decision-making</li> <li>• Create a set of management practices and a safety culture that are built into all systems and processes</li> <li>• Direct manager involvement in the safety of operations</li> </ul> </div>	<p>If appropriate, describe the organizational structure of one of your operators that has a Safety Department or separate organizational function that manages safety.</p>

PROMPTS	CONTENT	NOTES
<p style="text-align: center; font-size: 2em; font-weight: bold;">?</p>	<p>The goal of a safety management system – or SMS – is that operators manage safety just like every other part of their business, like finance or human resources. That way, safety becomes a critical component in all aspects of operational decision-making.</p> <p>In other words, an SMS should create a set of management practices and safety culture that are built into all systems and processes, with direct management involvement in the safety of operations.</p> <p>So rather than the traditional focus on inspecting end products and fixing them when there is a problem, with an SMS the focus is more on controlling the processes that produce the end product.</p> <p><b>B. SMS CONCEPTS</b></p> <p>In order to understand how operators can meet these goals, it’s useful to review some of the underlying concepts, so that it’s clear what we mean when we talk about a “safety management system.”</p> <p>Let’s first consider what we mean by “safety.”</p> <p>How do you define safety?  <i>Solicit responses and then show the slide.</i></p>	

PROMPTS	CONTENT	NOTES
<p>Slide 1-3</p>	<div style="border: 1px solid black; padding: 20px; margin-bottom: 20px; text-align: center;"> <h2 style="margin: 0;">Safety is ...</h2> <p style="margin: 10px 0;">... the state in which risk is reduced and maintained at or below an acceptable level through a process of hazard identification and risk management.</p> </div> <p>Because it is impossible to achieve operations that are completely free of danger or risk, safety is NOT the absence of risk.</p> <p>Instead, safety is the state in which risk is reduced to and maintained at or below an acceptable level.</p> <p>So an important part of an SMS involves identifying risks and appropriate controls to address them.</p> <p>In order to successfully identify and control risks, operators must use a systematic process. This systematic process is what we refer to when we say "system safety."</p> <p>Let's take a look at the official definition of system safety.</p>	

PROMPTS	CONTENT	NOTES
<p>Slide 1-4</p>	<div style="border: 1px solid black; padding: 20px; margin-bottom: 20px; text-align: center;"> <h2 style="margin: 0;">System Safety is ...</h2> <p style="margin: 0;">... the application of special technical and managerial skills in a systematic, forward-looking manner to identify and control the effects of hazards throughout the life cycle of a project, program, or activity.</p> </div> <p>System safety is the application of special technical and managerial skills in a systematic, forward-looking manner to identify and control the effects of hazards throughout the life cycle of a project, program, or activity.</p> <p>But what does all of that really mean? Let's take a closer look at some of the components of the definition.</p> <p>First, let's consider the technical element. There are two components that make up the technical element:</p> <ul style="list-style-type: none"> <li>• The technical element of <u>aviation</u>, which is a result of decades of development and experience in engineering, design and operation of the complex aviation processes that make up the air transportation system.</li> </ul>	

PROMPTS	CONTENT	NOTES
	<ul style="list-style-type: none"> <li data-bbox="396 216 1208 478">• The technical element of <u>system safety</u>, which is the oversight of these technical principles and the underlying technical skills and performance of aviation practitioners. Most of the emphasis in aviation safety has been placed on this aspect.</li> </ul> <p data-bbox="396 541 1175 716">While the emphasis on the technical element of system safety has brought us the safest air transportation system in the world, it often neglects the human element.</p> <p data-bbox="396 783 1198 999">This is where management principles come into play – planning, organizing, directing, and controlling people and other resources that support and operate the aviation system. This is the managerial element of system safety.</p> <p data-bbox="396 1066 1198 1241">So, while the technical aspects of the system are as vitally important as they ever were, we are now looking to the managerial aspects of the system to further enhance the level of safety.</p> <p data-bbox="396 1308 1224 1482">Moreover, the managerial area is where the safety process attributes (responsibility, authority, procedures, controls, interfaces, and process measures) come into play.</p> <p data-bbox="396 1549 1170 1682">According to our definition, these technical and managerial principles and skills are applied to identify and control the effects of hazards.</p>	

PROMPTS	CONTENT	NOTES
<p data-bbox="235 212 277 275">?</p> <p data-bbox="147 422 253 449">Slide 1-5</p>	<p data-bbox="394 212 1127 296">For those of you who have taken the system safety course, what is a hazard?</p> <p data-bbox="394 308 1081 350"><i>Solicit responses and then show the slide.</i></p> <div data-bbox="394 422 1227 1041" style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p data-bbox="651 474 967 520" style="text-align: center;">A hazard is ...</p> <ul data-bbox="444 575 1169 888" style="list-style-type: none"> <li>• Any existing or potential condition that can lead to:                             <ul style="list-style-type: none"> <li>– Injury, illness, or death to people</li> <li>– Damage to or loss of a system, equipment, or property</li> <li>– Damage to the environment</li> </ul> </li> <li>• A prerequisite to an accident or incident.</li> </ul> </div> <p data-bbox="394 1108 1222 1190">A hazard is any existing or potential condition that can lead to:</p> <ul data-bbox="394 1262 1198 1449" style="list-style-type: none"> <li>• Injury, illness, or death to people</li> <li>• Damage to or loss of a system, equipment, or property</li> <li>• Damage to the environment</li> </ul> <p data-bbox="394 1516 1133 1556">It is a prerequisite to an accident or incident.</p>	

PROMPTS	CONTENT	NOTES
<p data-bbox="237 936 277 995">?</p> <p data-bbox="147 1192 253 1220">Slide 1-6</p>	<p data-bbox="394 216 1211 338">Hazards may be related to the technical systems, the operational environment, or the management practices involved.</p> <p data-bbox="394 411 1224 621">Limitations or deficiencies in the design or condition of aircraft or other equipment can constitute hazards. Conditions in the environment such as terrain, weather, or airport facilities can also constitute hazards.</p> <p data-bbox="394 695 1211 863">Managerial functions can also introduce hazards into the system such as poor procedures, missing lines of communications between employees (i.e., interfaces), or lack of supervisory controls.</p> <p data-bbox="394 940 1146 1062">Again, for those of you who have taken the system safety course, what is the relationship between hazards and risks?</p> <p data-bbox="394 1083 1008 1119"><i>Solicit responses then show the slide.</i></p> <div data-bbox="394 1192 1227 1814" style="border: 1px solid black; padding: 10px; text-align: center;"> <p data-bbox="704 1247 917 1289"><b>Risk is ...</b></p> <p data-bbox="444 1346 1146 1472">... the composite of predicted severity and likelihood of the potential effect of a hazard in the worst credible system state.</p> </div>	

PROMPTS	CONTENT	NOTES
<p style="text-align: center; font-size: 2em; font-weight: bold;">?</p>	<p>Risk is the composite of predicted severity and likelihood of the potential effect of a hazard in the worst credible system state.</p> <p>In other words, risk is determined by how likely it is that a negative consequence of the hazard will occur and how bad it will be if it does happen.</p> <p>For example, how likely is it that a poorly designed maintenance procedure would result in a maintenance error that would cause an aircraft accident? And if that happens, how severe will the consequences be?</p> <p>Once risk is defined in terms of likelihood and severity, the operator can identify methods for controlling the risk.</p> <p>What are some examples of methods the operator could put in place to control the risks associated with a typical maintenance process, say a tire change?</p> <p><i>Solicit responses. Possible answers include:</i></p> <ul style="list-style-type: none"> <li>• <i>An inspection process to ensure the equipment is adequately maintained and functioning properly</i></li> <li>• <i>Documented procedures that must be followed, with supervisory sign off to verify they were followed.</i></li> </ul>	

PROMPTS	CONTENT	NOTES
	<p>So going back to our definition, in order to apply system safety to its processes, we're saying that an operator would need to involve people with both technical and managerial skills in identifying the hazards and methods to control the associated risks. They would also have to apply sound management principles to the design and control of safety critical processes.</p> <p>This systematic approach for identifying hazards and controlling risk is a fundamental SMS concept.</p> <p>To see how system safety is fundamental to SMS, let's take a closer look at the two SMS functional components:</p> <ul style="list-style-type: none"> <li>• Safety risk management</li> <li>• Safety assurance</li> </ul> <p><b>C. THE SAFETY RISK MANAGEMENT PROCESS</b></p> <div data-bbox="397 1218 1226 1837" style="border: 1px solid black; padding: 10px;"> <p style="text-align: center;"><b>The Safety Risk Management Process</b></p> <pre> graph TD     A[Describe System 5.1] --&gt; B[Identify Hazards 5.2]     B --&gt; C[Analyze Safety Risk 5.3]     C --&gt; D{Assess Safety Risk 5.4}     D -- Acceptable --&gt; E[Leads to Safety Assurance Process]     D -- Unacceptable --&gt; F[Control Safety Risk 5.5]     F -- Safety Risk Management --&gt; A     G[Safety Assurance Process identifies new hazard or ineffective control] --&gt; B     </pre> </div>	

Slide 1-7

PROMPTS	CONTENT	NOTES
	<p>When you look at the safety risk management process, you should clearly see the linkage to the system safety principles we've been discussing.</p> <p>Safety risk management is a 5-step process:</p> <ol style="list-style-type: none"> <li>1. Analyze systems and tasks in order to gain an understanding of a system's (or process') characteristics and operating environment.</li> <li>2. Identify and adequately document hazards that are likely to cause death, serious physical harm, or damage to equipment or property</li> <li>3. Analyze safety risk by determining the severity and likelihood of potential events associated with the identified hazards</li> <li>4. Assess safety risk by defining acceptance criteria and procedures and management levels that can make safety risk acceptance decisions for each identified hazard</li> <li>5. Control safety risk by designing and implementing a risk control for each identified hazard with unacceptable risk in order to reduce the potential harm to acceptable levels</li> </ol>	

PROMPTS	CONTENT	NOTES
<p>Slide 1-8</p>	<div style="border: 1px solid black; padding: 10px; margin-bottom: 10px;"> <p style="text-align: center;"><b>Operators should follow the SRM when they ...</b></p> <ul style="list-style-type: none"> <li>• Design new systems, organizations, or products</li> <li>• Develop operational procedures</li> <li>• Plan changes to existing systems, organizations, products, or procedures</li> </ul> </div> <p>By following this systematic process, operators can proactively address risks each time they:</p> <ul style="list-style-type: none"> <li>• Design new systems, organizations, or products</li> <li>• Develop operational procedures</li> <li>• Plan changes to existing systems, organizations, products, or procedures</li> </ul>	

PROMPTS	CONTENT	NOTES
	<p>It's also important to note that regulations are part of safety risk management, not something separate. The FAA takes into account identified hazards in the aviation system when developing regulations and their associated policies. Regulations set bounds on operators' risk acceptance and therefore set up a framework for risk control.</p> <p>In the video, you'll see an example of how an operator applies the safety risk management process when designing a new system.</p> <p><b>D. SAFETY ASSURANCE</b></p> <div data-bbox="396 909 1227 1533" style="border: 1px solid black; padding: 10px;"> <p style="text-align: center;"><b>The Safety Assurance Process</b></p> </div>	

Slide 1-9

PROMPTS	CONTENT	NOTES
	<p>Once risk controls are put in place, the safety assurance process ensures they are being practiced and they continue to achieve their intended objectives.</p> <p>The safety assurance process is a four-step process that includes:</p> <ol style="list-style-type: none"> <li>1. Information acquisition. In this step, the operator collects information about its systems through investigations, auditing, and continuous monitoring activities.</li> <li>2. Analysis of data, to assess the performance and effectiveness of the risk controls and identify root causes of deficiencies and/or potential new hazards</li> <li>3. System assessment, to determine how the system is performing. <ul style="list-style-type: none"> <li>• Nonconformances lead to the next step in the safety assurance process.</li> <li>• Newly discovered hazards or ineffective risk controls are addressed by returning to the safety risk management process.</li> </ul> </li> <li>4. Preventive/corrective action, to restore risk controls to their designed level of performance.</li> </ol> <p>As with the safety risk management process, you'll see an example of how an operator applies the safety assurance process in the video.</p>	

PROMPTS	CONTENT	NOTES
	<p><b>E. INTRODUCTION TO THE VIDEO</b></p> <p>In the video you'll hear Jim Ballough, the Director of the Flight Standards Service, introduce safety management systems.</p> <p>Then you'll hear more about SMS, including:</p> <ul style="list-style-type: none"> <li>• What an SMS is</li> <li>• Why an SMS is important</li> <li>• An overview of FAA's SMS standard</li> <li>• A closer look at the Safety Risk Management and Safety Assurance processes</li> <li>• The relationship between SMS and FAA oversight</li> </ul> <p>We'll stop the video part of the way through to discuss what you've heard so far and answer any questions you have.</p> <p>At the end of the video, we'll debrief what you learned and answer your remaining questions.</p>	<p>Start the video. Let the video play through the Overview of the FAA's SMS Standard section (the video will prompt you to pause). Then stop the video and continue with the next section of the lesson plan.</p>

PROMPTS	CONTENT	NOTES
<p style="text-align: center; font-size: 2em; font-weight: bold;">?</p>	<p style="text-align: center; font-weight: bold;">F. INTERIM DISCUSSION</p> <p>So far the video has provided a more detailed explanation of safety management systems and their importance.</p> <p>Based on what you have heard so far, what do you see as the relationship between system safety and a safety management system?</p> <p><i>Solicit responses. The suggested answer is:</i></p> <p><i>A safety management system is a formal and structured manner for practicing system safety. It provides a formal process for:</i></p> <ul style="list-style-type: none"> <li>• <i>Assessing systems, identifying hazards in the systems, and developing risk controls in those systems.</i></li> <li>• <i>Making sure that the controls are practiced and continue to be effective</i></li> </ul>	

PROMPTS	CONTENT	NOTES
<p style="text-align: center; font-size: 2em; font-weight: bold;">?</p>	<p>What are some of the benefits an operator can gain by implementing an SMS?</p> <p><i>Solicit responses. Add any of the following if they are not mentioned:</i></p> <ul style="list-style-type: none"> <li>• <i>Provides a proactive approach to managing safety</i></li> <li>• <i>Builds risk controls and a process for assuring the controls are effective into the design of the operator's systems</i></li> <li>• <i>It's good for business – better processes produce better products</i></li> <li>• <i>Integrates multiple management systems (such as quality, occupational safety, and environmental control systems) to reduce redundancy and inefficiency</i></li> <li>• <i>Provides more confidence that the level of safety will be maintained</i></li> </ul> <p>The video also reviewed FAA's SMS standard, as outlined in AC 120-92. This standard provides guidance for U.S. aviation service providers in developing their own safety management systems. By using the standard, it creates a common language and framework across domestic and international operators and oversight organizations.</p>	

PROMPTS	CONTENT	NOTES
<p>?</p>	<p>To review, what are the four components, sometimes called the four “pillars,” that are essential for safety management systems?  <i>Solicit responses. The correct answers are:</i></p> <ul style="list-style-type: none"> <li>• <i>Policy</i></li> <li>• <i>Safety Risk Management</i></li> <li>• <i>Safety Assurance</i></li> <li>• <i>Safety Promotion</i></li> </ul>	
<p>?</p>	<p>And of the four SMS components, which two represent the “heart” of a safety management system?  <i>Solicit responses. The correct answers are:</i></p> <ul style="list-style-type: none"> <li>• <i>Safety Risk Management</i></li> <li>• <i>Safety Assurance</i></li> </ul> <p>In the next part of the video, you’ll see how these processes are accomplished as an air carrier designs a new process.</p>	
<p>?</p>	<p>But before we start the video again, do you have any other questions about what has been presented so far?  <i>Answer any questions. Try to keep questions tied to the video content and remind participants that there will be more training in the future that will provide more detailed information..</i></p> <p>Let’s turn our attention back to the video – picking up with a closer look at the safety risk management process.</p>	



PROMPTS	CONTENT	NOTES
	<p>Why is the systems and task analysis step important?</p> <p><i>Solicit responses. Possible answers are:</i></p> <ul style="list-style-type: none"> <li>• <i>Allows the operator to make decisions about the system's design – for example, whether any modifications are needed based on the operator's business model</i></li> <li>• <i>Shows the operator how the system integrates into its operational environment</i></li> <li>• <i>Provides the operator with a comprehensive picture of the process, which is important to the success of the hazard identification process</i></li> </ul> <p>The next steps in the safety risk management process are:</p> <ul style="list-style-type: none"> <li>• Identify hazards</li> <li>• Analyze safety risk</li> <li>• Assess safety risk</li> <li>• Control safety risk</li> </ul> <p>Each hazard in an operator's system must be analyzed in terms of its safety risk, and if the risk is unacceptable, the operator must identify appropriate risk controls.</p>	

PROMPTS	CONTENT	NOTES
<p data-bbox="235 210 276 273">?</p>	<p data-bbox="394 205 1081 243">What are some examples of risk controls?</p> <p data-bbox="394 256 1057 296"><i>Solicit responses. Possible answers are:</i></p> <ul data-bbox="394 310 1218 604" style="list-style-type: none"> <li data-bbox="394 310 639 350">• <i>Regulations</i></li> <li data-bbox="394 363 630 403">• <i>Procedures</i></li> <li data-bbox="394 415 792 455">• <i>Improved equipment</i></li> <li data-bbox="394 468 581 508">• <i>Training</i></li> <li data-bbox="394 520 1218 604">• <i>Warnings or other signals to alert personnel of the hazard</i></li> </ul> <p data-bbox="394 676 1200 802">We saw an example of this process in the video with the new operator’s MEL process. Let’s walk through another example.</p> <p data-bbox="394 863 1187 1115">Assume an air carrier that has traditionally flown only in the warmer climate southwestern states decides to expand its routes to include flights to the Midwest. As part of this business decision, the carrier must update its de-icing/anti-icing process.</p>	<p data-bbox="1252 676 1471 1281">Use the example provided or select one of your own, using an operator with which you are familiar. If you select your own, describe the operator’s process to participants. Then explain a hazard associated with the process, the results of the risk assessment, and the risk controls the operator put in place.</p>
<p data-bbox="235 1297 276 1360">?</p> 	<p data-bbox="394 1310 1190 1394">What are some possible hazards associated with the air carrier’s de-icing/anti-icing process?</p> <p data-bbox="394 1415 1065 1455"><i>Solicit responses. If not mentioned add:</i></p> <ul data-bbox="394 1476 1201 1516" style="list-style-type: none"> <li data-bbox="394 1476 1201 1516">• <i>Weather that is conducive to icing conditions.</i></li> </ul> <p data-bbox="394 1598 1166 1724">On pages 19 and 20 of your participant guide, you’ll see the criteria for determining likelihood and severity levels and the risk matrix.</p>	

PROMPTS	CONTENT	NOTES
?	<p>If we focus on the hazard of the weather that is conducive to icing, it could result in the aircraft attempting to take off with ice, snow, or frost on its wings. How would you analyze the risk? What is the likelihood that an aircraft could attempt takeoff with ice, snow or frost on its wings?</p> <p><i>Solicit responses. The correct response should be frequent, considering that the air carrier will now be operating in locations that often have freezing precipitation during the winter.</i></p>	
?	<p>What is the severity of the hazard? In other words, how bad will it be if the aircraft fails to attain the necessary lift?</p> <p><i>Solicit responses. The correct response should be catastrophic, as an aircraft failing to attain the necessary lift due to ice, snow, or frost on its wings will likely crash.</i></p>	
?	<p>Using the risk assessment matrix, where would this risk fall?</p> <p><i>Solicit responses. The correct response is in the red area, Unacceptable.</i></p>	

PROMPTS	CONTENT	NOTES
<p>?</p>	<p>What are some examples of risk controls our air carrier could put in place to reduce the risk to acceptable levels?</p> <p><i>Solicit responses. Possible answers are:</i></p> <ul style="list-style-type: none"> <li>• <i>Provide detailed procedures that specify the exact mix of chemicals required</i></li> <li>• <i>Build in inspection procedures to ensure that the correct mix was used and that the plane is free of any ice, snow, and frost prior to takeoff</i></li> <li>• <i>Ensure that all personnel involved in the de-icing process are adequately trained</i></li> </ul> <p>By using the safety risk management process to proactively identify hazards and incorporate risk controls, the air carrier builds safety into the design of its de-icing system.</p> <p>Now let's review the safety assurance process.</p>	
<p>?</p>	<p>What are the purposes of the safety assurance process?</p> <p><i>Solicit responses. Answers are:</i></p> <ul style="list-style-type: none"> <li>• <i>Ensure that risk controls are effective</i></li> <li>• <i>Serve as a basis for continuous improvement</i></li> </ul> <p>As you heard in the video, the safety assurance process includes four steps:</p> <ul style="list-style-type: none"> <li>• Information acquisition</li> <li>• Analysis of data</li> <li>• System assessment</li> <li>• Preventive/corrective action</li> </ul>	

PROMPTS	CONTENT	NOTES
<p>?</p>	<p>In the information acquisition step, operators collect data about the performance of their processes.</p> <p>What are some of the methods operators can use to acquire information?</p> <p><i>Solicit responses. Answers are:</i></p> <ul style="list-style-type: none"> <li>• <i>Continuous monitoring of operational data (e.g., records review)</i></li> <li>• <i>Audit data, including:</i> <ul style="list-style-type: none"> <li>- <i>Internal audits by process owners (e.g., as part of the CASS)</i></li> <li>- <i>Internal audits by people unrelated to the process</i></li> <li>- <i>External audits, including FAA assessments</i></li> </ul> </li> <li>• <i>Investigations</i></li> <li>• <i>Employee reporting and feedback</i></li> </ul> <p>After collecting information about its systems, operators can then analyze it and make a decision about how they are performing.</p>	
<p>?</p>	<p>Assume an operator determines that some of its risk controls are not effective in maintaining risk at acceptable levels. What is the operator's next step?</p> <p><i>Solicit responses. The answer is: Return to the safety risk management process to redesign the failed system or control.</i></p>	

PROMPTS	CONTENT	NOTES
<p style="text-align: center; font-size: 2em; font-weight: bold;">?</p>	<p>If the results of the system assessment show that there are nonconformances with the system, what is the operator's next step?</p> <p><i>Solicit responses. The answer is: Preventive/corrective action to improve the system.</i></p> <p>An effective safety assurance process is critical to an operator's SMS to ensure that safety controls are effective.</p> <p>The last segment in the video discussed the relationship between SMS and FAA oversight.</p> <p>One of the key messages is that the FAA's oversight and the operator's SMS fulfill two distinct roles.</p> <ul style="list-style-type: none"> <li>• It is the FAA's role to provide oversight of an operator's systems, to confirm that they are operating at the highest levels of safety.</li> <li>• It is the operator's role to build safety management into their systems and the SMS gives them a structured way to do this.</li> </ul>	

PROMPTS	CONTENT	NOTES
<p>?</p> <p>?</p>	<p>Based on what you've heard today, how do you see your oversight role evolving as operators implement safety management systems?</p> <p><i>Solicit responses. Possible responses are:</i></p> <ul style="list-style-type: none"> <li>• <i>Assessing how operators have designed their systems to confirm that they have proactively considered the inherent risks and that these risks are addressed through risk controls.</i></li> <li>• <i>Evaluating whether operator systems are performing as they are designed (e.g., that procedures and controls are being followed)</i></li> </ul> <p>Do you have any other questions about what has been presented today?</p> <p><i>Answer any questions. Try to keep questions tied to the training content and remind participants that there will be more training in the future that will provide more detailed information..</i></p>	

PROMPTS	CONTENT	NOTES
	<p data-bbox="396 222 764 264"><b>III. SUMMARY</b></p> <p data-bbox="396 321 631 363"><b>A. REVIEW</b></p> <p data-bbox="396 394 1192 478">In today's session you were introduced to safety management systems.</p> <p data-bbox="396 552 1219 846">To conclude this training, I'd like to reinforce that an operator's implementation of an SMS does not diminish our oversight responsibilities. You will continue to rely on your technical skills to confirm that operator's systems meet regulatory requirements and adequately address the inherent risks.</p> <p data-bbox="396 915 1219 1041">In future training you'll have an opportunity to learn more about your oversight responsibilities of an operator's SMS.</p> <p data-bbox="396 1115 1154 1199">Thank you for your attention and participation today.</p>	

# **Handout 1**

**Introduction to Safety Management Systems  
Participant Guide**







## Video: Overview of Safety Management Systems

Video Section	Key Points Made	Your Notes
Introduction	<ul style="list-style-type: none"> <li>• As today's aviation systems become more complex and global, both aviation businesses and government entities must continually evaluate the safety strategies of the future.</li> <li>• In 2006, ICAO published requirements for air operators and aviation maintenance organizations to establish safety management systems (SMSs) so that their safety strategies and practices are managed just like any other business objective. ICAO Annex 6 requires member states to have requirements for SMSs in place as of January 1, 2009.</li> <li>• The FAA is a proponent of safety management systems and intends to implement this requirement. In June of 2006, the FAA published an advisory circular (AC 120-92) to introduce the concept of safety management systems and provide guidance for their development.</li> <li>• Because businesses and governments must work cooperatively to manage safety, AVS is also implementing its own safety management system, known as the AVSSMS. This internal SMS will help with oversight responsibilities by providing a process-orientated approach that emphasizes management systems to manage risk and assure safety. You will learn more about the internal safety management system in the future.</li> <li>• Risk is inherent in all aviation service provider organizations. It results from the environment and operational activities.</li> <li>• Under Title 49, certificate holders are responsible for identifying risk in their operating environments and managing it to an acceptable level.</li> </ul>	

Video Section	Key Points Made	Your Notes
Introduction (continued)	<ul style="list-style-type: none"> <li>• A safety management system will not eliminate hazards and risks. Instead, it provides certificate holders with a systematic way to control the risk in their environments and assure that risk controls are effective.</li> <li>• The video covers: <ul style="list-style-type: none"> <li>○ What safety management systems are and why they are important</li> <li>○ FAA's SMS standard</li> <li>○ The two primary elements of FAA's standard -- safety risk management and safety assurance</li> <li>○ The relationship of safety management systems and FAA's oversight systems</li> </ul> </li> </ul>	

Video Section	Key Points Made	Your Notes
<p>What is a Safety Management System, and Why is It Important?</p>	<ul style="list-style-type: none"> <li>• A safety management system is a formal, top-down business-like approach to managing safety risk. It includes systematic procedures, practices, and policies for the management of safety.</li> <li>• An SMS is a tool for a certificate holder to assess their systems, identify hazards in those systems, and develop risk controls in those systems.</li> <li>• An SMS also provides operators with a safety assurance system, which is a means of assuring those risk controls continue to be effective.</li> <li>• An SMS is important because it provides both safety benefits and business benefits <ul style="list-style-type: none"> <li>○ The safety benefits include providing management with: <ul style="list-style-type: none"> <li>▪ A quality management approach to identifying hazards and controlling risk</li> <li>▪ An organizational framework to support a sound safety culture</li> <li>▪ A detailed roadmap for monitoring the effectiveness of safety-related processes</li> </ul> </li> <li>○ The business benefits include: <ul style="list-style-type: none"> <li>▪ Providing the best way of meeting every customer's primary demand – a safe product or service</li> <li>▪ Financial benefits and better products as a result of added emphasis on assuring consistency and process management</li> <li>▪ Reduced inefficiencies as a result of integration of safety into the business model; including integration with other systems such as quality, occupational safety and environmental control systems</li> <li>▪ Continuous improvements reduce costs and waste and provide additional financial gains</li> </ul> </li> </ul> </li> </ul>	<p><i>Listen for the benefits of an SMS.</i></p>

Video Section	Key Points Made	Your Notes
What is a Safety Management System, and Why is It Important? (continued)	<ul style="list-style-type: none"> <li>• Safety management systems are built on two key principles: safety risk management and safety assurance</li> <li>• Safety risk management focuses on designing operating systems so that hazards are identified and associated risks are controlled. This involves assessing systems, their mission, what hazards might be byproducts of that mission, and putting risk controls into action.</li> <li>• Safety assurance focuses on auditing operating systems to ensure continuous effective performance and conformance with requirements.</li> <li>• These core functions are supported by a positive safety culture. A safety culture consists of how people think, how they act, and organizational elements such as mission goals and performance measures. A positive safety culture supports the safety risk management system in achieving the intended goals.</li> <li>• AC 120-92 explains these concepts in more detail and provides guidance for U.S. aviation service providers.</li> </ul>	

Video Section	Key Points Made	Your Notes
<p>Overview of FAA's SMS Standard</p>	<ul style="list-style-type: none"> <li>• Why the standard? When aviation service providers use the standards set in AC 120-92 to develop their safety management systems, it creates a common language and framework across domestic and international aviation service providers and oversight organizations.</li> <li>• How will air carriers use it? The standard describes “what” the safety management system must do, but not “how” to accomplish it. It is applicable to a wide variety of types and sizes of aviation service providers – allowing them to integrate safety management practices into their unique business models. While it allows flexibility in how service providers configure their systems, it assures functional standardization of essential safety management processes.</li> <li>• There are seven clauses in the standard. The first three clauses describe scope and applicability, references, and definitions.</li> <li>• The remaining four clauses (clauses 4-7) describe four components that are essential for safety management systems. Known as the four “pillars,” they are: <ul style="list-style-type: none"> <li>○ Clause 4 – Policy: All management systems must define policies, procedures, and organizational structures to accomplish their goals. Clause 4 outlines the requirements for these elements, which form the framework for the SMS functions.</li> <li>○ Clause 5 – Safety risk management: This is a formal system of hazard identification, risk analysis, and risk assessment, which is essential in controlling risk to acceptable levels. Clause 5 presents a safety risk management process, which is derived from FAA's system safety process model.</li> </ul> </li> </ul>	<p><i>Listen for the four essential components of an SMS, including the two that are the “heart” of an SMS.</i></p>

Video Section	Key Points Made	Your Notes
<p>Overview of FAA's SMS Standard (continued)</p>	<ul style="list-style-type: none"> <li>○ Clause 6 – Safety assurance: This function ensures that the risk controls are continuously practiced and remain effective when the environment changes. Clause 6 presents a safety assurance process, which is based on quality management concepts and processes.</li> <li>○ Clause 7 – Safety promotion: This consists of the practices the aviation service provider has in place to promote safety as a core value and to support a sound safety culture. Clause 7 provides guidance for setting up these functions.</li> <li>● Of the four components, safety risk management and safety assurance represent the heart of a safety management system.</li> </ul>	

## Interim Discussion

### Discussion Questions:

- Based on what you have heard so far, what do you see as the relationship between system safety and a safety management system?
- What are some of the benefits an operator can gain by implementing an SMS?
- What are the four components, sometimes called the four “pillars,” that are essential for safety management systems?
- And of the four SMS components, which two represent the “heart” of a safety management system?

Video Section	Key Points Made	Your Notes
<p>A Closer Look at Safety Risk Management (Clause 5)</p>	<ul style="list-style-type: none"> <li>• Safety risk management is a process for examining the operating environment for hazards, analyzing the associated risk, and identifying controls to address the risk. It includes five steps: <ul style="list-style-type: none"> <li>○ Analyze systems and tasks</li> <li>○ Identify hazards</li> <li>○ Analyze safety risk</li> <li>○ Assess safety risk</li> <li>○ Control safety risk</li> </ul> </li> <li>• To see how the safety risk management process works, let's look at how an operator can design its new system by following the safety risk management process in the FAA standard: <ul style="list-style-type: none"> <li>○ Step 1 – Systems and Task Analysis: First, describe the new systems in terms of the processes, procedures, people, equipment, and other organizational resources required for the system to work properly. Second, consider how the new system will interact with its other operating systems, such as: <ul style="list-style-type: none"> <li>▪ Flight operations</li> <li>▪ Dispatch/flight following</li> <li>▪ Maintenance and inspection</li> <li>▪ Cabin safety</li> <li>▪ Ground handling and servicing</li> <li>▪ Cargo handling</li> <li>▪ Training</li> </ul> </li> </ul> </li> </ul>	<p><i>Listen for what a certificate holder does during the first step of the safety risk management process when implementing a new system and why this first step is important.</i></p>

Video Section	Key Points Made	Your Notes
<p>A Closer Look at Safety Risk Management (Clause 5) (continued)</p>	<ul style="list-style-type: none"> <li>○ Step 2 – Hazard identification: Certificate holders are expected to exercise due diligence in identifying, documenting, and controlling hazards in their operating environment. A thorough system and task analysis facilitates this step.</li> <li>○ Step 3 – Risk analysis: The hazards are analyzed in terms of any existing safety risk controls, triggering mechanisms, and the likelihood and severity of an undesirable outcome resulting from the hazard. After identifying the hazards, look for potential consequences of the hazards.</li> <li>○ Step 4 – Risk assessment: Determine whether the risks associated with the identified hazards are acceptable. When a risk is determined to be unacceptable and that risk is not already addressed through regulation, the certificate holder would design an intervention to either: <ul style="list-style-type: none"> <li>▪ Eliminate the associated hazards, or</li> <li>▪ Control the factors that lead to higher likelihood or severity</li> </ul> <p>The certificate holder would identify how to reduce the risk to an acceptable level.</p> </li> <li>○ Step 5 – Control Safety Risk: The safety assurance process (Clause 6) helps the operator determine if these procedures are adequate for controlling the risk or if there are additional hazards, risks, or controls that must be built into its system.</li> </ul>	<p><i>Listen for examples of risk controls.</i></p>

Video Section	Key Points Made	Your Notes
<p>A Closer Look at Safety Assurance (Clause 6)</p>	<ul style="list-style-type: none"> <li>• Safety assurance is the function in the safety management system that makes sure that the risk controls are effective in maintaining risk within acceptable levels. It also provides a basis for continuous improvement. There are four steps: <ul style="list-style-type: none"> <li>○ Acquire data about the organization’s operational processes and the SMS. Data acquisition methods include continuous monitoring, internal and external audits, investigations, and employee reporting.</li> <li>○ Analyze the data and determine if the risk controls in place are effective, as well as identify new risks.</li> <li>○ Assess the system for performance and effectiveness of risk controls.</li> <li>○ Initiate preventive/corrective action, if required.</li> </ul> </li> <li>• The safety risk management process should be followed when a certificate holder initiates a new program, introduces new equipment, revises an existing program, or identifies a new hazard. The results of the safety risk management process are controls that address the identified risks.</li> <li>• The safety assurance process should be an ongoing part of every program to ensure the safety controls are effective. An effective safety assurance process considers data from the system being assessed as well as all interfacing systems; and collects data from multiple sources.</li> <li>• The implementation of these two SMS processes provides management with a systematic approach to controlling risk and managing safety.</li> </ul>	<p><i>Listen for:</i></p> <ul style="list-style-type: none"> <li>• <i>The purpose of the safety assurance process.</i></li> <li>• <i>Methods certificate holders can use to acquire information.</i></li> <li>• <i>Next steps based on the results of the system assessment.</i></li> </ul>

Video Section	Key Points Made	Your Notes
<p>The Relationship Between SMS and FAA Oversight</p>	<ul style="list-style-type: none"> <li>• Safety management systems provide certificate holders with a systematic approach for managing safety. The processes of safety risk management and safety assurance are the certificate holder’s responsibility.</li> <li>• The FAA is responsible for providing oversight to assure that certificate holders meet these responsibilities.</li> <li>• The systems-based nature of safety management systems is an important complement to FAA’s system for safety-based oversight (ATOS).</li> <li>• A certificate holder’s safety risk management process and the FAA’s design assessment process are complementary: <ul style="list-style-type: none"> <li>○ In the safety risk management process, the certificate holder designs controls to manage the hazards in their operating environment. These risk controls become the part of their program that assures that they have addressed the hazards in their operating environment. Other aspects of their program design assure that their program meets regulatory requirements.</li> <li>○ One of the key FAA oversight functions is assessing the certificate holder’s program design to ensure that it meets the regulatory requirements and addresses the hazards in the operating environment. This assessment results in either program approval (in the case of initial certification) or continued approval (in the case of certificate management).</li> </ul> </li> </ul>	

Video Section	Key Points Made	Your Notes
<p>The Relationship Between SMS and FAA Oversight (continued)</p>	<ul style="list-style-type: none"> <li>• Likewise, a certificate holder's safety assurance process and the FAA's performance assessment process are complementary:               <ul style="list-style-type: none"> <li>○ In the safety assurance process, the certificate holder confirms that the risk controls are performing as intended and are effective. These risk controls must be analyzed in the context of all parts of the certificate holder's system, resulting in an assessment of how well the system is performing.</li> <li>○ Another key FAA oversight function is assessing the certificate holder's program to ensure that it is performing as designed – for example that the procedures and controls are being followed – and that it is achieving the intended result, a bottom line assessment of the system's performance.</li> </ul> </li> </ul>	

Video Section	Key Points Made	Your Notes
Conclusion	<ul style="list-style-type: none"> <li>• AC 120-92 outlines a standard for safety management systems.</li> <li>• An SMS provides a structured framework for integrating the requirement to identify hazards and control associated risk with the certificate holder's unique operating environment.</li> <li>• Implementing the SMS will complement other established management practices; such as continuous analysis and surveillance systems, quality management systems, and internal evaluation programs.</li> <li>• The structured nature of an SMS is also a better interface with FAA oversight functions.</li> </ul>	

## Concluding Discussion

### Discussion Questions:

- When an operator is designing a new system, what happens during the systems and task analysis step?
- Why is the systems and task analysis step important?
- What are some examples of risk controls?

## Example Discussion:

Assume an air carrier that has traditionally flown only in the warmer climate southwestern states decides to expand its routes to include flights to the Midwest. As part of this business decision, the carrier must update its de-icing/anti-icing process.

- What are some possible hazards associated with the air carrier's de-icing/anti-icing process?
- If we focus on the hazard of the weather that is conducive to icing, it could result in the aircraft attempting to take off with ice, snow, or frost on its wings. How would you analyze the risk? What is the likelihood that an aircraft could attempt takeoff with ice, snow or frost on its wings?
- What is the severity of the hazard? In other words, how bad will it be if the aircraft fails to attain the necessary lift?
- Using the risk assessment matrix, where would this risk fall?
- What are some examples of risk controls our air carrier could put in place to reduce the risk to acceptable levels?

## SAMPLE SEVERITY AND LIKELIHOOD CRITERIA<sup>1</sup>

Severity of Consequences			Likelihood of Occurrence		
Severity Level	Definition	Value	Likelihood Level	Definition	Value
Catastrophic	Equipment destroyed, multiple deaths	5	Frequent	Likely to occur many times	5
Hazardous	Large reduction in safety margins, physical distress or a workload such that operators cannot be relied upon to perform their tasks accurately or completely. Serious injury or death to a number of people. Major equipment damage.	4	Occasional	Likely to occur sometimes	4
Major	Significant reduction in safety margins, reduction in the ability of operators to cope with adverse operating conditions as a result of an increase in workload, or as result of conditions impairing their efficiency. Serious incident. Injury to persons.	3	Remote	Unlikely, but possible to occur	3
Minor	Nuisance. Operating limitations. Use of emergency procedures. Minor incident.	2	Improbable	Very unlikely to occur	2
Negligible	Little consequence	1	Extremely Improbable	Almost inconceivable that the event will occur	1

<sup>1</sup> References: FAA Advisory Circular 120-92 and ICAO Safety Management Manual (SMM). ICAO Doc 9859.

# Safety Risk Matrix

Severity Likelihood			Higher Lower		
↑	Yellow	Yellow	Red	Red	Red
	Green	Yellow	Yellow	Unacceptable	
More Less	Green	Acceptable with Mitigation		Yellow	Red
↓	Acceptable		Green	Yellow	Yellow
	Green	Green	Green	Green	Yellow

## Concluding Discussion Questions (continued):

- What are the purposes of the safety assurance process?
- What are some of the methods operators can use to acquire information?
- Assume an operator determines that some of its risk controls are not effective in maintaining risk at acceptable levels. What is the operator's next step?
- If the results of the system assessment show that there are nonconformances with the system, what is the operator's next step?
- Based on what you've heard today, how do you see your oversight role evolving as operators implement safety management systems?

**Appendix A**  
**Key Points from the Overview of Safety  
Management Systems Video**

Video Section	Key Points Made
Introduction	<ul style="list-style-type: none"> <li>• As today's aviation systems become more complex and global, both aviation businesses and government entities must continually evaluate the safety strategies of the future.</li> <li>• In 2006, ICAO published requirements for air operators and aviation maintenance organizations to establish safety management systems (SMSs) so that their safety strategies and practices are managed just like any other business objective. ICAO Annex 6 requires member states to have requirements for SMSs in place as of January 1, 2009.</li> <li>• The FAA is a proponent of safety management systems and intends to implement this requirement. In June of 2006, the FAA published an advisory circular (AC 120-92) to introduce the concept of safety management systems and provide guidance for their development.</li> <li>• Because businesses and governments must work cooperatively to manage safety, AVS is also implementing its own safety management system, known as the AVSSMS. This internal SMS will help with oversight responsibilities by providing a process-orientated approach that emphasizes management systems to manage risk and assure safety. You will learn more about the internal safety management system in the future.</li> <li>• Risk is inherent in all aviation service provider organizations. It results from the environment and operational activities.</li> <li>• Under Title 49, certificate holders are responsible for identifying risk in their operating environments and managing it to an acceptable level.</li> <li>• A safety management system will not eliminate hazards and risks. Instead, it provides certificate holders with a systematic way to control the risk in their environments and assure that risk controls are effective.</li> <li>• The video covers: <ul style="list-style-type: none"> <li>○ What safety management systems are and why they are important</li> <li>○ FAA's SMS standard</li> <li>○ The two primary elements of FAA's standard -- safety risk management and safety assurance</li> <li>○ The relationship of safety management systems and FAA's oversight systems</li> </ul> </li> </ul>
What is a Safety Management System, and Why is It Important?	<ul style="list-style-type: none"> <li>• A safety management system is a formal, top-down business-like approach to managing safety risk. It includes systematic procedures, practices, and policies for the management of safety.</li> <li>• An SMS is a tool for a certificate holder to assess their systems, identify hazards in those systems, and develop risk controls in those systems.</li> <li>• An SMS also provides operators with a safety assurance system, which is a means of assuring those risk controls continue to be effective.</li> <li>• An SMS is important because it provides both safety benefits and business benefits <ul style="list-style-type: none"> <li>○ The safety benefits include providing management with: <ul style="list-style-type: none"> <li>▪ A quality management approach to identifying hazards and controlling risk</li> <li>▪ An organizational framework to support a sound safety culture</li> <li>▪ A detailed roadmap for monitoring the effectiveness of safety-related processes</li> </ul> </li> </ul> </li> </ul>

Video Section	Key Points Made
<p>What is a Safety Management System, and Why is It Important? (continued)</p>	<ul style="list-style-type: none"> <li>○ The business benefits include: <ul style="list-style-type: none"> <li>▪ Providing the best way of meeting every customer’s primary demand – a safe product or service</li> <li>▪ Financial benefits and better products as a result of added emphasis on assuring consistency and process management</li> <li>▪ Reduced inefficiencies as a result of integration of safety into the business model; including integration with other systems such as quality, occupational safety and environmental control systems</li> <li>▪ Continuous improvements reduce costs and waste and provide additional financial gains</li> </ul> </li> <li>• Safety management systems are built on two key principles: safety risk management and safety assurance</li> <li>• Safety risk management focuses on designing operating systems so that hazards are identified and associated risks are controlled. This involves assessing systems, their mission, what hazards might be byproducts of that mission, and putting risk controls into action.</li> <li>• Safety assurance focuses on auditing operating systems to ensure continuous effective performance and conformance with requirements.</li> <li>• These core functions are supported by a positive safety culture. A safety culture consists of how people think, how they act, and organizational elements such as mission goals and performance measures. A positive safety culture supports the safety risk management system in achieving the intended goals.</li> <li>• AC 120-92 explains these concepts in more detail and provides guidance for U.S. aviation service providers.</li> </ul>
<p>Overview of FAA’s SMS Standard</p>	<ul style="list-style-type: none"> <li>• Why the standard? When aviation service providers use the standards set in AC 120-92 to develop their safety management systems, it creates a common language and framework across domestic and international aviation service providers and oversight organizations.</li> <li>• How will air carriers use it? The standard describes “what” the safety management system must do, but not “how” to accomplish it. It is applicable to a wide variety of types and sizes of aviation service providers – allowing them to integrate safety management practices into their unique business models. While it allows flexibility in how service providers configure their systems, it assures functional standardization of essential safety management processes.</li> <li>• There are seven clauses in the standard. The first three clauses describe scope and applicability, references, and definitions.</li> <li>• The remaining four clauses (clauses 4-7) describe four components that are essential for safety management systems. Known as the four “pillars,” they are: <ul style="list-style-type: none"> <li>○ Clause 4 – Policy: All management systems must define policies, procedures, and organizational structures to accomplish their goals. Clause 4 outlines the requirements for these elements, which form the framework for the SMS functions.</li> </ul> </li> </ul>

Video Section	Key Points Made
Overview of FAA's SMS Standard (continued)	<ul style="list-style-type: none"> <li>○ Clause 5 – Safety risk management: This is a formal system of hazard identification, risk analysis, and risk assessment, which is essential in controlling risk to acceptable levels. Clause 5 presents a safety risk management process, which is derived from FAA's system safety process model.</li> <li>○ Clause 6 – Safety assurance: This function ensures that the risk controls are continuously practiced and remain effective when the environment changes. Clause 6 presents a safety assurance process, which is based on quality management concepts and processes.</li> <li>○ Clause 7 – Safety promotion: This consists of the practices the aviation service provider has in place to promote safety as a core value and to support a sound safety culture. Clause 7 provides guidance for setting up these functions.</li> </ul> <ul style="list-style-type: none"> <li>● Of the four components, safety risk management and safety assurance represent the heart of a safety management system.</li> </ul>
A Closer Look at Safety Risk Management (Clause 5)	<ul style="list-style-type: none"> <li>● Safety risk management is a process for examining the operating environment for hazards, analyzing the associated risk, and identifying controls to address the risk. It includes five steps: <ul style="list-style-type: none"> <li>○ Analyze systems and tasks</li> <li>○ Identify hazards</li> <li>○ Analyze safety risk</li> <li>○ Assess safety risk</li> <li>○ Control safety risk</li> </ul> </li> <li>● To see how the safety risk management process works, let's look at how an operator can design its new system by following the safety risk management process in the FAA standard: <ul style="list-style-type: none"> <li>○ Step 1 – Systems and Task Analysis: First, describe the new systems in terms of the processes, procedures, people, equipment, and other organizational resources required for the system to work properly. Second, consider how the new system will interact with its other operating systems, such as: <ul style="list-style-type: none"> <li>▪ Flight operations</li> <li>▪ Dispatch/flight following</li> <li>▪ Maintenance and inspection</li> <li>▪ Cabin safety</li> <li>▪ Ground handling and servicing</li> <li>▪ Cargo handling</li> <li>▪ Training</li> </ul> </li> </ul> </li> </ul>

Video Section	Key Points Made
<p>A Closer Look at Safety Risk Management (Clause 5) (continued)</p>	<ul style="list-style-type: none"> <li>○ Step 2 – Hazard identification: Certificate holders are expected to exercise due diligence in identifying, documenting, and controlling hazards in their operating environment. A thorough system and task analysis facilitates this step.</li> <li>○ Step 3 – Risk analysis: The hazards are analyzed in terms of any existing safety risk controls, triggering mechanisms, and the likelihood and severity of an undesirable outcome resulting from the hazard. After identifying the hazards, look for potential consequences of the hazards.</li> <li>○ Step 4 – Risk assessment: Determine whether the risks associated with the identified hazards are acceptable. When a risk is determined to be unacceptable and that risk is not already addressed through regulation, the certificate holder would design an intervention to either: <ul style="list-style-type: none"> <li>▪ Eliminate the associated hazards, or</li> <li>▪ Control the factors that lead to higher likelihood or severity</li> </ul> <p>The certificate holder would identify how to reduce the risk to an acceptable level.</p> </li> <li>○ Step 5 – Control Safety Risk: The safety assurance process (Clause 6) helps the operator determine if these procedures are adequate for controlling the risk or if there are additional hazards, risks, or controls that must be built into its system.</li> </ul>
<p>A Closer Look at Safety Assurance (Clause 6)</p>	<ul style="list-style-type: none"> <li>• Safety assurance is the function in the safety management system that makes sure that the risk controls are effective in maintaining risk within acceptable levels. It also provides a basis for continuous improvement. There are four steps: <ul style="list-style-type: none"> <li>○ Acquire data about the organization’s operational processes and the SMS. Data acquisition methods include continuous monitoring, internal and external audits, investigations, and employee reporting.</li> <li>○ Analyze the data and determine if the risk controls in place are effective, as well as identify new risks.</li> <li>○ Assess the system for performance and effectiveness of risk controls.</li> <li>○ Initiate preventive/corrective action, if required.</li> </ul> </li> <li>• The safety risk management process should be followed when a certificate holder initiates a new program, introduces new equipment, revises an existing program, or identifies a new hazard. The results of the safety risk management process are controls that address the identified risks.</li> <li>• The safety assurance process should be an ongoing part of every program to ensure the safety controls are effective. An effective safety assurance process considers data from the system being assessed as well as all interfacing systems; and collects data from multiple sources.</li> <li>• The implementation of these two SMS processes provides management with a systematic approach to controlling risk and managing safety.</li> </ul>

Video Section	Key Points Made
<p>The Relationship Between SMS and FAA Oversight</p>	<ul style="list-style-type: none"> <li>• Safety management systems provide certificate holders with a systematic approach for managing safety. The processes of safety risk management and safety assurance are the certificate holder’s responsibility.</li> <li>• The FAA is responsible for providing oversight to assure that certificate holders meet these responsibilities.</li> <li>• The systems-based nature of safety management systems is an important complement to FAA’s system for safety-based oversight (ATOS).</li> <li>• A certificate holder’s safety risk management process and the FAA’s design assessment process are complementary: <ul style="list-style-type: none"> <li>○ In the safety risk management process, the certificate holder designs controls to manage the hazards in their operating environment. These risk controls become the part of their program that assures that they have addressed the hazards in their operating environment. Other aspects of their program design assure that their program meets regulatory requirements.</li> <li>○ One of the key FAA oversight functions is assessing the certificate holder’s program design to ensure that it meets the regulatory requirements and addresses the hazards in the operating environment. This assessment results in either program approval (in the case of initial certification) or continued approval (in the case of certificate management).</li> </ul> </li> <li>• Likewise, a certificate holder’s safety assurance process and the FAA’s performance assessment process are complementary: <ul style="list-style-type: none"> <li>○ In the safety assurance process, the certificate holder confirms that the risk controls are performing as intended and are effective. These risk controls must be analyzed in the context of all parts of the certificate holder’s system, resulting in an assessment of how well the system is performing.</li> <li>○ Another key FAA oversight function is assessing the certificate holder’s program to ensure that it is performing as designed – for example that the procedures and controls are being followed – and that it is achieving the intended result, a bottom line assessment of the system’s performance.</li> </ul> </li> </ul>
<p>Conclusion</p>	<ul style="list-style-type: none"> <li>• AC 120-92 outlines a standard for safety management systems.</li> <li>• An SMS provides a structured framework for integrating the requirement to identify hazards and control associated risk with the certificate holder’s unique operating environment.</li> <li>• Implementing the SMS will complement other established management practices; such as continuous analysis and surveillance systems, quality management systems, and internal evaluation programs.</li> <li>• The structured nature of an SMS is also a better interface with FAA oversight functions.</li> </ul>