

FAA Airports Safety Management Systems (SMS)

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Federal Aviation
Administration



Organizations to Develop SMS

- **Internal SMS Efforts**
 - Air Traffic Organization
 - Aviation Safety Organization
 - Office of Airports

 - FAA Order 8000.369A, *Safety Management System*
 - FAA Order 8040.4A, *Safety Risk Management Policy*

- **External SMS Efforts**
 - Part 139 Airports

 - Program Guidance Letter 13-06, *Safety Management Systems (SMS)*
 - AC 150/5200-37, *Introduction to Safety Management Systems for Airport Operators*



Organizations to Develop SMS

- **Air Traffic Organization**
 - **FAA Order JO 1000.37A, *Air Traffic Organization Safety Management System***
- **Aviation Safety Organization**
 - **FAA Order JVS 8000.367A, *Aviation Safety (AVS) Safety Management System Requirements***
- **Office of Airports**
 - **FAA 5200.11, *FAA Airports (ARP) Safety Management Systems***



Components of an SMS

- **Safety Policy**
- **Safety Risk Management**
- **Safety Assurance**
- **Safety Promotion**



The SRM process ensures that:

- Safety related changes are documented
- Risk is analyzed and assessed
- Unacceptable Risk is mitigated. Residual risk is knowingly accepted
- Hazards are identified, tracked, and monitored to resolution
- The effectiveness of the risk mitigation strategies is assessed
- The performance of the change is monitored throughout its lifecycle



•The SRM Process



External SMS

- **Program Guidance Letter 13-06, *Safety Management Systems (SMS)***
 - Adds new Paragraph 401.g in FAA Order 5100-38C
 - Two categories of airports are eligible to use AIP funding to develop their internal SMS Manual
 - Any Part 139 Airport also included in the NPIAS
 - Any Nonprimary airport classified as “National” in the FAA’s May 2012 “ASSET” report or as may be updated from time to time
 - Reasonable contract costs for development of an initial Implementation Plan and SMS Manual are eligible and justified for AIP planning grant funds for these airports.
 - Timeline for Implementation?

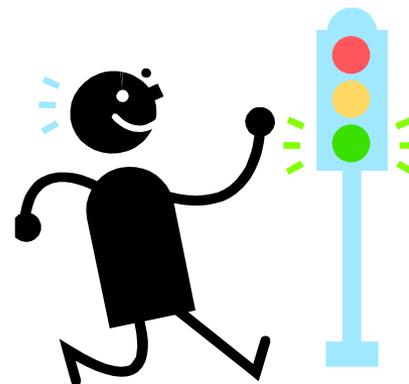


FAA Airports (ARP) Safety Management System



- Implementation:
 - Beginning June 1, 2011, all Large, Medium, and Small hub airports
 - Beginning June 1, 2012, all Part 139 certificated airports
 - Beginning June 1, 2013, all remaining towered airports
 - Beginning June 1, 2014, all remaining airports in the National Plan of Integrated Airport Systems (NPIAS)

FAA Airports (ARP) Safety Management System



- Sequence of SRM Applicability:
 - Beginning June 1, 2011, all Large hub airports
 - ARP will implement SMS policies and procedures at the remaining NPIAS airports in future years, depending on the levels of staffing and resources available

FAA Airports (ARP) Safety Management System

- So why bother talking about it?



FAA Airports (ARP) Safety Management System

- The regional Airports offices or Airports District Offices (ADO) may elect to conduct SRM at airports earlier than the above schedule in cases where it is deemed beneficial and appropriate.



FAA Airports (ARP) Safety Management System

- **Safety Assessment Screening (SAS) Forms**
 - SAS-1: Airport Planning and Development Projects
 - SAS-2: Modification of Standards
 - SAS-3: New and Revised Airport Standards



FAA Airports (ARP) Safety Management System

- **Submittal of ALPs for FAA Approval**
- **Airspace Determinations for Construction Safety Plans**
- **Non-construction changes, including runway and taxiway designations, airfield pavement marking and signage (excluding normal maintenance), runway categories (design aircraft), and in coordination with other LOBs for planned approach or departure procedure changes**



FAA Airports (ARP) Safety Management System

- **Approval of Part 150 Noise Compatibility programs**
- **Approval of Modification to Standards**
- **Approval of new and updated airport planning, design or construction standards**
- **Modification or update to any action that could represent a material change from a previous SRM review or Safety Assessment**
- **FAA decisions on operational or safety-related issues (complex airfield projects, complex planning study alternative analysis, etc.)**



FAA Airports (ARP) Safety Management System

- **Airport Project Approvals not Typically Requiring Safety Assessments**
 - Grants for Planning Studies
 - Purchase of vehicles and equipment
 - Reimbursement for a completed project
 - Land Acquisition
 - Residential and public building sound insulation
 - Installation of noise monitoring system outside the AOA
 - Construction, rehabilitation, or change of any facility entirely outside the AOA, for example passenger terminals, parking, or other structures



FAA Airports (ARP) Safety Management System

- **Airport Project Approvals not Typically Requiring Safety Assessments**
 - Projects shown on an ALP that are not expected to be under construction within 15 years from the ALP approval date
 - Approval of a PFC for “Impose only”



Figure 4-2 Airport Project SAS (SAS-1)

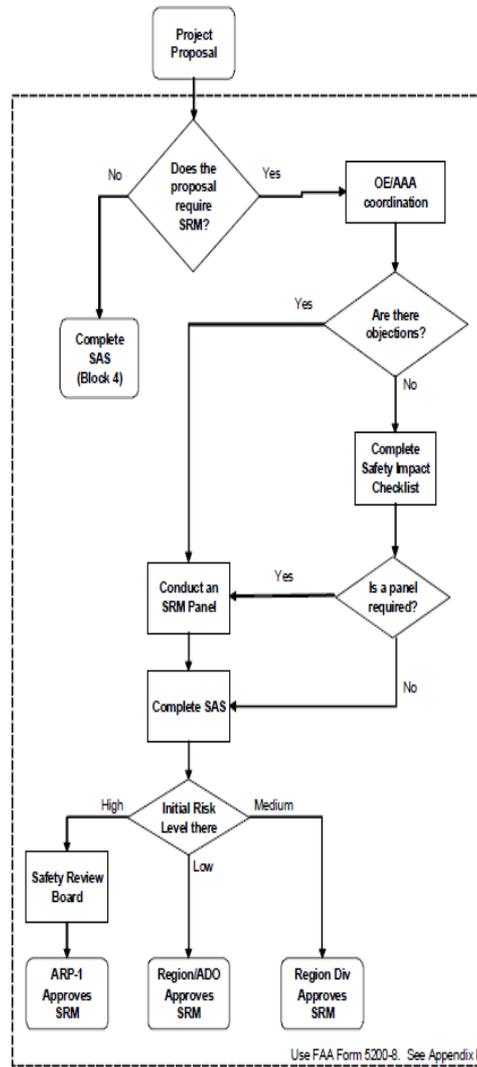
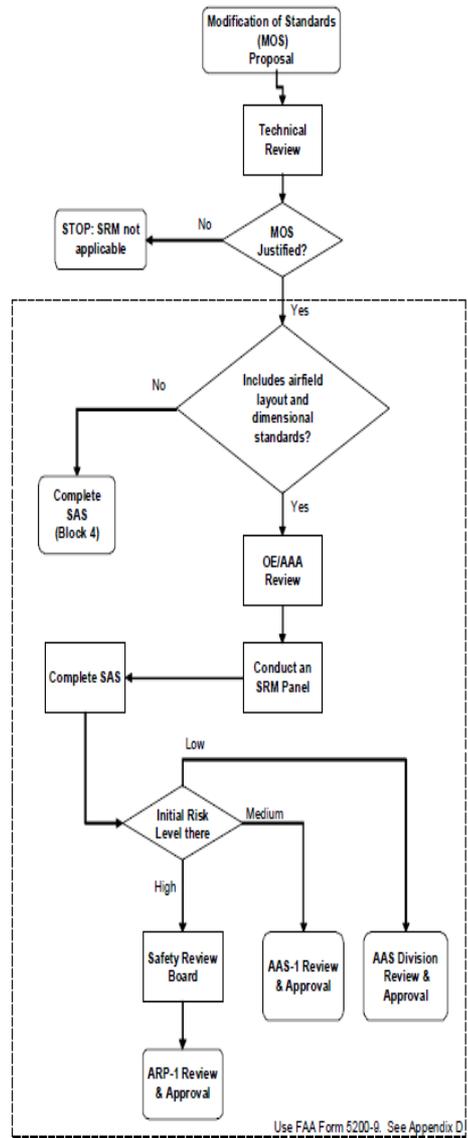


Figure 4-3 Modification of Standards SAS (SAS-2)



SRM PANEL

- **What is an SRM Panel?**
- A group of **SMEs (Subject Matter Experts)** who assemble to discuss, evaluate, examine, and determine if there are any **Hazards** associated with the proposed change and recommend **Mitigations** to control them.



SRM Panels

- **Panel Members**
 - Sponsor
 - ATCT
 - ATO-Tech Ops
 - ATO-Runway Safety
 - Flight Standards
 - ARP SME
 - Airlines
 - FBO
 - Tenants



SRM Panels

- **Panel Facilitator**

- Select and notify panel members
- Complete pre meeting logistics and documentation
- Facilitate during panel meetings
- Complete post meeting documentation



Typical Hazards Identified by ATO National Airport Safety Risk Management Document

- **Foreign Object Damage**
- **Loss of Situational Awareness by Pilot**
 - Airport Geometry Change
 - Complacency
 - Construction Light Pollution
 - Visual Cue Saturation
 - Complex Taxiway Instructions
 - Lack of Notifications to Pilot



Typical Hazards Identified by ATO National Airport Safety Risk Management Document

- **Loss of Situational Awareness by Controllers**
 - Change in Airport Complexity
 - Loss of NAS Systems
 - Line of Site Impact from Tower

Loss of Situational Awareness by Vehicle Operators



Typical Hazards Identified by ATO National Airport Safety Risk Management Document

- **Changes in Wildlife Activity**
- **Penetration to Airport Design or TERPS Surfaces**



Analyze Risk

- ***Risk*: Composite of predicted severity and likelihood of outcome or effect of the hazard**
 - Identify and evaluate existing controls
 - Mitigations that exist to prevent or reduce hazard occurrence or mitigate its effect
 - Determine hazard severity
 - Severity: Worst credible potential outcome
 - Determine likelihood
 - How often resulting harm can be expected to occur at worst credible severity



Appendix C. Safety Assessment Tables

Hazard Severity Classification

Effect On:	Minimal 5	Minor 4	Major 3	Hazardous 2	Catastrophic 1
ATC Services	<ul style="list-style-type: none"> -Conditions Resulting in a minimal reduction in ATC services, or -A loss of separation resulting in a Category D Runway Incursion (RI), or -An Operational Deviation (OD), or -A Proximity Event (PE) 	<ul style="list-style-type: none"> -Conditions resulting on a slight reduction in ATC services, or -A loss of separation resulting on a Category C RI, or Operational Error (OE) 	<ul style="list-style-type: none"> -Conditions resulting in a partial loss of ATC services, or -A loss of separation resulting in Category B RI or OE 	<ul style="list-style-type: none"> -Conditions resulting in a total loss of ATC services (ATC Zero), or -A loss of separation resulting in a Category A RI or OE 	<ul style="list-style-type: none"> Conditions resulting in a collision between aircraft, obstacles or terrain
Flight Crew	<ul style="list-style-type: none"> -Flight crew receives TCAS Traffic Advisory informing of nearby traffic or, -Pilot Deviation (PD) where loss of airborne separation falls within the same parameters of a Category D OE or PE, or -Minimal effect on operation of aircraft 	<ul style="list-style-type: none"> -Potential for PD due to TCAS Preventive Resolution Advisory (PRA) advising crew not to deviate from present vertical profile, or -PD where loss of airborne separation falls within the same parameters of a Category C OE, or -A reduction of functional capability of aircraft but does not impact overall safety (e.g. normal procedures per AFM) 	<ul style="list-style-type: none"> -PD due to response to TCAS Corrective Resolution Advisory (CRA) issued advising crew to take vertical action to avoid developing conflict with traffic, or -PD where loss of airborne separation falls within the same parameters of a Category B OE, or -Reduction in safety margin or functional capability of the aircraft requiring crew to follow abnormal procedures per AFM 	<ul style="list-style-type: none"> -Near mid-air collision (NMAC) results due to proximity of less than 500 feet from another aircraft or a report filed by pilot or flight crew member that a collision hazard existed between two or more aircraft; or -Reduction of safety margin and functional capability of the aircraft requiring crew to follow emergency procedures as per AFM. 	<ul style="list-style-type: none"> -Conditions resulting in a mid-air collision (MAC) or impact with obstacle or terrain resulting in hull loss, multiple fatalities, or fatal injury
Flying Public	<ul style="list-style-type: none"> Minimal injury or discomfort to passenger(s) 	<ul style="list-style-type: none"> -Physical discomfort to passenger(s) (e.g. extreme braking action; clear air turbulence causing unexpected movement of aircraft causing injuries to one or two passengers out of their seats) -Minor injury to greater than zero to less or equal to 10% of passengers 	<ul style="list-style-type: none"> -Physical distress on passengers (e.g. abrupt evasive action; severe turbulence causing unexpected aircraft movements), or -Minor injury to greater than 10% of passengers 	<ul style="list-style-type: none"> Serious injury to passenger(s) 	<ul style="list-style-type: none"> Fatalities or fatal injury to passenger(s)
Airport	<ul style="list-style-type: none"> No damage to aircraft but minimal injury or discomfort of little consequence to passenger(s) or workers 	<ul style="list-style-type: none"> -Minimal damage to aircraft, or -Minor injury to passengers, or -Minimal unplanned airport operations limitations (i.e. taxiway closure), or -Minor incident involving the use of airport emergency procedures 	<ul style="list-style-type: none"> -Major damage to aircraft and/or minor injury to passenger(s)/worker(s), or -Major unplanned disruption to airport operations, or -Serious incident, or -Deduction on the airport's ability to deal with adverse conditions 	<ul style="list-style-type: none"> -Severe damage to aircraft and/or serious injury to passenger(s)/worker(s); or -Complete unplanned airport closure, or -Major unplanned operations limitations (i.e., runway closure), or -Major airport damage to equipment and facilities 	<ul style="list-style-type: none"> -Complete loss of aircraft and/or facilities or fatal injury to passenger(s)/worker(s); or -Complete unplanned airport closure and destruction of critical facilities; or -Airport facilities and equipment destroyed

Likelihood Definitions

	NAS System & ATC Operational	NAS Systems		ATC Operational		Flight Procedures	Airports
		Individual Item/System	ATC Service/NAS Level System	Per Facility	NAS-Wide		Airport Specific
Frequent A	Probability of occurrence per operation/operational hour is equal to or greater than 1×10^3	Expected to occur about once every 3 months for an item	Continuously experienced in the system	Expected to occur more than once per week	Expected to occur more than every 1-2 days	Probability of occurrence per operation/operational hour is equal to or greater than 1×10^4	Expected to occur more than once per week or every 2500 departures, whichever occurs sooner
Probable B	Probability of occurrence per operation/operational hour is equal to or greater than 1×10^4	Expected to occur about once per year for an item	Expected to occur frequently in the system	Expected to occur about once every month	Expected to occur about several times per month		Expected to occur about once every month or 250,000 departures, whichever occurs sooner
Remote C	Probability of occurrence per operation/operational hour is less than or equal to 1×10^5 but equal to or greater than 1×10^4	Expected to occur several times during the life cycle of an item	Expected to occur numerous times in a system's life cycle	Expected to occur about once every year	Expected to occur about once every 3 years	Probability of occurrence per operation/operational hour is less than or equal to 1×10^5 , but equal to or greater than 1×10^4	Expected to occur about once every year or 2.5 million departures, whichever occurs sooner
Extremely Remote D	Probability of occurrence per operation/operational hour is less than or equal to 1×10^6 but equal to or greater than 1×10^5	Unlikely to occur, but possible in an item's life cycle	Expected to occur several times in a system's life cycle	Expected to occur once every 10-100 years	Expected to occur about once every 3 years	Probability of occurrence per operation/operational hour is less than or equal to 1×10^6 but equal to or greater than 1×10^5	Expected to occur once every 10-100 years or 25 million departures, whichever occurs sooner
Extremely Improbable E	Probability of occurrence per operation/operational hour is less than 1×10^6	So unlikely that it can be assumed that it will not occur in an item's life cycle	Unlikely to occur, but it is possible in system life cycle	Expected to occur less than every 100 years	Expected to occur less than every 30 years	Probability of occurrence per operation/operational hour is less than 1×10^6	Expected to occur less than every 100 years

Risk Matrix

Severity \ Likelihood	Minimal 5	Minor 4	Major 3	Hazardous 2	Catastrophic 1
Frequent A	Low Risk	Medium Risk	Medium Risk	High Risk	High Risk
Probable B	Low Risk	Medium Risk	Medium Risk	High Risk	High Risk
Remote C	Low Risk	Low Risk	Medium Risk	High Risk	High Risk
Extremely Remote D	Low Risk	Low Risk	Low Risk	Medium Risk	High Risk
Extremely Improbable E	Low Risk	Low Risk	Low Risk	Low Risk	High Risk *

* Unacceptable with Single Point and/or Common Cause Failures

High Risk
Medium Risk
Low Risk

High Risk – High risk is unacceptable within the ARP SMS. If a hazard presents a high-initial risk, the proposal cannot be carried out unless hazards are further mitigated so risk is reduced to medium or low level and the ARP Safety Review Board recommends that ARP-1 approve the mitigations. Tracking and management of high-risk hazards and controls are required.

Medium Risk – Medium risk is acceptable within the ARP SMS. A medium risk is the minimum acceptable safety objective. With medium risk, the proposal may be carried out as long as the risk is tracked and managed.

Low Risk – Within the ARP SMS, low risk is the target. Low risk is acceptable without restriction. Low-risk hazards do not need to be actively managed but must be recorded in the SRM documentation.

ARP Acceptance and Signature Requirements

- **ATO accepts risk for operations in the air traffic system**
- **Airport Sponsor accepts risks for the operation of the airfield**
- **One ARP signatory- the manager who has the proper responsibility to accept the Safety Assessment and documentation**
 - Low initial Risk- ADO Manager who have authority over the change
 - Medium Initial Risk- Regional Division Managers who have authority over the change
 - High initial Risk- Safety Review Board for review and ARP-1 for approval



Treating Risk

- **Need an effective and appropriate risk mitigation plan(s) to mitigate or eliminate hazards**
 - Control
 - Avoidance
- **Risk control is the option most often used and preferred**



Initial Risk and Residual Risk

- **Initial Risk : Risk Level with current controls in place**
- **Residual Risk: Risk level with new safety requirements implemented**



Hazard Tracking & Risk Resolution

- **Ensure requirements and mitigations for INITIAL medium and high risk hazards are implemented**
 - Track each INITIAL medium and high risk hazard until its risk is mitigated and the effectiveness of the controls mitigating the risk are verified.

•Describe System

•Identify Hazards

•Analyze Risk

•Assess Risk

•Treat Risk

FAA Airports (ARP) Safety Management System

- **Friedman Memorial Airport, Hailey, Idaho**
- **Five Modifications of Standards**
- **Safety Risk Management Panel was held in Hailey on June 4-5, 2013**



ANY QUESTIONS?

