National Transportation Safety Board

Federal Aviation Administration

UNITED STATES

STATE SAFETY PROGRAM (SSP)

2021 (Revision 1)

HQ-13-0028

Revision History

Revision Number	Description of Change	Effective Date
0	Original Document (Version 1.0)	January 2015
1	Aligned document to State Safety Program (SSP) Standards and Recommended Practices in International Civil Aviation Organization (ICAO) Annex 19, *Safety Management*, Second Edition (Version 2.0)	March 2021

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FOREWORD

The aviation and aerospace landscape continues to evolve, and the pace is quickening. We are seeing tremendous innovation in drones, advanced air mobility, “quiet boom” supersonic aircraft and orbital and suborbital commercial spacecraft. This innovation is coinciding with other technological advancements in artificial intelligence, Big Data, the Internet of Things, and increasingly complex cybersecurity needs for aviation and aerospace.

We must constantly innovate and evolve in order to keep pace with all of this change. We must do this while continuing to operate the safest, most efficient aerospace system in the world. Safety knows no borders, and the flying public expects the same level of safety no matter where in the world they may be traveling or on what type of vehicle.

That is why the U.S. has a mature State Safety Program (SSP) and supports the International Civil Aviation Organization’s (ICAO) efforts to establish safety management frameworks in all Member States for the integration of aviation safety standards and practices globally. We review our own SSP regularly to ensure it reflects the evolution of these standards and practices.

As the gold standard for aviation safety worldwide, the FAA has been the global leader in building a proactive approach to safety, starting with commercial aviation. This history, knowledge and commitment is reflected in our SSP. We continue to collect safety data to identify potential safety problems and work with industry to solve these problems before they can give rise to an accident. We continue to share safety best practices and lessons learned with the national and international aviation community. We also work to achieve smarter regulation and cost-effective measures that will ensure a safe and vibrant aviation system.

The global aviation industry has made tremendous advances in aviation safety over the past several decades. The United States has a mature regulatory framework; well-defined roles and responsibilities; advanced accident and incident investigation capabilities; effective certification; surveillance and enforcement processes; exceptional capacity for data collection and analysis; the ability to focus resources on areas of greatest safety risk; and established means to communicate with service providers, government representatives, and other stakeholders.

Because of these advances, we are now in an era in which commercial aviation accidents are extremely rare. This is a testament to the professionals that work in both industry and government, and our joint commitment to maintaining a strong safety culture.

Our ultimate success in aerospace as a global community will depend on how well we collaborate with, and leverage the efforts of, all stakeholders in the aviation community. Safety is our North Star, and our SSP is the map by which we navigate.

Steve Dickson
Administrator
Federal Aviation Administration

Robert L. Sumwalt, III
Chairman
National Transportation Safety Board

INTRODUCTION

Highly skilled, dedicated men and women of the Federal Aviation Administration (FAA) guide about 26 million[1] flights through the United States (U.S.) aerospace system during a typical year.[2] Through hard work, innovation, and perseverance, we have achieved the best safety record in the history of aviation. The size and complexity of our infrastructure, the diversity of our user groups, our commitment to safety and excellence, and our leadership in the world's aviation community set us apart. Building on this solid foundation, we are heading into an era of rapid technological advances in communication, navigation, and surveillance, as well as unprecedented challenges in the presence of changing economic, social, environmental, and energy needs of our nation, our industry, and our global partners. As such, our mature safety system will need processes for continuous improvement. Additionally, new technologies and business models are reshaping who interacts with the National Airspace System (NAS) and how aircraft operate within it. At the forefront of these changes are a host of new entrants in non-traditional areas, such as commercial space, unmanned aircraft, and the potential reintroduction of supersonic flights. The aviation sector is on the cusp of significant changes to operations as it moves towards systems that rely more heavily on automation and the use of data. In the face of these challenges, the FAA will work proactively on the domestic and international levels to maintain and improve the current level of safety in civil aviation.

The U.S. supports the International Civil Aviation Organization (ICAO) establishment of State Safety Program (SSP) requirements for Member States to effectively integrate aviation safety standards and practices. The ICAO SSP requirements build on the approach endorsed by ICAO to have aviation service providers establish comprehensive Safety Management Systems (SMSs) to guide the management of the range of activities involved in ensuring safety. The ICAO Council directed development of an annex dedicated to safety management responsibilities and processes, addressing the safety management responsibilities of product/service providers under SMS, and the safety management responsibilities of States under the SSP. The resulting material became Annex 19 to the Convention on International Civil Aviation (ICAO Annex 19). In ICAO Annex 19, Second Edition, ICAO defines the SSP as an integrated set of regulations and activities aimed at improving safety. The SSP includes specific safety activities that must be performed by the State; together with regulations and directives, the SSP supports the fulfillment of the State's responsibilities concerning safe and efficient delivery of State aviation activities. In accordance with ICAO Annex 19, the U.S. SSP incorporates the following elements:

Annex 19, Chapter 3 – State Safety Management Responsibilities

- *State safety policy, objectives and resources*
- *State safety risk management*
- *State safety assurance*
- *State safety promotion*

[1] This volume represents a typical annual average experienced before decreased traffic during the COVID-19 pandemic.

[2] *FAA Fiscal Year 2018 Citizen Centric Report,* page 1: https://www.faa.gov/about/plans_reports/media/2018_FAA_CCR-508_FINAL.pdf. Accessed February 19, 2021.

Annex 19, Chapter 5 – Safety Data and Safety Information Collection, Analysis, Protection, Sharing and Exchange

- *Safety data collection and processing systems*
- *Safety data and safety information analysis*
- *Safety data and safety information protection*
- *Safety information sharing and exchange*

The FAA organized the U.S. SSP document into five chapters. Chapters 1 through 4 cover U.S. functions and activities having to do with the four components of State Safety Management responsibilities. Chapter 5 addresses U.S. activities and responsibilities with respect to safety data. Appendix A, *ICAO Annex 19 Standards & Recommended Practices (SARPs)*, contains more detail on each of these elements.

The U.S. has a mature SSP with an established regulatory framework; well-defined roles and responsibilities; advanced accident and incident investigation capabilities; effective certification; surveillance and enforcement processes; exceptional capacity for data collection and analysis; the ability to focus on areas of greatest safety risk; and established means to communicate with service providers, government representatives, and other stakeholders. Because the FAA includes a service provider—the Air Traffic Organization (ATO), which is the U.S. air navigation service provider (ANSP)—as well as regulatory organizations, it chose to implement an SMS. By meeting the tenets of the SSP and an SMS, the FAA ensures interoperability among safety management functions in its organizations. Agency-wide SMS implementation also systematically integrates the management of safety risk into business planning, operations, and decision making.

While the U.S. meets most of the ICAO SSP requirements, the FAA has not implemented SMS regulations across all aviation sectors. The U.S. is engaged in rulemaking activities for some aviation sectors. Additionally, the FAA has established voluntary SMS implementation programs to allow participation across the entire aviation system.

The U.S. currently measures many aspects of an acceptable level of safety performance throughout its complex aviation system. Most of this measurement is done on specific components of the system, such as air carriers or air traffic management. The U.S. recognizes the importance of improving safety performance management capabilities; the FAA is collaborating with other countries and has developed a framework to augment existing system-level risk indicators with more detailed data to better inform management and analysts involved with safety related decision-making. This activity will leverage the safety performance framework to better align safety management activities and establish and track safety performance objectives currently accomplished through existing planning activities in the FAA. The FAA will improve its capability to measure safety across the aviation system through the development and use of additional safety indicators.

This document describes how the U.S. meets the SSP requirements outlined in ICAO Annex 19 and describes additional activities that will help improve the U.S. SSP and respond to future safety challenges, including safety data and information collection, analysis, protection, and

sharing capabilities.[3] While multiple U.S. government agencies contribute to the U.S. SSP, this document focuses on the role of the FAA and the National Transportation Safety Board (NTSB), because those two organizations fulfill the majority of SSP-related functions identified in ICAO Annex 19 for the U.S. The FAA and NTSB will review the U.S. SSP at least every three years to reflect evolving aviation safety standards and practices.

The following appendices are included in the SSP:

- Appendix A, *ICAO Annex 19 Standards & Recommended Practices (SARPs)*, contains Annex 19.
- Appendix B, *Acronyms/Abbreviations*, contains a list of acronyms used in this document.
- Appendix C, *Related Documents*, contains a list of international standards, U.S. regulations, multi-agency safety documents, and U.S. government agency orders, procedure documents, plans, and training related to the SSP.

[3] While ICAO Annex 19 recommends including enforcement policy under paragraph 3.2.1., this document describes enforcement policy in Section 3.1.5, where it details other surveillance obligations.

State Safety Policy, Objectives and Resources

The State safety policy, objectives, and resources component defines how the U.S. will manage safety throughout its aviation system. This includes the determination of responsibilities and accountabilities of the different State organizations related to the SSP, as well as the determination of the broad safety objectives to be achieved by the SSP.

The State safety policy and objectives provide management and personnel explicit policies, directions, procedures, management controls, documentation, and corrective action processes that keep the safety management efforts of the State's civil aviation authority, and other State organizations, on track. This enables the U.S. to provide safety leadership in an increasingly complex and continuously changing air transportation system. The U.S. safety objectives are as follows:

- Ensure that the U.S. safety system as a whole works effectively and that key players are working together in the interests of safety.
- Ensure U.S. safety regulatory and investigatory agencies remain world leading and have the skills and capabilities to maintain safety.
- Build on today's proactive accident prevention programs by adopting new tools and metrics to further anticipate potential sources of risk, to identify and mitigate accident precursors and contributors, and strategically manage safety resources for maximum safety improvement in a cost-effective manner.
- Build on safety management principles to proactively address emerging safety risk by using consistent, data-informed approaches to make smarter, system-level, risk-based decisions throughout U.S. aviation agencies, with industry, and with global stakeholders.
- Collaborate with domestic and international stakeholders to encourage cooperation for the open reporting of safety concerns and improved information sharing.
- Increase safety and efficiency by taking advantage of the growing availability of safety data and the development of additional analytical capabilities to systematically integrate the management of safety risk into decision making.
- Focus safety management activities toward higher risk areas and refine safety oversight models to prioritize safety inspection efforts based on risk.
- Collaborate with the international aviation community to achieve smarter regulation for safety and cost-effective measures to achieve sustainable aviation.

The FAA reports annually on achieving specific measures and targets related to the aforementioned objectives in *FAA Performance and Accountability Reports*.[4] The following policy statement[5] captures the U.S. commitment to the industry and to the international community on how it will approach the management of safety to achieve these objectives.

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[4] FAA Performance and Accountability Reports (listed by fiscal year): https://www.faa.gov/about/plans_reports/#performance. Accessed February 19, 2021.

[5] The U.S. policy statement is based on the template provided in ICAO's *Safety Management Manual* in Appendix 1 to Chapter 4, Guidance on the development of a State safety policy statement.

State Safety Program Policy Statement

The FAA promotes and regulates the safety of aviation in the U.S. The FAA is committed to developing, implementing, and consistently improving strategies and processes so that U.S. civil aviation achieves the highest practicable level of safety. To this end the FAA will:

- Set national standards that meet or exceed ICAO standards, recommended practices, and procedures, except where different standards are necessary in the U.S. for specific operational purposes;
- Adopt a data-informed and performance-based approach in safety regulation and industry oversight activities where appropriate;
- Identify safety trends within the aviation industry and adopt a risk-based approach to address areas of greater safety concern or need;
- Monitor and measure the safety performance of the aviation system continuously through U.S. aggregate safety indicators and service providers' safety performance indicators, as well as the result of performance-based and compliance-oriented oversight activities;
- Collaborate and consult with the aviation industry to address safety matters and continuously enhance aviation safety;
- Promote good safety practices and a positive organizational safety culture within industry and U.S. organizations based on sound safety management principles;
- Encourage safety information collection, analysis, and exchange amongst all relevant industry organizations and service providers, with the intent that such information is to be used for safety management purposes only;
- Prioritize sufficient financial and human resources for safety management and oversight; and
- Hire and equip staff with proper skills and expertise to discharge their safety oversight and management responsibilities competently.

The NTSB assures compliance with U.S. obligations under ICAO Annex 13 (Aircraft Accident and Incident Investigation). The NTSB is committed to independently investigating every civil aviation accident in the U.S. and issuing safety recommendations aimed at preventing future accidents. To this end, the NTSB will:

- Collaborate with the aviation industry to address safety matters and continuously enhance aviation safety;
- Promote good safety practices and a positive organizational safety culture within the industry based on sound safety management principles;
- Prioritize sufficient financial and human resources for accident and incident investigations; and
- Equip staff with proper skills and expertise to discharge their accident and incident investigation responsibilities competently.

Although the FAA Administrator is the Responsible Executive who represents the U.S. regarding commitments made in the name of the U.S., this U.S. SSP document is signed by both the FAA Administrator and the NTSB Chairperson and represents the U.S. SSP policy. The FAA and NTSB will communicate this policy, with visible endorsement, throughout the FAA and

the NTSB, and will conduct periodic reviews to ensure it remains relevant and appropriate to the U.S. aviation system.

1.1 Primary Aviation Legislation

A national aviation safety legislative framework and specific regulations define how the U.S. conducts the oversight and management of aviation safety in the U.S. As such, legislation and regulations are safety risk controls. The safety legislative framework and specific regulations are periodically reviewed to ensure they remain relevant and appropriate to the U.S.

1.1.1 United States Legislative System

U.S. federal government agencies, including the FAA, are under the auspices of the executive branch, but receive statutory authority to issue regulations from laws enacted by the legislative branch (U.S. Congress). An agency may not take action that goes beyond its statutory authority.

The Administrative Procedure Act (APA),[6] enacted June 11, 1946, requires agencies to inform the public of organization, procedures, and rules; and allow for public participation in the rulemaking process. Thus, agencies must follow an open, public process when issuing rules consistent with their statutory authority.

Generally, prior to issuing a final rule, the APA requires agencies to publish a notice of proposed rulemaking in the *Federal Register* describing the proposed rulemaking[7] and inviting public comment on the proposal.[8] After the comment period closes and the agency has reviewed and considered comments received, the agency may issue a final rule. A final rule must describe the basis and purpose of the rule and be published in the *Federal Register*.

In limited circumstances, the APA allows agencies to forgo the notice and comment process prior to issuing a final rule when there is good cause to do so. The "good cause" exception in the APA allows agencies to forgo public notice and comment prior to issuing a rule when notice and comment would be impracticable, unnecessary, or contrary to the public interest.

1.1.2 United States Aviation Legislation

Aviation statutory authorities in the U.S. are set forth primarily in Title 49 of the United States Code. The U.S. Congress periodically reauthorizes aviation programs providing authority for appropriations over a several year period. Reauthorization legislation also generally creates new aviation programs and amends existing programs to create efficiencies, reduce waste, and improve aviation safety and capacity. The reauthorization process helps to ensure stable funding for the national aviation system and ensures that executive branch agencies are accountable for continuous assessment and improvement in carrying out aviation programs.

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[6] Administrative Procedure Act (5 USC Subchapter II): http://www.archives.gov/federal-register/laws/administrative-procedure/. Accessed February 19, 2021.

[7] Typically, in notices of proposed rulemaking, agencies include proposed regulatory text, in addition to a preamble describing the need and basis for the proposal.

[8] *Federal Register*, The Daily Journal of the United States Government: https://www.federalregister.gov/. Accessed February 19, 2021.

Below is a brief history of aviation legislation in the U.S.[9]

The Federal Aviation Act of 1958[10] created the independent Federal Aviation Agency and transferred the functions of the Civil Aeronautics Authority to this new agency. The Act empowered the Federal Aviation Agency to oversee and regulate safety of civil aviation and to provide for the safe and efficient use of the U.S. airspace by both military and civilian aircraft. The Act transferred safety rulemaking to the new Federal Aviation Agency and gave the Federal Aviation Agency sole responsibility for a common civil-military system of air navigation and air traffic control (ATC).

In 1966, with the Department of Transportation Act, Congress authorized the creation of a cabinet department that would combine major Federal transportation responsibilities into a single department to develop and carry out comprehensive transportation policies and programs across all transportation modes.[11] This new Department of Transportation (DOT) began operations on April 1, 1967. On that day, the Federal Aviation Agency became one of several modal organizations within DOT and received a new name, the Federal Aviation Administration. The Department of Transportation Act also transferred the Civil Aeronautics Board's accident investigation function to the new NTSB.[12]

With the passage of the Airport and Airway Development Act of 1970, the FAA was placed in charge of a new airport aid program funded by a special aviation trust fund and was made responsible for safety certification of airports served by air carriers.[13]

The Hazardous Materials Transportation Act, 49 USC 5101 et seq., grants the DOT authority to regulate the transportation of dangerous goods by all modes. While the Pipeline and Hazardous Materials Safety Administration (PHMSA) has authority to promulgate the dangerous goods regulations for all transportation modes, the FAA has authority to oversee compliance with these regulations by certificated entities and shippers of dangerous goods via aircraft.

Aviation legislation was recodified in 1994, with the enactment of Pub. L. 103-272 (July 5, 1994). This action, in part, superseded the Federal Aviation Act of 1958.

In April 2000, the President signed into law the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century, which contained a provision mandating the appointment of a chief operating officer for the ATO.[14] In December 2000, with Executive Order (EO) 13180, *Air Traffic Performance-Based Organization*, the President directed the FAA to create a performance-based organization that focused on further improving the provision of air traffic

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[9] For more information on the history of the FAA, see https://www.faa.gov/about/history/brief_history/. Accessed February 19, 2021.

[10] The Federal Aviation Act of 1958: https://www.govinfo.gov/app/details/STATUTE-72/STATUTE-72-Pg731. Accessed February 22, 2021.

[11] The Department of Transportation Act: https://www.govinfo.gov/app/details/STATUTE-80/STATUTE-80-Pg931. Accessed February 22, 2021.

[12] 49 USC Subtitle II—Other Government Agencies, Chapter 11 establishes the NTSB as the permanent and independent authority in charge of "investigating, reporting on, and determining the probable cause of accidents" for all modes of transportation, including civil aviation.

[13] The Airport and Airway Development Act of 1970: https://www.govinfo.gov/content/pkg/STATUTE-84/pdf/STATUTE-84-Pg219.pdf. Accessed February 22, 2021.

[14] The Wendell H. Ford Aviation Investment and Reform Act for the 21st Century: https://www.govinfo.gov/content/pkg/PLAW-106publ181/pdf/PLAW-106publ181.pdf. Accessed February 22, 2021.

services in ways that increase efficiency, take better advantage of new technologies, accelerate modernization efforts, and respond effectively to the needs of the traveling public, while enhancing the safety, security, and efficiency of the U.S. air transportation system.

The tragic events of September 11, 2001, radically changed the FAA. On November 19, 2001, the President signed the Aviation and Transportation Security Act, which among other provisions, established a new agency responsible for aviation security within DOT—the Transportation Security Administration (TSA).[15] FAA remained responsible for aviation security until February 13, 2002, when TSA took over those responsibilities. The November 2002, passage of the Homeland Security Act[16] moved TSA into the new Department of Homeland Security (DHS) on March 1, 2003.

The Vision 100—Century of Aviation Reauthorization Act, signed into law in December 2003, endorsed the concept of a Next Generation Air Transportation System (NextGen).[17] The following month, the DOT Secretary announced plans for a new, multi-year, multi-agency effort to develop an air transportation system for the year 2025 and beyond. The Secretary subsequently established a Joint Planning and Development Office (JPDO) at the FAA composed of representatives from FAA, National Aeronautics and Space Administration (NASA), the Departments of Transportation, Defense, Homeland Security, and Commerce, and the White House Office of Science and Technology Policy to create and carry out an integrated plan for NextGen. On December 15, 2004, DOT unveiled the *Integrated Plan for the Next Generation Air Transportation System*, which laid out goals, objectives, and requirements necessary to create the NextGen system.

In August 2010, Congress passed the Airline Safety and FAA Extension Act, which directed the FAA through legislation to change requirements to improve pilot rest requirements, establish better processes for managing safety risk, and advance voluntary safety programs.[18]

On February 14, 2012, the President signed the FAA Modernization and Reform Act of 2012,[19] which modernized the nation's aviation system. The law provided $63.4 billion in FAA funding over four years, including about $11 billion toward the modernization of the ATC system. The law set the stage for major advancements in the aviation industry, and improved airline safety and set the course for a more efficient U.S. air transportation system.

The FAA Extension, Safety, and Security Act of 2016 included important safety and security additions, including the development of a cybersecurity framework to reduce cybersecurity risks to the NAS, a pilot project to detect and mitigate unauthorized operation of unmanned aircraft

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[15] The Aviation and Transportation Security Act: https://www.govinfo.gov/content/pkg/PLAW-107publ71/html/PLAW-107publ71.htm. Accessed February 22, 2021.

[16] The Homeland Security Act: https://www.govinfo.gov/content/pkg/PLAW-107publ296/html/PLAW-107publ296.htm. Accessed February 22, 2021.

[17] The Vision 100—Century of Aviation Reauthorization Act: https://www.govinfo.gov/content/pkg/PLAW-108publ176/pdf/PLAW-108publ176.pdf. Accessed February 22, 2021.

[18] The Airline Safety and FAA Extension Act: https://www.govinfo.gov/content/pkg/PLAW-111publ216/html/PLAW-111publ216.htm. Accessed February 22, 2021.

[19] The FAA Modernization and Reform Act of 2012: https://www.congress.gov/112/plaws/publ95/PLAW-112publ95.pdf. Accessed February 22, 2021.

around airports and other critical infrastructure, as well as changes to the hiring process for air traffic controllers.[20]

1.2 Specific Operating Regulations and Regulatory Review

Regulations define how the nation conducts the management of aviation safety in the U.S. Regulations are periodically reviewed to ensure they remain relevant and appropriate to the U.S.

1.2.1 Aviation Safety Regulation

The Code of Federal Regulations (CFR) is the codification of the general and permanent rules published in the *Federal Register* by federal agencies and departments. The CFR is divided to 50 titles that represent broad areas subject to Federal regulation. The FAA regulations pertaining to aviation safety are found in Title 14 of the Code of Federal Regulations (14 CFR), Aeronautics and Space, as shown in Figure 1.[21] The FAA is responsible for 14 CFR parts 1-199 and 400-499.[22]

[20] FAA Extension, Safety, and Security Act of 2016: https://www.congress.gov/114/plaws/publ190/PLAW-114publ190.pdf. Accessed February 22, 2021.

[21] Additional information on 14 CFR can be found on the U.S. Government Printing Office website: https://www.govinfo.gov/app/details/CFR-2004-title14-vol1. Accessed February 22, 2021.

[22] Dangerous Goods regulations can be found in 49 CFR parts 100-185: http://www.ecfr.gov/cgi-bin/text-idx?SID=1d6ba49dd2173fcde628f46ee295ddc1&tpl=/ecfrbrowse/Title49/49tab_02.tpl. Accessed February 22, 2021.

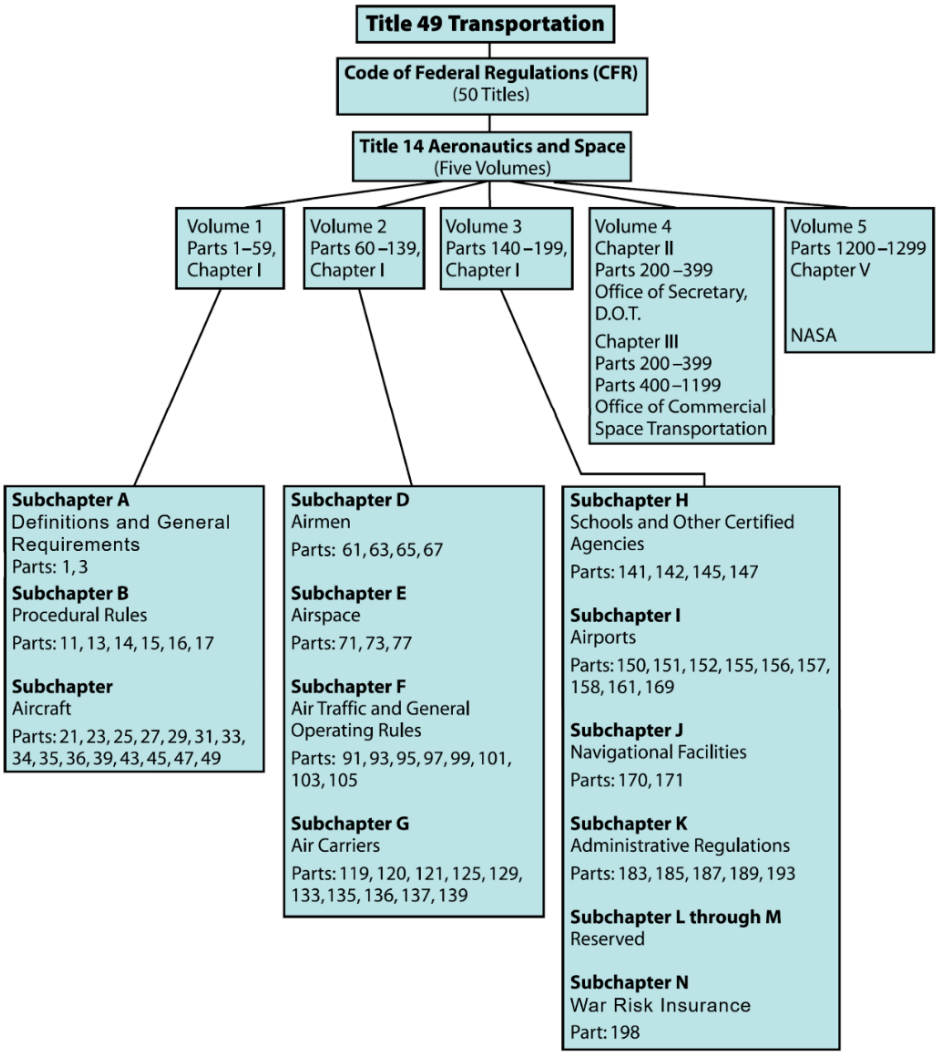

Figure 1: Title 14 of the Code of Federal Regulations

As discussed previously, the FAA was established by the U.S. Congress as part of the Executive Branch and is empowered to issue regulations within its statutory authority. The FAA issues regulations in accordance with applicable statutes, executive orders, and *Federal Register* requirements. The following are some steps involved in adopting regulations:

- Identify a need for rulemaking;
- Document the hazard(s) and level of safety risk that generated the need for the proposed rule;
- Analyze the comments and decide what to do next; and
- Assess potential safety risk associated with the final rule and document rationale behind its acceptability.

There are many factors that may indicate a need for rulemaking, such as:

- Laws passed by Congress;
- Recommendations resulting from accident investigations;

- Availability of new technology;
- Changes in industry practice;
- Internal FAA safety analyses;
- Desire to harmonize FAA's regulations with those of other States;
- Petitions for rulemaking submitted by members of the public; or
- Exemptions from FAA regulations.

As discussed in Section 1.1.1, *United States Legislative System*, the APA provides that, except for good cause, agencies must provide the public with notice and an opportunity to comment on a rulemaking. However, DOT Order 2100.6, *Policies and Procedures for Rulemakings*, and the DOT final rule, Administrative Rulemaking, Guidance, and Enforcement Procedures (49 CFR 5.11(j)(2)), provide that issuing a rule without prior notice and comment should be the exception. The public can participate by submitting written comments on a rulemaking document. Additional opportunities for the public to participate in rulemaking include:

- Requesting, or participating in, an FAA-sponsored public meeting on a rulemaking action;
- Asking the FAA to extend or reopen a comment period; and
- Filing a petition for rulemaking that asks the FAA to adopt, amend, or repeal a regulation.

In addition to legislation and regulations, the U.S. also issues aviation safety policies and guidance materials related to the management of aviation safety in the U.S. FAA orders, notices, and bulletins are documents that provide information to FAA employees on what the FAA expects of applicants and certificate holders.

The FAA also issues guidance[23] to U.S. aerospace system users and product/service providers, such as Advisory Circulars (ACs) and Notices to Airmen (NOTAMs).

1.2.2 Regulatory Review

The U.S. government also abides by several regulatory review requirements to assess the efficacy and burden of existing regulations. The paragraphs below discuss specific U.S. government-wide regulatory review requirements.

The Regulatory Flexibility Act, 5 USC 610(c), requires U.S. government agencies to review rules that have a "significant" economic impact upon a substantial number of small entities within ten years of the publication of such rules as final rules. The purpose of the review is "to determine whether such rules should be continued without change, or should be amended or rescinded…to minimize any significant economic impact of the rules upon a substantial number of such small entities." The Act requires agencies to assess the:

- Continued need for the rule;
- Nature of complaints or comments received concerning the rule from the public;
- Complexity of the rule;

[23] Additional information on specific guidance can be found on the FAA website: http://www.faa.gov/regulations_policies/. Accessed February 22, 2021.

- Extent to which the rule overlaps, duplicates, or conflicts with other Federal rules, and, to the extent feasible, with State and local governmental rules; and
- Length of time since the rule has been evaluated or the degree to which technology, economic conditions, or other factors have changed in the area affected by the rule.

EO 12866, *Regulatory Planning and Review*, establishes a program to reform and make the regulatory process more efficient and to ensure it meets applicable statutory requirements. Under this EO, the Office of Management and Budget (OMB) was tasked to conduct a coordinated review of agency rulemaking to ensure that regulations are consistent with applicable law and the President's priorities, and that decisions made by one agency do not conflict with the policies or actions taken or planned by another agency. The EO also requires agencies to have a program to periodically review its "significant regulations to determine whether any such regulations should be modified or eliminated so as to make the agency's regulatory program more effective in achieving the regulatory objectives, less burdensome, or in greater alignment with the President's priorities and the principles set forth in EO 12866."

The DOT Review Plan[24] also discusses these review requirements.

The FAA may also determine it is necessary to review and revise rules based on the same factors previously identified as considerations for initiating a new rule.

1.3 State System and Functions

The U.S. civil aviation safety system encompasses a number of government agencies with specific functions and responsibilities, supported by sufficient and qualified personnel and provided with adequate financial resources for the management of safety. As discussed in the *Introduction* section of this document, multiple U.S. government agencies contribute to the U.S. SSP, each with stated safety functions and objectives to fulfill their safety management responsibilities. This document focuses on the roles of the FAA and the NTSB because those two organizations fulfill the majority of SSP related functions for the U.S. Figure 2 shows the organizations within the FAA, and their relationships to the ICAO Annexes.

[24] DOT's Review Plan: https://www.transportation.gov/regulations/dots-review-plan. Accessed February 22, 2021.

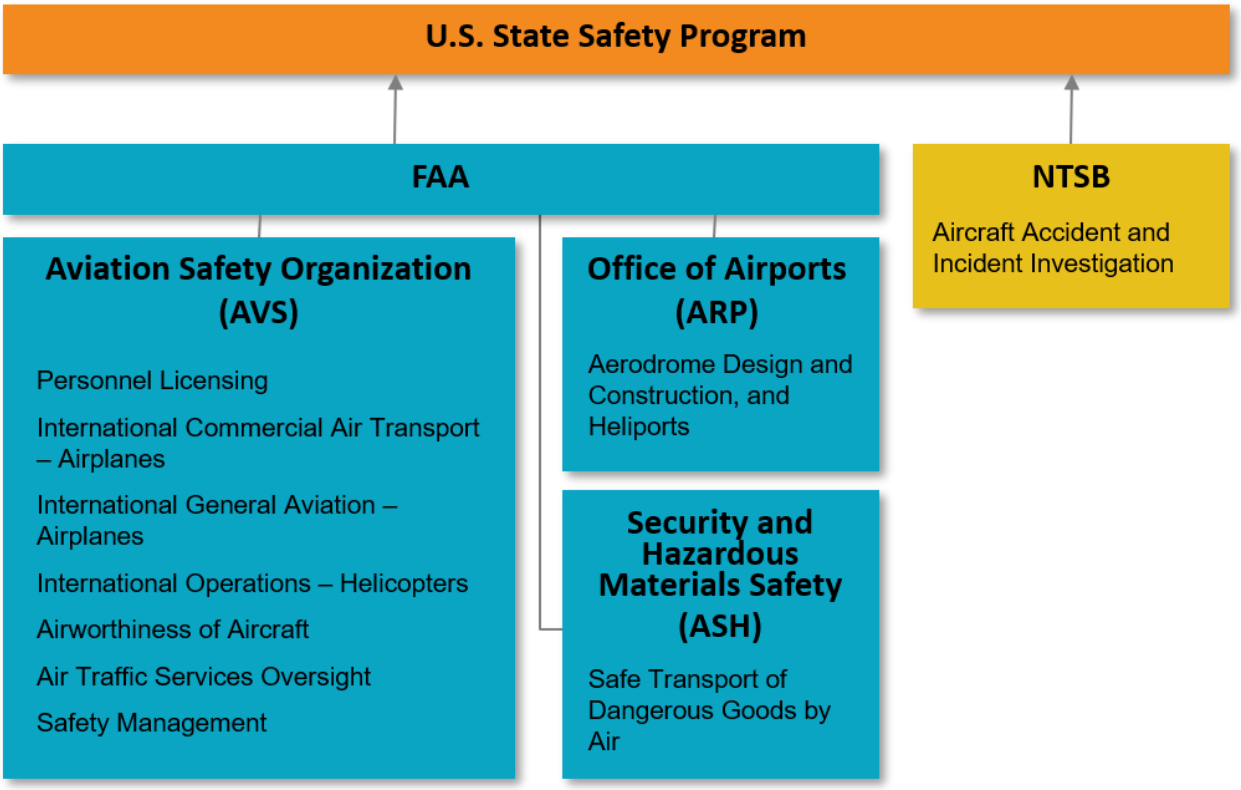

Figure 2: U.S. State Safety Program in Accordance with ICAO Annex 19

1.3.1 Department of Transportation (DOT)

The DOT was established by an act of Congress on October 15, 1966. The mission of the Department is to:

> *Serve the United States by ensuring a fast, safe, efficient, accessible and convenient transportation system that meets our vital national interests and enhances the quality of life of the American people, today and into the future.*

The Secretary of Transportation leads the DOT and serves as the principal adviser to the U.S. President in all matters relating to federal transportation programs. The Deputy Secretary assists by the Secretary in this role. The Office of the Secretary (OST) oversees the formulation of national transportation policy and promotes intermodal transportation. Other responsibilities include negotiating and implementing international transportation agreements, assuring the fitness of U.S. airlines, enforcing airline consumer protection regulations, issuing regulations to prevent alcohol misuse and illegal drug use in transportation systems, and preparing transportation legislation.

1.3.2 Federal Aviation Administration (FAA)

An agency of the DOT, the FAA is the national aviation authority of the United States. It has authority to regulate and oversee all aspects of U.S. civil aviation safety.

Each FAA organization with safety oversight responsibilities ensures that the workforce has the necessary competencies to perform their duties relevant to the operation and performance of the SMS. Safety is the first and foremost mission of the FAA and includes the issuance and

enforcement of regulations and standards related to the manufacture, operation, certification, and maintenance of aircraft. The agency is responsible for the certification of airmen, and for certification of air carriers, repair stations, and airports. It also oversees a program to protect the security of civil aviation, and enforces regulations under the Hazardous Materials Transportation Act,[25] 49 USC 5101 et seq., for shipments by air. Furthermore, the FAA regulates and encourages the U.S. commercial space transportation industry, and licenses commercial space launch facilities and private sector launches.

The ATO, a line of business (LOB) within the FAA, is the ANSP for the U.S. It operates a network of airport towers, air route traffic control centers, and flight service stations; and it develops air traffic rules, allocates the use of airspace, and provides for the security control of air traffic to meet national defense requirements. Other responsibilities include the construction or installation of visual and electronic aids to air navigation and the promotion of aviation safety internationally.

The FAA has authority over all civil aviation safety matters in the U.S. The FAA Administrator is responsible for the development and maintenance of this document and for monitoring and reporting on the progress of the SSP activities to ICAO. The Administrator's role with regard to the U.S. SSP is further discussed in Section 1.3.4, *Coordination within the U.S. Aviation Safety System*.

Aviation Safety Organization (AVS)

AVS is the FAA organization responsible for overseeing the certification, production approval, and continued airworthiness of aircraft, as well as certification of pilots, mechanics, and others in safety-related positions. Specifically, AVS is responsible for assuring compliance with U.S. obligations under the following ICAO Annexes:

- Annex 1: Personnel Licensing;
- Annex 2: Rules of the Air;
- Annex 6: Operation of Aircraft (International Commercial Air Transport – Aeroplanes, International General Aviation – Aeroplanes, and International Operations – Helicopters);
- Annex 7: Aircraft Nationality and Registration Marks;
- Annex 8: Airworthiness of Aircraft;
- Annex 10: Aeronautical Telecommunications (Radio Navigation Aids; Communications Procedures; Communications Systems; Surveillance Radar and Collision Avoidance Systems; and Aeronautical Radio Frequency Spectrum Utilization);
- Annex 11: Air Traffic Services; and
- Annex 19: Safety Management.

AVS is also responsible for:

- Certification of all operational and maintenance enterprises in domestic civil aviation;

[25] The Hazardous Materials Transportation Act: https://uscode.house.gov/statviewer.htm?volume=88&page=2156. Accessed February 22, 2021.

- Certification and safety oversight of approximately 7,300 U.S. commercial airlines and air operators;
- Civil flight operations; and
- Developing safety regulations.

To execute its SSP responsibilities, AVS is organized into the following Services and Offices:

- Flight Standards (FS) promotes safe air transportation by setting the standards for certification and oversight of airmen, air operators, air agencies, and designees. FS also promotes safety of flight of civil aircraft and air commerce by:
    - Accomplishing certification, surveillance, investigation, and enforcement;
    - Setting regulations and standards;
    - Managing the system for registration of civil aircraft and maintaining records; and
    - Certification of airmen and maintaining all airmen records.
- The Aircraft Certification Service (AIR) is responsible for:
    - Administering safety standards governing the design, production, and airworthiness of civil aeronautical products;
    - Overseeing design, production, and airworthiness certification programs to ensure compliance with prescribed safety standards;
    - Ensuring continued operational safety (COS) of aircraft; and
    - Working with aviation authorities, manufacturers, and other stakeholders to help them successfully improve the safety of the international air transportation system.
- The Office of Aerospace Medicine (AAM) is responsible for a broad range of medical programs and services for both the domestic and international aviation communities including:
    - Aerospace medical education;
    - Aerospace medical and human factors research;
    - Regulation and oversight of industry drug and alcohol testing programs;
    - FAA employee substance abuse testing programs;
    - Medical clearance of FAA ATC specialists and other agency employees required to meet medical standards to perform safety-sensitive duties;
    - Medical certification/qualification of airmen and other persons associated with safety in flight;
    - Airman medical regulations, standards, policies, and procedures; and
    - Management and oversight of designees who support the AAM mission.
- The Air Traffic Safety Oversight Service (AOV) establishes safety standards, approves and accepts standards, and provides independent oversight of the ATO—the ANSP in the U.S. The ATO is also a part of the FAA, and its relationship with AOV is discussed in Section

3.1.5, *Enforcement Policy.* AOV accomplishes this safety oversight in a variety of ways including:

- Developing and amending regulations and guidance for regulatory oversight and credentialing functions;
- Participating in the development and harmonization of ATC international standards;
- Providing oversight and approval of the ATO SMS;
- Approving and validating the ATO safety-related processes used for introduction of new separation standards, and modification of existing separation standards;
- Approving new standards and waivers, and the extension and modification of existing waivers;
- Analyzing, approving, and authorizing controls used by the ATO to mitigate hazards;
- Participating in the conduct of operational and procedural review and analysis of information pertaining to employees, operations, and programs; and,
- Auditing, inspecting, and monitoring ATO compliance with safety standards and the SMS.

- The Office of Accident Investigation and Prevention (AVP) manages aviation safety management activities and safety data management activities both within the FAA and the U.S., and is also responsible for assuring U.S. compliance with the intent of ICAO Annex 19. The AVP mission is to make air travel safer through investigation, data collection, risk analysis, and information sharing. AVP is the principal organization within the FAA with respect to aircraft accident investigation and all activities related to the NTSB. AVP strives to continuously improve safety by collaboratively developing safety enhancements with the FAA and the aviation community based on the identification of hazards, evaluation of risk, and monitoring of the effectiveness of risk mitigations. AVP also works with international regulatory groups in an effort to coordinate and harmonize safety related standards and accepted practices.

AVS management demonstrates its commitment to managing risk in the current version of FAA Order VS 8000.367, *Aviation Safety (AVS) Safety Management System Requirements*, which states that the organization will allocate resources and funding needed to support the promotion, implementation, maintenance, and management of the Aviation Safety Safety Management System (AVSSMS). AVS also has established an AVSSMS Coordination Group, steered by the AVSSMS Management Board, which provides the resources essential to incorporate, maintain, and improve the AVSSMS. Finally, AVS Services and Offices prioritize allocation of resources for safety management, as reflected in the annual AVS Business Plan.

Office of Airports (ARP)

ARP is the FAA organization that oversees compliance with U.S. obligations under Annex 14, Aerodrome Design and Construction, and Heliports.

ARP provides leadership in planning and developing a safe and efficient national airport system. The office is responsible for all programs related to airport safety and inspections and standards for airport design, construction, and operation (including international harmonization of airport standards). Each year, ARP awards approximately $3.5 billion in airport grants and approves passenger facility charge collections estimated at $2 billion. ARP is also responsible for national

airport planning and environmental requirements and establishes policies related to airport rates and charges, compliance with grant assurances, and airport privatization.

FAA Order 5200.11, *FAA Airports (ARP) Safety Management System*, demonstrates the organization's commitment to assessing and managing risk. It states that the Associate Administrator for Airports will provide the funding, personnel, and support necessary to create an effective SMS within ARP and requires that the entire organization follows all policies, procedures, guidance, and standards needed to set up and use SMS.

Office of Hazardous Materials Safety (AXH)

The Office of Hazardous Materials Safety (AXH) falls under the Office of Security and Hazardous Materials Safety (ASH). AXH is responsible for managing the risks to aviation safety posed by the transportation of dangerous goods by air and assuring compliance with the U.S. obligations under the following ICAO Annexes and guidance:

- Annex 6: Operation of Aircraft (International Commercial Air Transport – Aeroplanes, International General Aviation – Aeroplanes, and International Operations – Helicopters);
- Annex 18: The Safe Transport of Dangerous Goods by Air;
- Annex 19: Safety Management
- ICAO Safety Management Manual (SMM), Doc 9859; and
- ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air, Doc 9284.

AXH is also responsible for the dangerous goods certification and safety oversight of air operators. AXH manages the safety risks of dangerous goods through the acceptance and approval of certificate holders' operating manuals and/or established programs/procedures as an integral process with FS.

FAA Risk-Based Decision Making – Administrator's Strategic Initiative

Although the different organizations within the FAA have distinct oversight roles, they also work together to achieve objectives of the FAA SMS and Risk-Based Decision Making Strategic Initiative.[26] The Risk-Based Decision Making Initiative was one of four strategic initiatives identified by the FAA Administrator in 2014 as top priority over the next five years. Through this initiative, the FAA built on safety management principles to proactively address emerging safety risk by using consistent, data-informed approaches to make smarter, system-level, risk-based decisions.

The Risk-Based Decision Making Initiative was supported by sub-initiatives and activities that focused on ensuring that decision makers have the necessary information regarding safety risk to make well-informed decisions. Specifically, one sub-initiative focused on data with underlying activities necessary to increase data collection, sharing, and analysis to support decision makers. Another sub-initiative focused on ensuring that the FAA has the processes and tools to develop the necessary information to support decision makers and make safety-informed decisions. This sub-initiative also ensured that the information is properly aligned with and incorporated into FAA governance structures and processes through which decisions are made.

[26] FAA Strategic Initiatives Summary: http://www.faa.gov/about/plans_reports/media/FAA_Strategic_Initiatives_Summary.pdf. Accessed on February 22, 2021.

The final sub-initiative focused on the oversight model and implementation of SMS in industry. This sub-initiative completed the picture to ensure that FAA decisions impacting industry are made with safety risk fully considered and that oversight models are properly aligned with SMSs in industry organizations.

1.3.3 National Transportation Safety Board (NTSB)

The NTSB is an independent Federal agency charged by Congress with investigating every civil aviation accident in the United States and significant accidents in other modes of transportation—railroad, highway, marine, and pipeline. The NTSB determines the probable cause of the accidents and issues safety recommendations aimed at preventing future accidents.

The NTSB is also responsible for maintaining the U.S. database of civil aviation accidents, and it conducts special studies of transportation safety issues of national significance. The NTSB performs an administrative review function for certificate actions taken by the FAA under 49 USC 44709 or civil penalty actions initiated by the FAA against persons acting as pilots, mechanics, repairmen, or flight engineers. The NTSB is not part of the DOT, nor is it affiliated with any of its modal administrations (such as the FAA). The Board derives its authority from 49 USC Chapter 11. Title 49 of the USC provides the NTSB and its investigators with the authority to carry out investigations, including control of wreckage and accident sites; entry into and inspection of any relevant facility; conduct of any relevant testing or examination; and interview of witnesses.[27]

The NTSB is the government agency charged with the responsibility for assuring compliance with U.S. obligations under ICAO Annex 13, Aircraft Accident and Incident Investigation.

NTSB Office of Aviation Safety

The Office of Aviation Safety within NTSB is responsible for conducting the aviation accident investigation and reporting activities described above. It investigates and reports on all accidents involving U.S. air carrier, commuter, air taxi, and general aviation aircraft, as well as certain accidents involving public aircraft operations. It also investigates accidents involving both civilian and military aircraft. Additionally, the NTSB Office of Aviation Safety conducts investigations of safety issues that extend beyond a single accident to examine specific aviation safety problems from a broader perspective.

In conjunction with other offices within the NTSB, the Office of Aviation Safety also works to formulate recommendations to prevent the recurrence of similar accidents and incidents, and to otherwise improve aviation safety. The Office of Aviation Safety includes a number of regional offices spread throughout the U.S. to ensure that NTSB personnel are within closer proximity to potential accident sites.[28]

[27] Additional information on 49 USC Chapter 11: https://www.govinfo.gov/app/details/USCODE-2011-title49/USCODE-2011-title49-subtitleII-chap11. Accessed February 22, 2021.

[28] NTSB Office of Aviation website: https://www.ntsb.gov/about/organization/AS/Pages/office_as.aspx. Accessed February 22, 2021.

1.3.4 Coordination Within the U.S. Aviation Safety System

In addition to agency responsibilities designated by statutory authority and organizational structures, a number of inter-agency relationships, and activities ensure that the U.S. has a cohesive and collaborative aviation safety system.

U.S. SSP Governance

The U.S. identified, defined, and documented the requirements, responsibilities, and accountabilities regarding the establishment and maintenance of the SSP within this document. This includes the directives to plan, organize, develop, maintain, control, and continuously improve the SSP in a manner that meets U.S. safety objectives.

While multiple U.S. government agencies contribute to the U.S. SSP, this document focuses on the roles of the FAA and the NTSB, because those two organizations fulfill the majority of SSP related functions for the U.S.

The U.S. SSP Responsible Executive is the FAA Administrator. The FAA Associate Administrator for Aviation Safety (AVS-1) will administrate and coordinate the implementation and operation of the SSP. AVS-1 will leverage the FAA SMS Executive Council and FAA SMS Committee to carry out the responsibilities of managing the U.S. SSP.

FAA Safety Management System (SMS) Governance

FAA Safety Management System (SMS)

To support its mission to provide the safest, most efficient aerospace system in the world, the FAA has implemented an SMS to systematically integrate the management of safety risk into business planning, operations, and decision making. The FAA SMS leverages existing effective FAA practices for safety management.

ICAO has established Standards and Recommended Practices (SARPs) for SSP, which are applicable to Member States, and SMS, which is applicable to product/service provider organizations. Because the FAA includes both a product/service provider and regulatory organizations, the agency chose to implement an SMS. By meeting the tenets of both SSP and SMS, the FAA seeks interoperability among safety management functions in its organizations.

The current version of FAA Order 8000.369, *Safety Management System,*[29] governs how FAA LOBs and Staff Offices (SOs) implement their own SMSs into the overall FAA SMS, and thereby meet the ICAO SSP framework. These organizational SMSs work together to form the overall FAA SMS. The order explains SMS principles and requirements, and standardizes terminology for safety management, where appropriate. The order requires FAA organizations to establish guidance for their own SMS activities and the industry segment they oversee regarding the implementation and incorporation of SMS, and establishes the commitment for continuous improvement of SMS.

[29] FAA Order 8000.369C, *Safety Management System*, effective June 24, 2020: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.current/documentNumber/8000.369. Accessed February 22, 2021.

The order defines the roles and responsibilities of FAA organizations, the FAA SMS Executive Council, and the FAA SMS Committee regarding safety management, which are described below.

FAA SMS Executive Council

The FAA SMS Executive Council is responsible for setting the strategic direction for SMS implementation across the FAA. It provides executive-level guidance and conflict resolution for FAA SMS-related issues. It also approves SMS guidance developed by the FAA SMS Committee. The FAA SMS Committee keeps the Council apprised of SMS activities across the FAA. The Council resolves any issues the FAA SMS Committee raises, which may include disagreements related to Safety Risk Management (SRM). The council is authorized by the FAA Administrator, chaired by AVS-1, and includes senior-level FAA management personnel including the Assistant Administrators of the Office of the Next Generation Air Transportation System (ANG) and ASH; Associate Administrators of ARP, Office of Commercial Space Transportation (AST), and AVS; and the ATO Chief Operating Officer.

The Council is charged with carrying out SSP responsibilities to:

- Assure continuous safe operation of the U.S. aviation system;
- Approve U.S. SSP policy prior to agency signature(s);
- Execute U.S. SSP policy within their respective organizations;
- Agree on roles, responsibilities, and relationships between U.S. SSP organizations;
- Agree on activities/accountability for all relevant state organizations;
- Coordinate the U.S. SSP among state organizations, as appropriate;
- Promote the U.S. SSP document within their respective organizations; and
- Commit to continuously improving the U.S. SSP and review it at least every three years to ensure it reflects evolving aviation safety standards and practices.

The FAA SMS Executive Council is responsible for the development and continuing maintenance of the SSP document and for monitoring and reporting on SSP implementation and the indicators relating to levels of safety in the U.S. aviation system. Although the FAA SMS Executive Council is ultimately responsible for the definition, implementation, and continuous improvement of the SSP, it delegates day-to-day management of the SSP to AVS-1 and the FAA SMS Committee.

The FAA regularly communicates with the NTSB, through its established relationships and processes, to coordinate SSP activities as necessary.

The FAA Administrator has ultimate control of all resources provided to all of the representatives on the council. The NTSB and FAA have agreements in place that established the terms for which FAA services are provided to the NTSB.

FAA SMS Committee

The FAA SMS Committee is authorized by AVS-1, chaired by the Director of the Safety Management and Research Planning Division in the Office of Accident Investigation and Prevention (AVP-300) in AVS, and coordinated with relevant organizations within the FAA and NTSB. Membership includes safety professionals from AVS, ARP, ATO, ANG, AST, and ASH, as well as other organizations as necessary.

The FAA SMS Committee provides advice and guidance to responsible program offices to help them fulfill their authority and responsibility to incorporate and continuously improve the SMS. It meets at regular intervals and at the discretion of the Committee chairperson to exchange SMS information. The FAA SMS Committee serves as a forum for discussion of safety policy, SRM, safety assurance, and safety promotion across all FAA member organizations; develops and/or provides input to safety management products; serves as a forum for organizations to raise safety issues that would be best addressed cross-organizationally; determines whether to track and manage a safety issue on behalf of the FAA SMS Executive Council and assigns an Office of Primary Responsibility (OPR) for safety risk assessments of those safety issues; ensures cross-organizational coordination regarding safety and the management of hazards and safety risk; reviews safety assessments for cross-organizational safety risk documents for completeness and accuracy as appropriate; reviews open hazards in the Hazard Identification, Risk Management and Tracking (HIRMT) system; and resolves disagreements between FAA organizations regarding safety management, such as disagreements related to SRM, and escalates disagreements to the FAA SMS Executive Council that it cannot resolve at the Committee-level.

The Committee works with the Responsible Executive and various organizations to manage SSP activities. The Committee is also responsible for defining and documenting implementation and subsequent continuing operation of the SSP. The SSP documentation includes this top-level U.S. SSP document that defines/describes the U.S. SSP. Further documentation, such as other records, forms, and Standard Operating Procedures (SOPs) associated with SSP implementation and operation will be developed as the SSP evolves.

FAA Safety Data and Analysis Team

The FAA Safety Data and Analysis Team (SDAT) is responsible for improving data standardization and access, and integrating safety data at the agency level—across LOBs and SOs—to support personnel in making data-informed decisions based on risk. The FAA SMS Executive Council sponsors SDAT and provides direction to SDAT in matters pertaining to strategy and the business aspects of governing and managing its information. SDAT acts as an intermediary between the business aspects of safety analysis and the information technology (IT) aspects of data management. SDAT works with the FAA Enterprise Information Management (EIM) Steering Committee, serving as a Community of Interest/Practice and advises them on data management for all data and systems within the safety domain.

SDAT is composed of safety professionals from each of the following LOBs/SOs: AVS, ARP, ATO, AST, ANG, ASH, and the Office of Finance and Management (AFN). SDAT accomplishes their objectives through the creation and direction of Standardization Teams and Tactical Teams. Standardization Teams serve as cross-LOB/SO groups that will work to create agency-wide requirements and standards for safety data, while Tactical Teams are chartered to study and analyze data and information in support of this document, FAA SMS, and decision makers.

Chapter 5, *Safety Data and Safety Information Collection, Analysis, Protection, Sharing, and Exchange*, contains more specific information on SDAT.

<u>Inter-Agency Coordination Activities</u>

In addition to U.S. SSP coordination activities, the U.S. engages in other mechanisms of inter-agency safety management related coordination, described below.

Department of Transportation (DOT) Safety Management System (SMS) Guidance Document

On August 9, 2011, the Secretary of Transportation issued guidance for the DOT to use SMS principles in overseeing the safety activities of the transportation community by each of the Department's modal administrations. The Secretary recognized that actively promoting SMS and a safety culture within the transportation community and with users of the transportation system is a next step in making the U.S. transportation system safer. Implementing SMS concepts within DOT modal administrations demonstrates commitment to establishing a safety culture, holds DOT accountable, helps measure performance, and enables communications with DOT partners on the advantages of using SMS concepts in improving the safety of the transportation system.

Interagency Group on International Aviation (IGIA)

IGIA was established by an Interagency Agreement in 1960 at the direction of the President to provide coordinated recommendations on international aviation matters to the Department of State. Upon establishment of the DOT (EO 11382 dated November 28, 1967, Sec. 7), the IGIA functions vested in the FAA Administrator were transferred to the Secretary of Transportation.[30] The DOT utilizes IGIA to obtain the views of participating departments and agencies on international aviation matters requiring government decision or policy direction, when two or more agencies other than the Department of State are affected. In addition, DOT assures that the Secretary of State is provided with recommendations on policy directives and technical or other instructions for the guidance of U.S. representatives to ICAO and other international bodies concerned with aviation, and U.S. delegations to international conferences in this field, after obtaining the recommendations of the agencies represented on IGIA. The Secretary of State is provided agreed upon recommendations and dissenting views of any substantially affected agency.

Interagency Committee for Aviation Policy (ICAP)

Federally owned aircraft is one of the nation's most valuable assets. To support the government's vision for modernization and progress, the U.S. General Services Administration (GSA) provides the federal aviation community with guidance and regulation regarding the effective acquisition, management, and disposal of aircraft. In support of those goals, GSA established ICAP to promote sound policy and foster the highest aviation standards. ICAP is composed of aviation leaders from across the government who coordinate and advise GSA on developing robust policy. GSA provides a leadership role by chairing the committee, providing programs to support aviation activities, and collecting and reporting data related to federal aviation management.[31]

Members of the committee include:

- Department of Agriculture
- Department of Commerce
- Department of Defense
- Department of Energy

[30] EO 11382: https://www.fas.org/irp/offdocs/eo/eo-11382.htm. Accessed February 22, 2021.

[31] Additional ICAP information can be found at http://www.gsa.gov/portal/category/21234. Accessed February 22, 2021.

- Department of Health and Human Services
- Department of Homeland Security
- Department of Justice
- Department of State
- Department of the Interior
- Department of the Treasury
- Department of Transportation
- Department of Veterans Affairs
- Environmental Protection Agency
- General Services Administration
- National Aeronautics and Space Administration
- National Science Foundation
- Office of Management and Budget
- Tennessee Valley Authority

Coordination through Memoranda of Understanding (MOU)

The U.S. coordinates a range of aviation safety management issues between agencies through Memoranda of Understanding (MOUs), which aim to ensure that responsibilities and communication protocols are clearly articulated between relevant agencies. For example, although the relationship between DOT and NTSB was established by legislation, the organizations created agreements to lay out specific relationships, notification procedures, coordination requirements, and reporting responsibilities for both the Board and the Department for accident investigations. The agreements also identify and describe the conditions and agreements that exist between the two organizations regarding data exchange, availability of resources, conduct of studies and other services, and reimbursement for services rendered by either party. Other examples of uses of MOU agreements include DHS and U.S. Coast Guard search and rescue coordination, and Department of Defense (DoD)/ATO coordination on military/civil air traffic management.

1.3.5 Safety Objective Documentation and Monitoring

Relevant to its safety functions, the FAA establishes strategic initiatives that highlight the agency's priority goals in performing its mission and advancing its capabilities. These objectives are described in the agency-wide Business Plan each year. Each FAA organization has its own Business Plan,[32] which includes additional detail on how the organization will support agency-wide initiatives as well as activities within the organization. The FAA establishes and monitors measurable targets for each initiative and associated activities, to ensure that the agency is meeting its goals. In fiscal year (FY) 2020, the FAA achieved all six of its strategic goals in the area of aviation safety.

[32] FAA Performance and Accountability Report FY2020: https://www.faa.gov/about/plans_reports/#business_plans. Accessed February 22, 2021.

The FAA has an established process for annual strategic and tactical activity planning, with a particular emphasis on safety. Review boards at various levels of the agency meet monthly to review progress toward agency goals and to implement interventions, when necessary. In accordance with the current version of FAA Order 8000.369, management officials in each FAA organization establish roles, responsibilities, and accountabilities regarding the organization's safety performance through the organization's safety policy. For organizations with oversight responsibilities, the policy establishes basic guidelines for compliance and enforcement personnel.

1.4 Qualified Technical Personnel

The U.S. recruits and retains qualified personnel for performing safety oversight functions through its robust job analysis and hiring practices. These practices ensure that the FAA sets minimum qualification requirements for the technical personnel performing safety-related functions and provides for appropriate initial and recurrent training to maintain and enhance their competence at the desired level. Section 4.1.1, *FAA Competencies and Training,* describes FAA hiring and training practices in greater detail. The current version of FAA Order 3750.7, *Ethical Conduct and Financial Disclosure*, provides guidance to all level employees at the FAA on the procedures and responsibilities of ethical conduct and financial disclosure.

1.4.1 Aviation Safety Organization (AVS)

AVS promotes the safety of the world's largest, most complex aviation system by regulating and providing oversight of the civil aviation industry. The AVS workforce is responsible for setting standards, certification, and continued operational safety. AVS conducts annual workforce planning to understand background for current staffing levels; describe the evolving AVS environment; provide an Aviation Safety Inspector (ASI) and Aviation Safety Engineer (ASE) staffing forecast based on model results; forecast expected attrition and specific hiring targets over a 10-year period; and detail strategies for meeting staffing needs.[33] FS and AIR are the two largest organizations within AVS. ASIs and ASEs make up roughly 75 percent of the personnel within FS and AIR and they represent over two-thirds of all positions within AVS. ASIs are responsible for the certification and surveillance of air carriers, aircraft manufacturers, and air operators in accordance with 14 CFR. ASEs apply advanced engineering knowledge and experience in specific engineering disciplines, such as airframe, systems and equipment (electronics/avionics and electrical or mechanical), propulsion, and flight test. Because the majority of positions within AVS are ASIs and ASEs, forecasting and modeling efforts have concentrated on assessing the requirements for these positions. AVS has also established guidance for personnel competencies necessary to support the SMS for AVS Service/Offices to use when filling other safety management-related positions.

1.4.2 Office of Airports (ARP)

ARP's contribution to the world's largest and complex NAS is to identify hazards and safety issues and concerns early in the planning process phase of airport projects and when developing airport related standards. To that end, the ARP workforce consists of program/project management specialists, as well as technical experts, including engineers, electronics engineers, operations research specialists, and information technology professionals. This proactive approach to safety is intended to remove many hazards by eliminating or mitigating any potential hazards during the design stage and through effective airport standards before large capital investments are made. ARP's SMS endeavors to facilitate

[33] AVS Workforce Plan 2020-2029: https://www.faa.gov/about/plans_reports/media/fy20_avs_wfp.pdf. Accessed February 22, 2021.

better collaboration and coordination with other FAA LOBs by providing useful tools for communicating safety issues, concerns, and sharing of safety information across affected LOBs. ARP's SMS has shared responsibilities with other LOBs, such as ATO, AVS, and AST, and requires their involvement and commitment in ARP-led safety assessments that potentially could impact their operations and processes. Pursuant to the FAA's policy of creating and maintaining a just safety culture, the ARP SMS will continue to encourage identification of hazards and safety concerns from any source without fear of reprisal or other repercussions.

1.4.3 Office of Hazardous Materials Safety (AXH)

AXH is responsible for assuring compliance with the U.S. obligations related to managing the risks to aviation safety posed by the transportation of dangerous goods by air. The AXH workforce is responsible for setting standards, certification, and continued operational safety relating to the transport of dangerous goods by air. AXH engages in workforce planning based on an indication of industry trends, collaboration with stakeholders, and strategic goals of the program. The majority of AXH personnel are Hazardous Materials Aviation Safety Inspectors (HMASIs). In the previous five years, AXH has been developing its capabilities to analyze data and integrate safety risk assessment strategies. This trend has influenced the skills and attributes of the personnel to support such efforts. AXH is utilizing core competencies to support and sustain its SMS efforts when filling safety management-related positions.

1.4.4 Training and Records for Technical Personnel

Technical personnel performing safety-related functions are offered appropriate initial and recurrent training to maintain and enhance their competence at the desired level. Section 4.1.1, *FAA Competencies and Training,* lists some of the courses available.

Aviation Safety Organization (AVS)

Training provided to new safety critical staff varies across AVS and ranges from one to fifteen weeks depending on a new hire's specialty. For most employees, initial technical training is provided within the first 12 months of employment. AVS uses a blended training delivery model, with some components delivered through online courses and others delivered in the classroom. FS has four main areas of technical specialization: General Aviation Operations, General Aviation Airworthiness, Air Carrier Operations, and Air Carrier Airworthiness. AIR requires all employees to attend AIR Indoctrination training to introduce and familiarize employees with the AIR organization. This is followed up with other courses tailored to an employee's anticipated role in the organization. Safety critical staff also take required job function training in their area of specialization, which includes Aerospace Engineering (Airframe, Propulsion, Systems, and Software), and Aviation Safety Inspection-Manufacturing. Employees with other technical specialties in AVS (e.g., Drug Abatement Inspectors, Air Traffic Safety Inspectors, Rulemaking staff) receive structured initial technical training specific to their field of expertise. Employees involved in rulemaking activities are provided detailed training on the rulemaking and exemption processes.

After employees complete the initial technical courses, AVS identifies additional training needs during annual calls for training requirements. These requirements are role-based and focused on competency. Inspectors, designee advisors, and flight test pilots are required to receive initial and recurrent training tailored to their particular job responsibilities. In FY 2014, AVS implemented the Consolidated Management Resource Information System (CMRIS), a "call for training" tool for FS and AIR that provides greater flexibility to monitor and revise training needs throughout the year. In addition to mandated AVS training, all Air Traffic Safety Inspectors are required to attend AOV-specific Audit and Assessment Training and Oversight of an Air

Navigation Service Provider's Safety Management System Training. Audit training is a requirement to become an Air Traffic Safety Inspector and provides the skills needed to participate on an audit. The AOV SMS course is designed to standardize understanding of the SMS concept and provide working knowledge and application of SRM processes. AOV employees engaged in SMS documentation reviews must understand and apply formalized processes to assess risk of changes or additions to equipment, operations, and procedures implemented by the ATO.

Office of Airports (ARP)

Training provided to new ARP employees varies across ARP and covers a wide range of information and particular completion time periods depending on a new hire's specialty. For employees where SMS is part of their performance plans, initial technical training is provided within the first 12 months of employment. ARP uses a blended training delivery model, with some training objectives delivered through online courses and others delivered in the classroom. Employees involved in rulemaking activities are provided detailed training on the rulemaking and exemption processes.

Office of Hazardous Materials Safety (AXH)

AXH maintains a training program to provide initial training and continuing professional development training. The training program is delivered through a combination of methods including formal classroom-based training, structured on-the-job training, on-line training courses, managerial/lead inspector assessment and feedback, and in-service continuing education opportunities.

Training Record System

The FAA's electronic Learning Management System (eLMS) is used to launch and track online training and to track all training records for FAA personnel. eLearning content is housed on the FAA's eLMS content server in Oklahoma City and linked to the FAA's Learning Management System by the FAA Academy's Content Integration Team (CIT).

The FAA eLMS is part of the state-of-the-art, web-based DOT eLMS system that meets the needs of training administrators, learners, and managers and facilitates fulfilling the requirements of the e-Gov Act of 2002. It is the official system of records for DOT employees' training. eLMS provides online courses, instructor-led-training, and capabilities for Individual Development Plans (IDPs) and competency management.

The NTSB utilizes an internal, online training system to facilitate the provision and tracking of training courses for its staff. The system provides a web-based platform to register for internal and external training, whether administered on-line or in a classroom setting. It serves as a one-stop training portal for the agency, with the overall goal of enhancing individual learning and career development and assisting the agency to better assess and monitor the training needs of the NTSB.

1.5 Technical Guidance, Tools, and Safety-critical Information

The FAA provides comprehensive and up-to-date technical guidance material and safety-critical information to both FAA personnel engaged in safety oversight activities as well as to industry over which the FAA has oversight responsibility. The NTSB provides a comprehensive suite of guidance and training for its accident investigators.

1.5.1 FAA Personnel

The FAA provides appropriate facilities, comprehensive and up-to-date technical guidance material and procedures, safety-critical information, tools and equipment, and transportation means, as applicable, to the technical personnel to enable them to perform their safety oversight functions effectively and in accordance with established procedures in a standardized manner. Some examples include the current versions of:

- FAA Order 8900.1, *Flight Standards Information Management System (FSIMS)*;
- FAA Order 8110.107, *Monitor Safety/Analyze Data*; and
- FAA Order 8120.23, *Certificate Management of Production Approval Holders*.

1.5.2 Industry

The FAA distributes technical guidance to the aviation industry on the implementation of relevant regulations. The Dynamic Regulatory System (DRS) is a comprehensive knowledge center that includes all regulatory guidance material from AVS. DRS combines more than 65 document types from a dozen repositories into a single searchable application. It also includes all information found in the Flight Standards Information System (FSIMS) and the agency's Regulatory and Guidance Library (RGL). Section 4.2, *External Communication and Dissemination of Safety Information*, describes additional methods for providing guidance and information to industry organizations.

1.5.3 NTSB Personnel

The NTSB utilizes a broad suite of Board orders, operations bulletins, and other internal guidance to help ensure that staff is equipped and trained to carry out their investigative duties. This information is reinforced through ongoing training and supported by offices such as the NTSB Training Center and a safety division. The safety division provides occupational safety and health services for the prevention of injuries and illnesses, which enhances the readiness of the agency to conduct investigations and address transportation safety deficiencies.

U.S. safety agencies have processes and systems in place that have created a safe and efficient aviation system. To further improve aviation safety, the U.S. must augment its traditional methods of analyzing the causes of an accident or incident after the accident or incident has occurred by adopting tools and metrics to better anticipate potential sources of risk. This approach will allow the U.S. to identify and address accident precursors and contributors, and strategically manage safety resources for maximum safety improvement in a cost-effective manner. The FAA SMS enables the U.S. to manage safety risk in the aviation system.

2.1 Licensing, Certification, Authorization, and Approval Obligations

The U.S. has well established processes and procedures to ensure that individual organizations performing an aviation activity meet the established requirements before they receive a license, certificate, authorization, or approval to conduct the relevant aviation activity. In FAA policies, these processes and procedures are considered safety assurance functions.

2.1.1 Aviation Safety Organization (AVS)

FS, within AVS, sets the standards for certification and oversight of airmen, air operators, air agencies, and designees. It also promotes safety of flight of civil aircraft and air commerce by accomplishing certification, inspection, surveillance, investigation, and enforcement; setting regulations and standards; and managing the system for registration of civil aircraft and certification of airmen. AIR is part of AVS and includes more than 1,300 engineers, scientists, inspectors, test pilots, and other experts responsible for oversight of design, production, airworthiness certification, and continued airworthiness programs for all U.S. civil aviation products and foreign import products. AOV establishes safety standards and provides independent oversight of the ATO—the provider of U.S. air traffic services. AOV conducts oversight of ATO in many ways, including validating the ATO safety-related processes used for introduction of new separation standards and modification of existing separation standards; approving new standards, waivers, and the extension and modification of existing waivers; analyzing and authorizing controls used by ATO to mitigate hazards; and participating in operational review and analysis of information pertaining to the ATO employees, operations, and programs. AAM is responsible for a broad range of medical programs and services for both the domestic and international aviation communities, including aviation industry drug and alcohol testing; medical clearance of air traffic control specialists (ATCSs) and other FAA employees required to meet medical standards to perform safety-sensitive duties; and pilot medical certification.

The current versions of the following documents describe how AVS organizations meet their licensing, certification, authorization, and approval obligations:

- FAA Order 8100.5, *Aircraft Certification Service – Organizational Structure and Functions*;
- FAA Order 8900.1, *Flight Standards Information Management System (FSIMS)*;
- FAA Order 1100.161, *Air Traffic Safety Oversight*;
- FAA Order 9000.3, *Aviation Drug and Alcohol Testing Program Inspector and Investigator Credential*;
- FAA Order 9120.1, *Drug and Alcohol Compliance and Enforcement Inspector Handbook*;

- FAA Order AM 1100.3, *Office of Aerospace Medicine Organization*; and
- FAA Order 8500.1, *Airman Medical Certification – Disqualification Procedures*.

2.1.2 Office of Airports (ARP)

ARP establishes standards that prescribe rules governing the certification and operation of airports in any U.S. state, the District of Columbia (DC), or any U.S. territory or possession (14 CFR part 139, Certification of Airports). Additionally, ARP promotes safe airport operations and safety of flight of civil aircraft and air commerce by accomplishing certification, inspection, surveillance, investigation, and enforcement; setting regulations and standards; and managing the certification of airports.

The current version of FAA Order 5280.5, *Airport Certification Program Handbook*, describes how airports meet licensing, certification, authorization, and approval obligations.

2.1.3 Office of Hazardous Materials Safety (AXH)

AXH supports the establishment of the standards that manage the risks posed by the transport of dangerous goods by air. AXH promotes the management of safe transport of dangerous goods by air through the certification, approval, acceptance, inspection, surveillance, investigation, enforcement, and stakeholder engagement of certificate holders and shippers. The current versions of the following documents describe how AXH meets the above listed obligations:

- FAA Order 8900.1, *Flight Standards Information Management Systems (FSIMS)*, Volume 18;
- AC 121-40, *14 CFR Part 121 and Part 135 Dangerous Goods Transportation Operations*; and
- FAA Order 1650.9, *Transportation Of Hazardous Materials*.

2.2 Safety Management System Obligations

The U.S. recognizes the requirement for States to establish regulations requiring service providers to implement SMS. The U.S. filed a difference, however, because it has not issued regulations requiring the implementation of SMS by approved training organizations that are exposed to safety risks related to aircraft operations during the provision of their services; some operators of airplanes or helicopters authorized to conduct international commercial air transport; approved maintenance organizations providing services to operators of airplanes or helicopters engaged in international commercial air transport; organizations responsible for the type design or manufacture of aircraft; and aerodromes certified in accordance with Annex 14. The FAA has provided guidance for several voluntary SMS programs. As a result, many U.S. product/service providers meet ICAO SMS requirements even though the State has not yet issued regulations applicable to the aforementioned organizations.

In accordance with ICAO Annex 19 standards, the U.S., through AOV, has implemented SMS requirements for the U.S. ANSP, the ATO. Additionally, on January 8, 2015, the FAA issued a final rule requiring each air carrier operating under 14 CFR part 121 to develop and implement

an SMS to improve the safety of its aviation-related activities.[34] The FAA approved all U.S. 14 CFR part 121 carriers' SMS programs by March 9, 2018. The FAA developed 14 CFR part 5 as a standard that could be extended to other certificate holders in the future.

The FAA issued a notice of proposed rulemaking (NPRM) followed by a supplemental notice of proposed rulemaking (SNPRM) proposing to require airports certificated under 14 CFR part 139 to establish an SMS. This rulemaking process is ongoing. Additionally, FAA established an Aviation Rulemaking Committee (ARC) which assessed the application of SMS to 14 CFR part 21 organizations. Additionally, the FAA has initiated rulemaking that would require persons engaged in the design and production of aircraft, engines, or propellers; certificate holders that conduct common carriage operations under 14 CFR part 135; persons engaged in maintaining 14 CFR part 121 aircraft under 14 CFR part 145; and persons conducting certain, specific types of air tour operations under 14 CFR part 91 to implement an SMS.

For those components of the aviation system that are not currently covered by the FAA's existing SMS requirements, the FAA has provided guidance for the development of voluntary SMS programs. The FAA conducted voluntary SMS pilot projects with airport operators, and aircraft design and manufacturing organizations to study the implementation of SMS in these segments. Since 2006, FS has sponsored voluntary pilot projects that include, among others, air carriers (14 CFR part 135 certificate holders) and repair stations (14 CFR part 145 certificate holders). Section 2.2.3, *Voluntary SMS Projects*, offers more detail on voluntary SMS programs.

2.2.1 Air Traffic Organization (ATO) SMS

The U.S. ANSP, ATO, is part of the FAA. Through the publication of FAA Order 1100.161, *Air Traffic Safety Oversight,* the FAA established AOV to oversee the ATO. FAA Order 1100.161 also requires the ATO to implement an SMS.[35] AOV certified the ATO SMS in March 2010.

The U.S., via AOV, established standards which govern how the ATO identifies hazards and manages safety risk. These standards include the requirements, specific operating regulations, and implementation policies for the ATO SMS. They are periodically reviewed to ensure that they remain relevant and appropriate to the ATO. FAA JO 1000.37, *Air Traffic Organization Safety Management System,*[36] the *ATO Safety Management System Manual,*[37] and related guidance (e.g., Safety Risk Management Guidance for System Acquisitions) are reviewed periodically to ensure relevancy to the ATO.

The ATO is working on continuous improvement of its SMS and published the latest version of its *Safety Management System Manual* in April 2019.

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[34] Safety Management Systems for Domestic, Flag, and Supplemental Operations Certificate Holders – Final Rule, 80 FR 1326 (January 8, 2015): https://www.federalregister.gov/articles/2015/01/08/2015-00143/safety-management-systems-for-domestic-flag-and-supplemental-operations-certificate-holders. Accessed February 22, 2021.

[35] FAA Order 1100.161A, *Air Traffic Safety Oversight*, effective February 28, 2020: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1037354. Accessed March 1, 2021.

[36] FAA Order JO 1000.37B, *Air Traffic Organization Safety Management System*, effective October 31, 2018: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1034788. Accessed February 22, 2021.

[37] *ATO Safety Management System Manual*, published April 2019: https://www.faa.gov/air_traffic/publications/media/ATO-SMS-Manual.pdf. Accessed February 22, 2021.

2.2.2 Proposed Rulemaking and Aviation Rulemaking Committee Activity

The U.S. has activities underway to establish SMS requirements for specific certificate holders and other organizations in the U.S. aviation industry. These activities are described below.

Airports

The FAA proposed to establish requirements for SMS at certain U.S. airports certificated under 14 CFR part 139 (Safety Management System for Certificated Airports, NPRM 75 FR 62008 [Oct. 7, 2010]; SNPRM, 81 FR 45872 [July 14, 2016]). The FAA intends for this proposed rule to meet part of the U.S.'s obligation to establish SMS requirements for organizations covered under ICAO Annex 14.

Aircraft Design and Manufacturing

A 14 CFR part 21 ARC was established in 2012 to provide a forum for the U.S. aviation community to discuss and provide recommendations to the FAA. The committee provided recommendations regarding proposed changes to 14 CFR part 21 and the FAA SMS as it relates to design and manufacturing (D&M) certificate and approval holders. Specifically, the ARC analyzed and explored proposals for rulemaking, suggested processes, policies, and guidance the agency should consider in applying SMS to 14 CFR part 21 certificate holders. Part 21 provides certification procedures for products and parts (i.e., design and manufacture of aircraft and aircraft parts). Therefore, a rulemaking applicable to 14 CFR part 21 would meet part of the U.S. obligation to establish SMS requirements for organizations covered under Annex 8.

2.2.3 Voluntary SMS Projects

Regulations may not always be feasible and other mechanisms to meet the intent of ICAO Annex 19 may be necessary.

The development of processes to oversee SMSs of product/service providers outside the FAA began with voluntary SMS pilot projects. These pilot projects have been in place for several years and have been quite successful. Participation in the SMS pilot projects positions industry organizations for easier transition to SMS.

The FAA conducted voluntary SMS pilot projects with airport operators and aircraft design and manufacturers. In addition, FS has an ongoing voluntary pilot project that includes participation from various types of service providers overseen by FS. SMS pilot projects offer industry participants broad experience in the development of an SMS, input to FAA guidance under development, and an opportunity to share best practices and lessons learned. In addition, they provide a practical environment in which the FAA can revise or develop additional processes to oversee product/service providers that are implementing or have implemented an SMS. These organizations can apply what they learned from the pilot projects while transitioning to voluntary programs. The pilot projects are described in more detail below.

Flight Standards (FS) SMS Pilot Projects

FS conducted voluntary SMS pilot projects specifically for operators and service providers. The SMS pilot projects helped to develop implementation strategies and oversight interfaces, and for both FS and service providers to gain experience with SMS. The SMS Focus Group (SMSFG) was a voluntary implementation users group that provided two-way communication between the FS SMS Program Office and participants in voluntary implementation. It also provided a forum

for knowledge sharing among participants. SMSFG meetings were held annually and offered a forum for SMS pilot project participants to share information and lessons learned with each other and the FS SMS Program Office. FS published several documents to assist pilot project participants, including the current version of AC 120-92, *Safety Management Systems for Aviation Service Providers*, which provides a framework for SMS development by aviation service providers.[38] It contains a uniform set of expectations that aligns with the structure and format of the ICAO SMS Framework. FS created additional guidance documents that support the AC. Appendix 1 of AC 120-92 provides aviation industry organizations with a standard set of concepts, documents, and tools for the voluntary development and implementation of SMS. The appendix also makes SMS implementation standards consistent with AVS policy and assists participants in conforming to future rules.

The voluntary SMS pilot projects were so successful that they transitioned to the FAA Safety Management System Voluntary Program (SMSVP), which ultimately leads to formal acceptance of participants' SMSs as "acceptable to the State." Participants in this program include non-121 air operators; maintenance, repair, and overhaul (MRO) organizations; and training organizations.

With the publication of 14 CFR part 5, those 14 CFR part 119 certificate holders conducting operations under14 CFR part 121 no longer participate in the voluntary SMS projects because they are required to have an SMS.

Approved Maintenance Organizations (AMOs) are eligible for entry into the FAA's SMS Voluntary Program along with operators certificated under 14 CFR part 135 and approved training organizations that are not currently required by regulations to implement SMS.

Aircraft Certification Service's (AIR's) Voluntary SMS Program

AIR launched a voluntary SMS program for design and/or production approval holders in October 2016. In support of this program, AIR developed the Voluntary SMS Assessment Guide, which provides standardized criteria to determine whether a requestor's SMS meets the intent of the requirements in 14 CFR part 5, Safety Management Systems. To assist that assessment, the U.S. industry, through the Aerospace Industries Association (AIA) and General Aviation Manufacturers Association (GAMA) developed a national standard, National Aerospace Standard (NAS) 9927, *Safety Management Systems and Practices for Design and Manufacturing*. The intent of NAS 9927 is to assist design and manufacturing organizations to voluntarily implement an SMS. The FAA has acknowledged that NAS 9927 meets the intent of Annex 19 and 14 CFR part 5. The FAA assesses each voluntary SMS in accordance with NAS 9927 or 14 CFR part 5 and if accepted, the FAA issues the industry participant a Letter of Acceptance of their SMS. At this time, the voluntary program will continue supporting industry needs for obtaining an FAA-accepted SMS.

[38] AC 120-92B, *Safety Management Systems for Aviation Service Providers*, published January 8, 2015: https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/1026670. Accessed February 22, 2021.

Office of Airports (ARP) SMS Pilot Studies

As part of its effort to develop and update AC 150/5200-37, *Introduction to Safety Management Systems (SMS) for Airport Operators,* which introduces the concept and offers guidance on SMS for airport operators,[39] ARP completed pilot studies to help determine the appropriate scope and detail of that guidance. ARP designed the pilot studies to encourage and assist airport operators in developing an SMS and allow them to share their experiences and SMS practices with other airports and the FAA. To date, there have been three phases of pilot studies for airports.

Under the first Airport SMS Pilot Study, ARP selected 31 airports to participate, 29 of which received Airport Improvement Program (AIP)[40] grants to develop their SMS Manuals and Implementation Plans. Airports participating in the study were required to follow a Statement of Work and Pilot Study Participant Guide, which detailed the deliverables and time frames for the study. ARP later reopened the study to smaller certificated airports to gather information on scalability and how smaller airports might implement SMS.

In the second phase, ARP selected three airports, varying in size and operational complexity, to conduct a proof-of-concept study. The three airports tested selected components and elements of their SMS Manuals developed during the first phase and reported out on lessons learned, challenges, and strengths.

In December 2009, the FAA conducted a 14 CFR part 139 SMS Implementation Study. The study examined how airports implement the elements of the SRM and safety assurance components throughout the airfield environment. Eligibility for the study was limited to airports that participated in the first or second studies. Fourteen airports participated, providing valuable input to the rulemaking and guidance development processes.

The FAA issued AC 120-92, *Safety Management Systems for Aviation Service Providers*, which provides guidance on the voluntary implementation of SMS to a wide range of aviation-related service providers. The FAA encourages the voluntary implementation of SMS using the guidance provided in ACs 120-92 and 150/5200.37 while rulemaking action is pending.

2.2.4 International General Aviation Difference

The U.S. does not currently require international general aviation operators of large or turbojet airplanes to implement an SMS, consistent with ICAO Annex 19, Standard 3.3.2.3. The U.S. suggested that this Standard be changed to a Recommended Practice, since it is vague and full implementation would be very difficult for some States. Depending upon the organizational structure, or lack thereof, of a State's international general aviation operators of large or turbojet airplanes, there may be circumstances in which requiring an SMS of such operators might be unnecessarily burdensome to the operators. Since ICAO published SMS for operators of large or turbojet airplanes to implement SMS as a Standard, the U.S. has filed a difference to allow for additional safety enhancements in this sector without undue burden on itself and international general aviation operators of large or turbojet airplanes.

[39] AC 150/5200-37, *Introduction to Safety Management Systems (SMS) for Airport Operators*, published February 28, 2007: https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.current/documentNumber/150_5200-37. Accessed February 22, 2021.

[40] AIP: http://www.faa.gov/airports/aip/. Accessed February 22, 2021.

2.2.5 Agreement on Service Provider's Safety Performance

The establishment of service provider safety performance is done through regulation and would be considered as part of the approval of a service provider's SMS. As service providers implement SMS, the FAA, as a regulator, will determine whether a service provider's safety performance indicators and respective target levels are acceptable. The service provider would then evaluate its safety performance against those accepted indicators/targets. The agreed upon safety performance targets would be reviewed periodically to ensure they remain relevant and appropriate to the service provider.

FAA Order 1100.161, *Air Traffic Safety Oversight*, requires the ATO to assess the effectiveness of its SMS in affecting NAS safety by collecting, tracking, and analyzing safety data. AOV requires the ATO to measure several reportable air traffic incidents, such as losses of standard separation, runway incidents, near mid-air collisions, missed equipment preventative maintenance, and expired equipment certifications, in order to assess ATO SMS effectiveness in affecting the safety of the NAS.[41]

2.3 Accident and Incident Investigation

The U.S. currently possesses independent, robust, and mature accident and incident investigation capabilities. The NTSB was established in 1967 to conduct independent investigations of all civil aviation accidents in the U.S. and major accidents in the other modes of transportation. Congress made the NTSB an independent board by passing the Independent Safety Board Act of 1974 (49 of the United States Code Annotated [USCA] app. § 1901 [1982]). The act gave the NTSB sole responsibility for investigating airline crashes. The NTSB mission is to determine the probable cause of major transportation accidents and make safety recommendations so that they do not reoccur.

The NTSB has no regulatory or enforcement powers. To ensure that NTSB investigations focus only on improving transportation safety, its analysis of factual information and its determination of probable cause cannot be entered as evidence in a court of law. NTSB reports are intended to be used to prevent future accidents from occurring and therefore they are released to the public.[42]

The relationship between the NTSB and the FAA is well established in 49 USC 1131, General Authority,[43] and section 1132, Civil Aircraft Accident Investigations.[44] The NTSB and FAA have a common objective to promote safety in aviation and prevent aircraft accidents within the scope of their respective statutory responsibilities. When accidents occur, the FAA participates in the NTSB investigation to learn why the accident occurred, what actions could prevent a recurrence of similar accidents, and to provide technical support to the NTSB. The NTSB has jurisdiction to investigate accidents to determine probable cause and to make recommendations to reduce the likelihood of recurrences of similar accidents. The current version of FAA Order 8020.11, *Aircraft Accident and Incident Notification, Investigation, and Reporting*, establishes FAA

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[41] FAA Order 1100.161, *Air Traffic Safety Oversight*, effective February 28, 2020: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1037354. Accessed February 23, 2021.

[42] NTSB Reports are searchable on the NTSB website: https://www.ntsb.gov/investigations/AccidentReports/Pages/AccidentReports.aspx. Accessed February 23, 2021.

[43] 49 USC 1131, General Authority: http://www.gpo.gov/fdsys/pkg/USCODE-2009-title49/pdf/USCODE-2009-title49-subtitleII-chap11-subchapIII-sec1131.pdf. Accessed February 22, 2021.

[44] 49 USC 1132, Civil Aircraft Accident Investigations: http://www.gpo.gov/fdsys/pkg/USCODE-2009-title49/pdf/USCODE-2009-title49-subtitleII-chap11-subchapIII-sec1132.pdf. Accessed February 23, 2021.

procedures and responsibilities for aircraft accident and incident notification, investigation, and reporting. It also explains the responsibilities of the FAA and the NTSB when conducting investigations.

The FAA policy gives timely attention and full consideration to all NTSB safety recommendations. The FAA prepares formal written responses to each NTSB safety recommendation in writing within 90 days of receipt. Those deemed urgent are addressed sooner. NTSB safety recommendations are coordinated fully with each affected FAA organizational element before the FAA provides a substantive reply to the NTSB. The FAA considers NTSB safety recommendations active and subject to priority attention until appropriate action[45] is completed and the safety recommendations are classified as "closed" by the NTSB.[46]

2.4 Hazard Identification and Safety Risk Assessment

The FAA uses safety assurance functions to monitor aerospace system data to determine the existence of potential hazards, ineffective safety risk controls, or instances of nonconformance with requirements intended to control safety risk. The FAA implements systems and procedures and applies expertise to use safety assurance to identify hazards in the aerospace system.

The current version of FAA Order 8040.4, *Safety Risk Management Policy*, establishes requirements for how to conduct SRM in the FAA. It formalizes SRM guidance for FAA LOBs and SOs, and describes specific steps when performing and documenting SRM. It also establishes common terms and processes used to analyze, assess, mitigate, and accept safety risk in the aerospace system. The design of this policy is to prescribe common SRM language and communication standards to be applied throughout the FAA. The FAA also has a set of guidance materials to accompany the SRM Policy, including guidance on SRM applicability, coordinating cross-LOB safety risk assessments, the SRM process, and SRM tools and guidance.

The HIRMT tool is an FAA-wide tool, built upon a workflow consistent with the current version of FAA Order 8040.4. It is used to track aviation safety hazards, risks, and mitigation outcomes. The HIRMT tool provides a comprehensive capability to categorize identified hazards using a consistent, systematic methodology; facilitate consistent organizational use of prescribed safety risk management and safety assurance processes; bring visibility to complex safety issues across multiple organizations' areas of responsibility; and track the status of hazard analysis and risk management efforts to provide an overall view of FAA and organizational safety portfolios.

Chapter 5, *Safety Data and Safety Information Collection, Analysis, Protection, Sharing, and Exchange*, details current FAA practices used to identify hazards from collected safety data.

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[45] The FAA can address NTSB Safety Recommendations in multiple ways, including taking action that surpasses what the Safety Board recommended, completing the action recommended, taking an alternate course of action that meets the safety recommendation's objective. More information on NTSB Recommendation Status and Assignment Definitions: https://www.ntsb.gov/safety/safety-recs/pages/Status-Explanation.aspx. Accessed February 23, 2021.

[46] FAA Order 1220.2G, *FAA Procedures for Handling National Transportation Safety Board Recommendations*, effective May 13, 2011: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1019142. Accessed February 23, 2021.

2.5 Management of Safety Risks

The FAA has well-documented processes to take appropriate actions, up to and including enforcement measures, to resolve identified safety issues among aviation service providers. Those processes seek to ensure that that identified safety issues are resolved in a timely manner through a system which monitors and records progress, including actions taken by individuals and organizations performing an aviation activity in resolving such issues.

2.5.1 Industry SRM

FAA Order 2150.3, *FAA Compliance and Enforcement Program*, describes how the FAA expects regulated entities to identify and correct underlying issues, including issues that may present safety risk. The obligation of the aviation and aerospace communities to comply with statutory and regulatory requirements includes a duty to develop and use processes and procedures that will prevent deviation from such requirements. The FAA's intent is for regulated persons to identify and correct underlying causes that may lead to statutory and regulatory violations and to gain future compliance. When deviations from statutory or regulatory requirements occur, the FAA's goal is to use the most effective and appropriate means to gain compliance and prevent recurrence. Chapter 5 of FAA Order 2150.3 provides guidance to FAA personnel for determining the best response to statutory or regulatory noncompliance, including the use of compliance, administrative, informal, and legal enforcement actions. It also provides guidance for FAA personnel for recommending non-regulatory compliance action determinations to address situations that do not involve statutory or regulatory noncompliance but when such actions address other safety concerns.

Under an SMS, regulated entities identify undue risks in their operations and develop systematic procedures, practices, and policies to control such risk. SMS represents a proactive approach to identifying and controlling potential safety risks rather than a reactive approach focusing on discovering and mitigating the cause of an accident or safety issue after its occurrence. Under 14 CFR part 5, only air carriers conducting operations under 14 CFR part 121 are required to have an SMS. The FAA, however, encourages other regulated entities to develop a voluntary SMS to proactively identify and manage risk in their operations. Because a regulated entity is in the best position to identify deficiencies and promptly correct them, an SMS includes procedures under which regulated entities perform internal compliance audits and inform senior management of the company's operations, compliance, and safety record. Such internal audits improve a regulated entity's ability to identify and correct any safety problems before, rather than after, FAA inspections. In addition, the FAA encourages individual certificate holders to manage their activities to ensure compliance. Although individuals may not have structured processes or safety or quality management systems, they can support effective compliance through the use of personal operating minimums, recommended practices, checklists, and similar approaches to safety. FAA Compliance Oversight is grounded in SMS principles.

2.5.2 FAA SRM Process

FAA Order 8040.4, *Safety Risk Management Policy*, describes how FAA SRM provides a structured process for decision makers. The formal process is made up of five steps, including describing the system, identifying the hazards, analyzing the risk, assessing the risk, and controlling the risk. Along with safety assurance functions, SRM assists the FAA in identifying hazards and managing safety risk to acceptable levels throughout the aerospace system.

Safety risk is managed in the “control safety risk” step, in which an FAA team develops and manages options to deal with unacceptable safety risk. Effectively mitigating risk involves:

- Identifying feasible mitigation options;
- Developing a risk mitigation plan and accepting the predicted residual risk;
- Developing a monitoring plan that details review cycles for evaluating the effectiveness of mitigations; and
- Implementing and confirming the mitigations.

While FAA organizations agree on the five basic steps of SRM, the methodologies and tools in performing SRM can differ from one organization to another. The SRM Policy in FAA Order 8040.4 provides a common methodology, including severity and likelihood definitions, as well as risk matrices, which can be used when an SRM project crosses multiple organizations. There are two basic triggers that may indicate the need for a cross-agency safety risk assessment. The first trigger is an FAA-level safety issue, and the second trigger is a planned change in the aerospace system.

3 State Safety Assurance

Safety oversight based on SMS principles reinforces the responsibility of service providers to focus on safety throughout their organization and operating environment. However, the U.S. government and its aviation agencies retain a critical role in maintaining quality assurance of the broader safety system. U.S. aviation agencies conduct oversight activities and use the resulting data from the U.S. safety system to monitor trends in aviation safety and to identify areas where there may be safety issues to be addressed.

3.1 Surveillance Obligations

Safety assurance in the U.S. is accomplished through mature oversight of service providers spanning all sectors of the aviation industry. Many of the oversight and surveillance programs are data-informed so that resources are focused and prioritized according to areas of highest risk or greatest safety concern.

ICAO identified eight critical elements of an effective State aviation safety oversight system. The U.S. has established mechanisms for effective monitoring of these critical elements.[47] The U.S. also possesses robust and mature oversight mechanisms for the various sectors of U.S. industry which is evidenced by results of the ICAO Universal Safety Oversight Audit Programme (USOAP) U.S. aviation system review in 2008. Figure 3 shows the U.S. performing well above global averages in all categories audited in the 2008 USOAP review.[48] The U.S. submitted a corrective action plan (CAP) to ICAO in 2008 to address deficiencies found in the audit. Each individual FAA LOB or U.S. Government Agency is responsible for its own CAP, and all CAPs are coordinated through the FAA Office of International Affairs (API) before submittal to ICAO.

A key USOAP principle is the Continuous Monitoring Approach (CMA), a proactive risk-based approach to monitor the safety oversight capability of a State. The objective of CMA is to promote global aviation safety through continuous monitoring of Member States' safety oversight capabilities. The U.S. is transitioning to using CMA and will submit information on its compliance with SARPs to ICAO through an online framework. CMA provides a mechanism for ICAO to:

- Collect safety information from Member States and other stakeholders on a real time basis, and
- Analyze the information using a risk-based approach to identify and prioritize appropriate activities to be carried out by ICAO.

[47] The ICAO eight critical elements (CE) of a safety oversight program are as follows: CE-1, Primary Aviation Legislation; CE-2, Specific Operating Regulations; CE-3, State System and Functions (Organization); CE-4, Qualified Technical Personnel; CE-5, Technical Guidance, Tools, and the Provision of Safety-Critical Information; CE-6, Licensing, Certification, Authorization and Approval Obligations; CE-7, Surveillance Obligations; and CE-8, Resolution of Safety Issues.

[48] USOAP information: https://www.icao.int/safety/cmaforum/Pages/default.aspx. Accessed February 23, 2021.

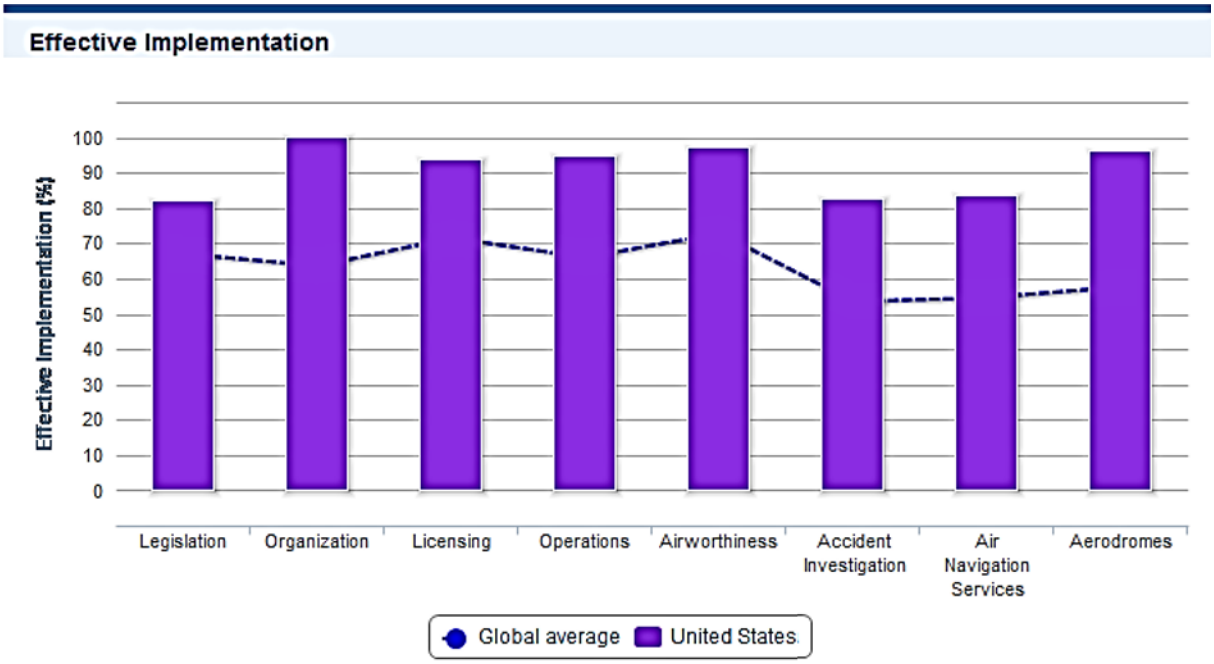

Figure 3: U.S. USOAP Review Results - 2008

The FAA will further enhance these processes as it continues moving forward with incorporating safety management principles into its processes and study requirements for the organizations the FAA oversees.

In addition to its certification and licensing functions, the FAA formally monitors service provider operations through inspections and audits to make certain that they are meeting regulations and that fulfillment of the requirements has the intended effects. FAA organizations that oversee service providers and their respective surveillance programs are further discussed below.

3.1.1 Aviation Safety Organization (AVS)

AVS is responsible for the certification, production approval, and continued airworthiness of aircraft; the certification of pilots, mechanics, and others in safety-related positions; and the oversight of the ATO. Safety assurance of product/service providers refers to those activities used by AVS to assure providers are meeting their requirements to manage safety risk in their operational systems.

Safety reviews, evaluations, audits, inspections, surveillance, data tracking, data analysis, and investigations are AVS safety assurance tools. They systematically provide confidence that organizational outputs regarding design and performance of products and services meet or exceed safety requirements. Safety assurance ensures compliance with FAA orders, standards, and policies, as well as SMS requirements; it provides insight to opportunities for improving safety and minimizing risk.

Since AVS organizations with oversight responsibility each provide oversight of different product/service providers, their existing methods and future needs in safety assurance may vary. As SMS implementation progresses, AVS will seek every opportunity to increase safety by

improving organizational processes using tools such as the Quality Management System (QMS), such that these organizations can:

- Speak a common language with respect to safety and risk;
- Share safety data/information more easily; and
- Apply common decision-making methodologies to allocate oversight resources based on safety risk.

In addition, AVS oversight activities should align with industry implementation of SMS. As discussed earlier, FS and AIR have ongoing activities to expand their knowledge base regarding the impact of industry SMS implementation.

Flight Standards Service (FS)

Since regulatory compliance is the safety benchmark, safety risk controls are assessed through oversight based on existing regulations. FS assures compliance of regulations through acceptance or approval of certificate holders' operating manuals and/or established programs/procedures, as well as surveillance of the programs and procedures presented in those manuals.

Compliance with surveillance obligations is accomplished utilizing the Safety Assurance System (SAS) for over 7,000 14 CFR parts 121, 135, and 145 certificate holders. This is a proactive, risk-based, data-supported system that provides a consistent tool for the certification and COS of certificate holders. The SAS policy and procedure provide aviation safety inspectors with standardized protocols to evaluate certificate holder programs required by regulations to be approved or accepted. SAS implements FAA policy by providing safety controls (i.e., regulations and their application) of business organizations and individuals that fall under FAA regulations. SAS provides inspectors standardized means to verify that an applicant can operate safely and comply with regulations and standards before issuing a certificate and approving or accepting programs; conduct periodic reviews to verify that a certificate holder continues to meet regulatory requirements when the environment changes; and validate the performance of a certificate holder's approved and accepted programs for the purpose of COS.

SAS provides for planning, resource management, data collection, analysis, assessment, and action tracking. It also provides a process to target resources according to assessment of safety risk. Additionally, SAS has a problem resolution function that employs the risk assessment steps outlined in the current version of FAA Order VS 8000.367, *Aviation Safety (AVS) Safety Management System Requirements*, Chapter 3 (SRM) paragraph 2a-b.[49] Control of risk is the responsibility of the operator (i.e., product/service provider) per 49 USC 44702, Issuance of Certificates.[50] Subsequent to risk assessment, the SAS risk management module provides for tracking of these air operator actions.

[49] FAA Order VS 8000.367B, *Aviation Safety Safety Management System Requirements*, Chapter 3 (SRM) paragraph 2a-b, effective May 9, 2017: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1031431. Accessed February 23, 2021.

[50] 49 USC, Section 44702, Issuance of Certificates: http://www.gpo.gov/fdsys/pkg/USCODE-2011-title49/pdf/USCODE-2011-title49-subtitleVII-partA-subpartiii-chap447-sec44702.pdf. Accessed February 23, 2021.

These surveillance processes and other areas of FS responsibility are covered by the most recent version of FAA Order 1800.56, *National Flight Standards Work Program Guidelines*.[51] Activities are recorded in the Program Tracking and Recording Subsystem (PTRS). These systems provide for nationally and locally defined standardized surveillance activities. Analysis capabilities are available through the Safety Performance Analysis System (SPAS).

External product/service provider data acquisition programs also support voluntary programs and processes. A few examples are Flight Operational Quality Assurance (FOQA), Aviation Safety Action Program (ASAP), and Line Operational Safety Audits (LOSA).

FAA Order 8900.1, *Flight Standards Information Management Systems (FSIMS),*[52] describes how aviation safety inspectors oversee operations permitted under 14 CFR, including part 121 carriers, and it contains specific information on SAS.[53]

The Enhanced Flight Standards Automation System (eFSAS) is the System of Record for all required Flight Standards reporting and historical certificate management data concerning the certification and surveillance of FAA certificated Air Operators and Air Agencies. eFSAS is the official repository for all current, past, and planned FAA ASI task records for all technical, administrative, and training tasks.

The Accident/Incident Database System (AIDS) is the System of Record for all accidents and incidents investigated by the FAA, reported by the inspectors in charge (IICs) on the FAA electronic form 8020.23, and maintained by the Aviation Data Systems Branch (AFS-620). Each record submitted to AFS-620 is reviewed for quality of content, and all needed corrective actions on the reports are coordinated between the quality assurance (QA) personnel in AFS-620 and the IIC. Once the QA personnel accept the reports, they are maintained in this system of record where all privacy information is protected, while permitting internal and external users to utilize the data contained in these records for analysis.

The Service Difficulty Reporting System (SDRS) is the System of Record for the submission of mandatory and voluntary reports of mechanical malfunctions, defects, and failures on civil aviation aircraft. SDRS was developed to improve the effectiveness of analyzing detected and reported safety related service difficulties and to aid in the detection trends that may indicate future safety problems. The aviation community submits these reports to the FAA whenever a system, component, or part of an aircraft, power plant, propeller, or appliance fails to function in a normal manner. Mandatory reports are submitted under 14 CFR §§ 121.703, 125.409, 135.415, and 145.63.

Aircraft Certification Service (AIR)

For AIR, safety assurance of product/service providers applies to activities related to design approvals, production approvals, and continued airworthiness. The AIR core business functions of Regulation, Certification, and COS work in an integrated fashion. AIR is moving toward risk-based decision making with regards to product/service provider safety assurance by

[51] FAA Order 1800.56U, *National Flight Standards Work Program Guidelines*, effective June 20, 2020: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1037694. Accessed March 1, 2021.

[52] FAA Order 8900.1, *Flight Standards Information Management Systems (FSIMS), e*ffective September 13, 2007: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/15477. Accessed February 23, 2021.

[53] FSIMS: http://fsims.faa.gov/PICResults.aspx?mode=EBookContents&restricttocategory=all~menu. Accessed February 23, 2021.

implementing two processes/services—Risk Based Resource Targeting (RBRT) and Monitor Safety/Analyze Data (MSAD).

RBRT provides a structured approach for assessing product/service provider organizational and technical risk to determine AIR resource allocation for:

- Developing rules and policy/guidance documents, and
- Performing certifications (e.g., type certificate [TC]/amended type certification [ATC]/ supplemental type certificate [STC], production certificate [PC], parts manufacturer approval [PMA], technical standard order [TSO] approval).

RBRT may also be used to support AVS designee management decision making.

MSAD was deployed in support of the AIR COS function. It is used to assess hazards and associated risk indicated by in-service data. Risk analyses are performed, as appropriate, along with associated root-cause analysis to support making recommendations to AIR Corrective Action Review Boards on whether a risk control (e.g., Airworthiness Directive [AD], Special Airworthiness Information Bulletin [SAIB]) should be issued for a hazard that has gone through the MSAD process.

Office of Aerospace Medicine (AAM)

AAM oversees aviation product and service providers through a variety of programs focused at the individual and organizational level. Programs designed to provide safety assurance information to support safety oversight include:

- Regulation and oversight of industry drug and alcohol testing programs;
- Medical regulations, standards, policies, and procedures;
- Medical certification and clearance of airmen and other persons associated with safety in flight;
- Designated Aviation Medical Examiner (AME) system;
- Aerospace medical education; and
- FAA employee substance abuse testing programs including the medical review of all positive drug cases involving DOT employees.

FS and AAM are dependent on each other to share data regarding the safety assurance of many product and service providers. While both AAM and FS have different safety assurance roles, both organizations recognize the importance of working cooperatively to share safety data. AAM's Civil Aerospace Medical Institute (CAMI) supports safety oversight through aerospace medical research projects, biometric and biostatistical data collection and analysis, and the investigation of aerospace medical and human factors in civil aircraft accident investigations. AAM also implemented a formal, internal SMS to ensure all safety programs include SRM and safety assurance as part of their oversight operations.

Air Traffic Oversight Service (AOV)

Under FAA Order 1100.161, *Air Traffic Safety Oversight*, AOV carries out surveillance, compliance, and verification processes coupled with cooperation with other organizations' safety services. AOV monitors ATO operations to determine compliance with established standards,

rules, and directives, particularly the ATO SMS. AOV reviews and approves ATO safety implementation actions and risk control strategies. AOV ensures consistency in the application of requirements by means of credentialing programs for ATO operational personnel and safety audits, inspections, and assessments of ATO operations and system processes.

AOV oversight of the ATO follows a systems safety approach, which is predicated on continuous improvement. It requires systematically capturing and analyzing safety data for trends and hazards, so that decisions and processes having a negative safety impact can be identified, changed, or eliminated.

Accident Investigation and Prevention (AVP)

AVP is involved in the safety assurance of product/service providers as the FAA lead for accident and incident investigation. FAA Order 8020.11, *Aircraft Accident and Incident Notification, Investigation, and Reporting,* includes specific responsibilities regarding safety assurance of product/service providers in accident investigations which include:[54]

- Performance of FAA facilities or functions;
- Performance of non-FAA owned and operated ATC facilities or navigational aids;
- Airworthiness of FAA-certificated aircraft;
- Competency of FAA-certificated airmen, air agencies, commercial operators, or air carriers;
- Adequacy of regulations issued by the FAA;
- Airport certification safety standards or operations;
- Dangerous goods;
- Airman medical qualifications; and/or
- Violation of regulations issued by the FAA.

SMS requires the continued use of accident and incident investigations as a means to identify potential hazards and non-compliances in the aerospace system. Within the AVSSMS, AVP continues to investigate accidents/incidents. In addition, AVP continues to monitor controls through the Aviation Safety Information Analysis and Sharing (ASIAS) program and conduct vulnerability activities (i.e., identification of hazards in the system). These programs may provide insight and early detection of hazards prior to having an accident or incident. Supporting policy and processes include the current versions of:

- AVP-100-001, *Aircraft Accident and Incident Notification, Investigation and Reporting*;
- AVP-200-001, *Aviation Safety Information Analysis and Sharing (ASIAS) Study Process*;
- FAA Order 8020.11, *Aircraft Accident and Incident Notification, Investigation, and Reporting*; and
- FAA Order 1220.2, *FAA Procedures for Handling National Transportation Safety Board (NTSB) Recommendations*.

[54] FAA Order 8020.11D, *Aircraft Accident and Incident Notification, Investigation, and Reporting*, effective May 10, 2018: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1033315. Accessed February 23, 2021.

3.1.2 Office of Hazardous Materials Safety (AXH)

AXH safety assurance utilizes risk-based, data-driven surveillance activities of air operators, repair stations, and shippers who offer, accept, or transport dangerous goods by air. Compliance with surveillance obligations is accomplished utilizing SAS. Additionally, AXH evaluates air operator training programs and manuals for compliance with regulations and existing guidance. AXH manages the safety risk of certificate holders through an integrated process with FS. AXH obtains additional aviation dangerous goods risk-based data through investigating incidents, investigating discrepancies, evaluating regulatory compliance, performing focuses observations, record reviews, and analysis of safety research.

Supporting documentation includes the current versions of:

- FAA Order 2150.3, *Compliance and Enforcement Program*;
- FAA Order 1650.9, *Transportation of Hazardous Materials*; and
- FAA Order 8900.1, *Flight Standards Information Management Systems (FSIMS)*, Volume 18.

3.1.3 Office of Airports (ARP)

ARP oversees the certification and safety surveillance of 14 CFR part 139 airports as described in the current version of FAA Order 5280.5, *Airport Certification Program Handbook.*[55] ARP inspectors visit each certificated airport to determine compliance with 14 CFR part 139 in the areas of training, records, self-inspection, airport condition reporting, aircraft rescue and firefighting, wildlife, markings, signs, lighting, and other areas. ARP also works with ATO and AVS to investigate and track runway incursions and excursions.

ARP is applying safety management principles to its own internal operations. In accordance with FAA standards, the Associate Administrator for Airports published FAA Order 5200.11*, FAA Airports Safety Management System*, in August 2010 and updated it in August 2014. The order establishes the ARP internal policy and requirements for infusing the components and elements of SMS into areas of oversight, including standards development, planning, and other oversight activities.[56] In June 2012, ARP published the *Office of Airports SMS Desk Reference* to complement the order and give practical guidance on the implementation of SMS throughout the organization.[57] At its core, ARP is now incorporating formalized SRM practices into its oversight and approval processes, which include the approval of Airport Layout Plans and Construction Safety and Phasing Plans and requests for Modification of Standards.

3.1.4 Established Process for Initial Review/Acceptance of Individual SMSs

Where SMSs are being implemented in the aviation industry, the responsible oversight authority established processes for initial review/acceptance of individual SMSs. SMS requirements will be treated like every other service provider responsibility, and the FAA role is to assure service

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[55] FAA Order 5280.5D, *Airport Certification Program Handbook*, effective November 7, 2016: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.current/documentNumber/5280.5. Accessed February 23, 2021.

[56] FAA Order 5200.11*, FAA Airports Safety Management System*, effective August 29, 2014: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/323070. Accessed February 23, 2021.

[57] *Office of Airports SMS Desk Reference*, published June 1, 2012: https://www.faa.gov/airports/airport_safety/safety_management_systems/internal/media/arp-sms-desk-reference-version-1-0.pdf. Accessed February 23, 2021.

providers meet all requirements. As regulations are established, existing approval processes will be updated or additional ones will be established to ensure that the approval/acceptance process is stated explicitly.

As mentioned earlier, the ATO has a certified SMS, and FAA Order 1100.161, *Air Traffic Safety Oversight*, established the process for its initial review/acceptance by the State. In addition, all current certificate holders under 14 CFR part 119 authorized to conduct operations in accordance with the requirements of 14 CFR part 121 must and do have an SMS that meets the requirements of 14 CFR part 5, and is acceptable to the FAA Administrator.

As discussed in Section 2.2, *Safety Management System Obligations*, other service providers regulated by the FAA are not yet required to implement SMS, although some are participating in voluntary SMS pilot projects.

3.1.5 Enforcement Policy

The FAA's central mission is to promote safety in civil aviation. To achieve this, the agency establishes regulatory standards and requirements, found in 14 CFR parts 1-199 under the statutory authority in 49 USC subtitle VII.[58] Under 49 USC 40113, the FAA Administrator has broad authority to take action the Administrator considers necessary to carry out his or her statutory responsibilities and powers relating to safety in air commerce, including conducting investigations; prescribing regulations, standards, and procedures; and issuing orders.[59] The FAA also establishes regulatory standards and requirements governing commercial space transportation, found in 14 CFR chapter III[60] under the statutory authority in 49 USC subtitle IX, which the Secretary of Transportation delegated to the FAA.[61] In addition, the Secretary delegated to the FAA Administrator, the authority to investigate violations and enforce certain PHMSA dangerous goods rules, 49 CFR parts 100-185. Section 119.59 of 14 CFR identifies specific authority for inspections and tests of air carriers and commercial operators. Section 119.59 also identifies specific responsibilities for 14 CFR part 119 certificate holders with respect to any inspection or test. FAA personnel performing safety oversight functions must be provided access to the aircraft, operations, facilities, personnel and associated records, as applicable, of a 14 CFR part 119 certificate holder.

Aviation product/service providers have the primary responsibility for the safety of their products and services; they must comply with safety regulations established by the FAA. Aviation product/service providers control resources and activities of people directly exposed to hazards and are in a position to directly control the risk related to those hazards. When a product/service provider is in noncompliance with statutory or regulatory requirements, the FAA takes appropriate enforcement action or compliance action in accordance with the FAA's Compliance and Enforcement Program.

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[58] 49 USC subtitle VII: https://www.govinfo.gov/content/pkg/USCODE-2009-title49/pdf/USCODE-2009-title49-subtitleVII.pdf. Accessed February 23, 2021.

[59] 49 USC 40113: https://www.govinfo.gov/content/pkg/USCODE-2011-title49/pdf/USCODE-2011-title49-subtitleVII-partA-subparti-chap401-sec40113.pdf. Accessed February 23, 2021.

[60] 14 CFR chapter III: https://www.govinfo.gov/content/pkg/CFR-2004-title14-vol4/pdf/CFR-2004-title14-vol4-chapIII.pdf. Accessed February 23, 2021.

[61] 49 USC subtitle IX: https://www.govinfo.gov/content/pkg/USCODE-2011-title49/pdf/USCODE-2011-title49-subtitleIX.pdf. Accessed February 23, 2021.

FAA Compliance and Enforcement Program[62]

The FAA Compliance and Enforcement Program is designed to promote compliance with statutory and regulatory requirements and is applicable to all activities regulated or enforced by the FAA. The program provides a wide range of options for addressing noncompliance. These options include:

- Compliance action, which may include on-the-spot corrective action or counseling;
- Educational and remedial training efforts;
- Administrative action in the form of either a warning notice or letter of correction;
- Certificate suspensions for a fixed period of time;
- Civil penalties;
- Indefinite certificate suspensions pending compliance or demonstration of qualifications;
- Certificate revocations;
- Injunctions; and
- Referrals for criminal prosecution.

When violations occur, whether they involve operating an airport; producing aircraft, products, or parts; performing aircraft maintenance; operating aircraft; or accepting for transport or transporting dangerous goods, FAA enforcement personnel must take the action most appropriate to promote safety and compliance with the regulations. The initial priority of FAA investigative personnel is to correct any ongoing noncompliance. FAA personnel then determine what action to take by evaluating, among other things, the seriousness and safety risk imposed by the noncompliance. A primary determinant for whether to take compliance actions versus enforcement actions is the willingness and ability of the product/service provider or individual to engage in effective corrective action.

FAA compliance and enforcement-related policies and programs also seek to promote safety and greater compliance by encouraging regulated entities to disclose their own violations and the circumstances surrounding those violations. Based on information provided through such disclosures, the agency's policies and programs foster the implementation of permanent corrective measures to improve overall safety.

The FAA focuses enforcement efforts on those violations that have the greatest safety impact. The agency's highest priorities are those enforcement cases that involve certificate holder qualifications requiring emergency action. Cases identified by program offices as warranting aggressive, swift prosecution are also prioritized.[63] Some matters within the investigatory jurisdiction of the FAA may also involve violations of statutes or regulations that are within the

[62] FAA Order 2150.3C, *FAA Compliance and Enforcement Program*, effective January 13, 2021: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1034329. Accessed February 23, 2021.

[63] Public Law (PL) 103-272, Re-codified Federal Aviation Act of 1958, subpart IV.

investigatory jurisdiction of another government agency, and in those cases the FAA coordinates accordingly.[64]

The public has a legitimate interest in the FAA's enforcement program and a general right to obtain records of the FAA's enforcement actions, subject to exemptions from required disclosure under the Freedom of Information Act (FOIA)[65] and the Privacy Act.[66] Quarterly, the FAA publishes a compilation of enforcement actions against regulated aviation entities that are closed with either a civil penalty, issuance of a certificate suspension or revocation, or other form of legal enforcement action. The compilation is based on data from the agency's Enforcement Information System (EIS). For purposes of these compilations, a regulated aviation entity holds a certificate issued by the FAA (e.g., air carrier operating certificate, repair station certificate, pilot school certificate, airport operating certificate) or is a foreign air carrier or other aviation entity regulated under 14 CFR part 129, Operations: Foreign Air Carriers and Foreign Operators of U.S.-Registered Aircraft Engaged in Common Carriage.[67]

Voluntary Programs

Punitive legal enforcement actions are an effective deterrent for regulatory noncompliance. While legal enforcement actions have deterrent value, they do not necessarily include corrective actions to preclude future noncompliance. Voluntary programs and compliance actions concentrate on problem solving, root-cause analysis, and effective corrective action. Where noncompliance is inadvertent, compliance actions provide an opportunity for open dialogue and information sharing that may result in corrective measures that address the reasons for the noncompliance. When individuals or organizations are unwilling or unable to take immediate effective corrective action, the FAA takes strong enforcement action, including, if necessary, certificate action.

The public interest in aviation safety is served in appropriate circumstances by positive incentives to promote and achieve compliance. To this end, the FAA established several programs to improve compliance and increase safety by offering incentives to regulated entities and individuals to disclose their own violations, other safety discrepancies, and general safety information to the FAA and take appropriate corrective action to preclude future safety problems. Examples of such programs include the Voluntary Disclosure Reporting Programs (VDRP), ASAP, and the FOQA program.[68]

Regulations for protection of data submitted voluntarily are in 14 CFR part 193, Protection of Voluntarily Submitted Information. Certain information, which might otherwise be disclosed, is

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[64] A provision for coordination with agencies outside of FAA is discussed in Chapter 2 Section 9 of FAA Order 2150.3C, *FAA Compliance and Enforcement Program*.

[65] FOIA website: http://www.foia.gov/about.html. Accessed February 23, 2021.

[66] Additional information on the Privacy Act can be found on the U.S. Department of Justice website: http://www.justice.gov/opcl/1974privacyact-overview.htm. Accessed February 23, 2021.

[67] The Transportation Security Administration (TSA) is now the record owner for all enforcement actions ever taken against regulated aviation entities for violations of 49 USC, Chapter 449 or a regulation prescribed or an order issued thereunder. The FAA, therefore, will no longer include within the quarterly compilations closed enforcement actions against entities for violations of such requirements. The FAA has removed such security enforcement actions from all quarterly compilations presently posted on the FAA website. Information about such enforcement actions must be sought from the TSA.

[68] Additional information regarding voluntary disclosure of violations is discussed in Chapter 3 Section 7 of FAA Order 2150.3B, *FAA Compliance and Enforcement Program*

prohibited from disclosure if it is protected by an order issued under 14 CFR part 193.[69] FAA Order 8000.81 designates certain information provided to the FAA from an approved FOQA program as protected under 14 CFR part 193. Except for criminal and deliberate acts, the FAA may not use an operator's FOQA data in an enforcement action against that operator or its employees when that data is obtained from an FAA-approved FOQA program. FAA Order 8000.82 designates certain information provided to the FAA from an ASAP program as protected under 14 CFR part 193. FAA Order 8000.89 designates certain information provided to the FAA from a VDRP program as protected under 14 CFR part 193.[70]

Voluntary reporting programs are described further in Section 5.1.5, *Voluntary Reporting*.

AOV Enforcement of ANSP (ATO) SMS Policy

The FAA is unique in that it contains both regulatory and service provider organizations. The FAA ATO provides air navigation service in the U.S. aerospace system. AOV, within AVS, oversees the ATO as established in FAA Order 1100.161, *Air Traffic Safety Oversight*.[71] AOV has the authority to issue Warning Notices and Safety Directives requiring ATO to make a change, stop a procedure, or alter a practice where there is a safety concern that warrants such an action. AOV can also issue Letters of Correction when procedures and/or practices are brought into compliance. Further information regarding AOV Enforcement of ATO SMS Policy is contained in AOV Safety Oversight Circular (SOC) 13-13, *Corrective Action Plan Development and Acceptance in Response to Safety Compliance Issues*.[72]

Integrated Oversight Philosophy

FAA Order 8000.72, *FAA Integrated Oversight Philosophy*, was signed in June 2017. It sets forth core principles for evolving safety oversight systems. The philosophy embraces interdependent principles, including transparent exchange of information, collaboration, critical thinking, risk-based decision making, compliance philosophy, SMS integration, and voluntary

[69] 14 CFR part 193: https://www.govinfo.gov/content/pkg/CFR-2012-title14-vol3/pdf/CFR-2012-title14-vol3-part193.pdf. Accessed February 23, 2021.

[70] FAA Order 8000.81, *Designation of Flight Operational Quality Assurance (FOQA) Information as Protected from Public Disclosure under 14 CFR part 193*, effective April 14, 2003: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/13521. Accessed February 23, 2021.

FAA Order 8000.82, *Designation of Aviation Safety Action Program (ASAP) Information as Protected from Public Disclosure under 14 CFR part 193*, effective September 3, 2003: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/13636. Accessed February 23, 2021.

FAA Order 8000.89, *Designation of Voluntary Disclosure Reporting Program (VDRP) Information as Protected from Public Disclosure under 14 CFR part 193*, effective October 1, 2016: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/14744. Accessed February 23, 2021.

[71] FAA Order 1100.161A, *Air Traffic Safety Oversight*, effective February 28, 2020: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1037354. Accessed February 23, 2021.

[72] AOV SOC 13-13, *Corrective Action Plan Development and Acceptance in Response to Safety Compliance Issues*, effective August 1, 2016: https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aov/policies_forms/media/SOC_13_13A_CAP.pdf. Accessed February 23, 2021.

safety reporting programs. Implementation of these principles ensures that the FAA meets the challenges of a rapidly evolving aerospace system.

3.1.6 Risk-based Oversight Prioritization

The U.S. developed risk-based oversight systems for various sectors of the industry to prioritize inspections, audits, and surveys toward those areas of greater safety concern or need, as identified by the analysis of data on hazards, their consequences in operations, and the assessed safety risk. Examples of processes and data sources used for prioritization include the following.

Safety Assurance System (SAS)

SAS implements FAA policy by providing safety controls (i.e., regulations and their application) of business organizations and individuals that fall under FAA regulations. Three major functions further define the oversight system—design assessment, performance assessment, and risk management. Design assessment is the SAS function that seeks to ensure an air carrier's operating systems comply with regulations and safety standards. Performance assessments confirm that an air carrier's operating systems produce intended results, and that the air carrier is taking appropriate corrective action when needed. The risk management process deals with hazards and associated risk and is used to manage FAA resources according to risk-based priorities.[73] FAA Order 8900.1, *Flight Standards Information Management Systems (FSIMS),* describes how aviation safety inspectors oversee operations permitted under 14 CFR, including part 121 carriers, and it contains specific information on SAS.[74]

System Approach for Safety Oversight (SASO)

The System Approach for Safety Oversight (SASO) program is designed to improve, standardize, and automate the FAA's safety oversight and inspection policies and processes in accordance with ICAO SMS principles. SASO implements new FS business processes, automation tools, and associated policy designed to assist the ASI work force and others in performing their oversight mission and function more effectively. This will be accomplished by designing and developing oversight tools and associated policies that implement the ICAO SMS components:

- Safety policy;
- Safety assurance;
- SRM; and
- Safety promotion.

The initial product of the SASO program is the FS SAS, an automated, risk-based, decision support tool. SAS provides a comprehensive, standardized methodology for the safety oversight of aviation certificate holders and will improve the FAA's ability to identify and address hazards and safety risks before they result in degraded safety performance. SAS supports the safety assurance component.

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[73] SAS page on FAA website: https://www.faa.gov/about/initiatives/sas/. Accessed February 23, 2021.

[74] FAA Order 8900.1, *Flight Standards Information Management Systems (FSIMS), e*ffective September 13, 2007: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/15477. Accessed February 23, 2021.

SASO implementation Phase 2a is focused on the development and implementation of the web-based SAS for 14 CFR part 121 (Air Carriers), part 135 (Commuter and On-Demand Operations), and part 145 (Repair Stations). SASO implementation Phase 2b, currently in the planning stage, will expand SAS for all remaining applicable 14 CFR parts; reengineer and consolidate FS oversight business processes and systems in accordance with the FAA Enterprise Architecture; and implement processes and tools supporting the three remaining SMS components (safety policy, SRM, and safety promotion).

Monitor Safety/Analyze Data (MSAD)

AIR uses the MSAD process and IT tool to analyze event-based safety data, identify the appropriate response to significant events in support of COS, and detect trends that could lead to future events. The MSAD process helps AIR identify safety issues in in-service aircraft fleets and identify corrective actions to mitigate safety risk across the fleet. The process uses product-defined hazard criteria to pinpoint potential hazards from pools of safety data. With MSAD, AIR can better identify emerging safety trends through dependent variable analysis. In addition, MSAD establishes a causal analysis approach to identify the underlying contributing factors of significant events, such as process breakdowns, which are then communicated to the appropriate AVS oversight business process owner.[75]

Risk Based Resource Targeting (RBRT)

The RBRT process and IT tool assess risk and identify risk management options in order to establish work priorities and allocate resources. It is a sub-process used in other AIR business processes, such as type and production certification, certificate management, and designee management. This process establishes risk thresholds that provide a consistent approach for AIR involvement and prioritization decisions, thereby allowing AIR to manage resources with a consistent understanding of the risk based on real-time data. RBRT provides a means to identify what activities warrant the assignment of FAA resources and allows risk-based business and safety decision making.

Aerospace Medicine Safety Information System (AMSIS)

The Aerospace Medicine Safety Information System (AMSIS) will provide an aerospace medical information network that integrates critical medical information from geographically distributed locations nationally and internationally. AMSIS will be used as a platform to provide better data accessibility and enhanced ability to analyze medical information to identify safety trends. The program objectives include providing tools necessary for AAM to analyze information to make risk-based policy decisions through an automated method of collecting, reviewing, and analyzing medical information for airmen and ATCSs.

This system will ensure timely and comprehensive access to data, thereby improving timeliness and accuracy while eliminating paper-based correspondence. It will also enable collaboration within the aviation community, both domestic and international, as well as among personnel, designees, and applicants. Data will be secured and remain easily accessible, while facilitating management and workforce decision making, thereby providing the basis for a proactive safety approach with improved productivity.

[75] FAA Order 8110.107A, *Monitor Safety/Analyze Data,* effective October 1, 2012: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1020373. Accessed February 23, 2021.

Regulation and Certification Infrastructure for System Safety (RCISS)

The Regulation and Certification Infrastructure for System Safety (RCISS) provides hardware and software capability for safety applications throughout AVS. These applications assist in prioritizing AVS resources based on changing workload demands.

NTSB Most Wanted List

The NTSB Most Wanted List[76] represents the Board's advocacy priorities for transportation improvements. It is designed to increase awareness of, and support for, the most critical changes needed to reduce transportation accidents and save lives.

3.2 State Safety Performance

The U.S. strives to provide the safest, most efficient aerospace system in the world. To achieve that mission, the U.S. is building on safety management principles to proactively address emerging safety risk by using consistent, data-informed approaches to make smarter, system-level, risk-based decisions.

The U.S. traditionally measures the safety of its system by monitoring safety performance measures, such as those listed in the *FAA Fiscal Year (FY) 2020 Performance and Accountability Report.*[77] In FY 2020, the FAA met all six of the following safety goals:

- Reduce the commercial air carrier fatalities per 100 million persons on board by 50 percent over 18-year period — FY 2008-2025. Target for FY 2020 is 5.7.
- Manage the weighted surface safety risk index at or below 0.35 per million airport operations for commercial aviation.
- Manage the weighted surface safety risk index at or below 0.60 per million airport operations for non-commercial aviation.
- Implement 75 percent of approved mitigation activities in association with ATO's Top Five identified trending safety issues in the national airspace system.
- Reduce the general aviation fatal accident rate to no more than 0.89 fatal accidents per 100,000 flight hours by 2028. FY 2020 Target: 0.97.
- Ensure there are no fatalities, serious injuries, or significant property damage to the uninvolved public during licensed or permitted space launch and re-entry activities.

In 2012, the FAA started an agency-wide Metrics Harmonization effort. The agency was faced with an increasing number of metrics being used or reported by various organizations, use of various data sources for the same calculation, use of multiple names for the same metric definition, and use of multiple definitions under the same metric name. The Metrics Harmonization effort is addressing terminology, methodology, and stewardship across the FAA LOBs for all metrics. Its purpose is to bring order, consistency, and accuracy to metric reporting. The FAA Harmonized Operational Metrics website presents the agency's harmonized

[76] NTSB Most Wanted List: https://www.ntsb.gov/safety/mwl/Pages/default.aspx. Accessed February 23, 2021.

[77] *FAA FY 2020 Performance and Accountability Report,* page 44: https://www.faa.gov/about/plans_reports/media/2020_PAR.pdf. Accessed February 23, 2021.

operational metrics. The metrics displayed show how the FAA is performing in the areas of Environment, Safety, Efficiency, Capacity, and Cost Effectiveness.[78]

Risk-Based Decision Making Initiative

Because commercial aviation accidents are becoming rare occurrences, the FAA needs to identify and mitigate precursors to accidents (i.e., safety risk) to manage and improve aviation safety. The FAA has built the foundation to address these challenges by incorporating safety management principles into operational processes to enable better informed decisions from a safety perspective. The FAA Administrator's Risk-Based Decision Making Initiative flowed from the safety management principles, built on existing processes, and directly addressed the challenges faced by the FAA. It has increased safety and efficiency by taking advantage of the growing availability of safety data and the development of powerful analytical capabilities to systematically integrate the management of safety risk into decision making.

In the face of growing complexity throughout the industry, the Risk-Based Decision Making Initiative aimed to make the safest and most efficient aerospace system in the world even safer and more efficient. Through increased sharing of safety data among FAA organizations, industry, and international peers, a broader spectrum of data has become available. The FAA analyzes that data to identify hazards, and predict and address the associated safety. The FAA coordinates and shares the resulting information with decision makers, allowing them to better manage safety risk in order to make the U.S. aviation system even safer. By working with industry and global partners to transform its safety system, the FAA is able to identify hazards and mitigate their associated risk before they become accidents.

In addition to the performance measures mentioned above, the FAA is developing the following metrics to track and measure safety risk:

Outcome measures

- Decreased safety risk *(measure to be developed)*
- Decreased commercial fatality rate

Process measures

- Number of cross-organizational decisions made using safety data
- Number of FAA organizations with safety data-informed decision processes
- Prioritized resources based on safety risk

The U.S. regularly monitors its safety indicators to assure that corrective or follow-up actions are taken for any undesirable trends, alert level breaches, or non-achievement of improvement targets.

FAA SMS Committee and Safety Performance Management

[78] FAA Harmonized Operational Metrics: https://www.faa.gov/data_research/aviation_data_statistics/operational_metrics/. Accessed February 23, 2021.

The U.S. recognizes the importance of improving safety performance management capabilities. The FAA meets its own requirements for safety performance measurement and management through its planning activities (strategic and business planning), as well as the existence of safety performance metrics that are tracked and reported on the FAA's Performance Management website. However, this area represents a significant opportunity for improvement because the agency could improve the alignment between safety management activities and the establishment and tracking of safety performance objectives.

As a member of the Safety Management International Collaboration Group (SM ICG), the FAA contributed to the development of *A Systems Approach to Measuring Safety Performance – The Regulator Perspective.*[79] In FY 2018, the FAA developed a framework to augment existing system-level risk indicators with more detailed data to better inform management and analysts involved with safety related decision-making, titled the NAS-wide Safety Performance Monitoring Methodology. This framework meets ICAO guidance and FAA order requirements for measuring system safety performance. It also aligns with the SM ICG guidance document. This activity will leverage the safety performance framework to better align safety management activities and the establishment and tracking of safety performance objectives currently accomplished through existing planning activities in the FAA. The activity will not change existing planning processes, but rather, use them to establish safety performance objectives and targets.

Eventually, the FAA envisions establishing a holistic view of aviation metrics from the highest-level safety objectives (commercial accident rates) down to operational metrics within different domains. The plan will assist the FAA in understanding safety risk across the U.S. aviation system by mapping out what the FAA measures today, how those measures relate to one another, and identifying areas where no/few measures exist. An aggregate view of current measures, which provides the average expected figure for each measure, will help the FAA identify any trends that could indicate potential safety issues/emerging risk.

[79] SM ICG product *A Systems Approach to Measuring Safety Performance – The Regulator Perspective,* published January 27, 2014: http://www.skybrary.aero/bookshelf/books/2620.pdf. Accessed February 23, 2021.

4 State Safety Promotion

An effective safety promotion program is essential to support the core operational objectives of the U.S. SSP. As part of their missions and responsibilities, both the FAA and the NTSB provide various types of safety-related training and actively communicate safety information to their employees to support the development of a culture that fosters an effective and efficient SSP. In addition, they provide education and communicate safety relevant information to support a positive safety culture among aviation service providers.

4.1 Internal Communication and Dissemination of Safety Information

The FAA and NTSB currently provide various types of safety-related training to their employees and actively communicate safety information to their workforce. Further enhancements will be made as a result of SSP development.

4.1.1 FAA Competencies and Training

The FAA sets, oversees, and enforces safety standards for any person or organization that operates in the U.S. aerospace system, including airmen, airlines, manufacturers, repair stations, mechanics, and air traffic controllers. Completing this mission requires a dedicated workforce of safety critical and operational support professionals located in offices around the country and abroad. The FAA established competencies and training to ensure technical employees, such as inspectors, engineers, pilots, physicians, nurses, and accident investigators, have the necessary technical and analytical skills to meet its safety mission.

FAA Competencies

The FAA adopted an agency-wide hiring practice of conducting a thorough job analysis on all of its positions to ensure that an accurate and timely assessment of the duties to be performed and competencies required are identified prior to recruiting and filling positions. It uses a recruitment and hiring system called the Automated Vacancy Information Access Tool for On-Line Referral (AVIATOR) to facilitate the overall application and selection process for positions. In 2013, the AVIATOR system was integrated into the Office of Personnel Management's automated hiring system, USAJOBS. The agency also uses FAA Managerial and Employee Leadership Competency Profiles to correlate and define interpersonal and business competencies, which are part of the knowledge, skills, and abilities (KSAs) when creating vacancy announcements. In FY 2013, vacancy announcements included competencies that supported safety management as well as interpersonal and business requirements. With SSP implementation in mind, FAA LOBs developed safety management-related competencies to ensure that personnel requirements are aligned with the safety management principles and FAA employees have the requisite skills and knowledge to perform effectively in the U.S. SSP.

FAA Training

The FAA Academy provides technical and managerial training and development for both its workforce and the aviation community.[80] Since courses have different admissions criteria, prospective participants are admitted on a course-by-course basis. Many courses are available

[80] More information on FAA Academy courses: https://www.academy.jccbi.gov/catalog/. Accessed February 23, 2021.

to other government agencies, industry, and international civil aviation authorities. The FAA Academy received accreditation from the North Central Association (NCA) of Colleges and Schools on March 19, 1991. Each year since, the Academy has met or exceeded NCA's rigorous accreditation standards. The Academy has the honor of being the first federal non-military training organization accredited by NCA.

The FAA curriculum includes initial, recurrent, and specialty courses. Employees complete initial technical courses, and additional training needs are identified during annual calls for training requirements, which are role-based and competency-focused. Supervisors work with employees to determine the kind of training needed. They also evaluate the skill sets represented in their offices to determine if additional skills are needed. Inspectors, designee advisors, and flight test pilots receive initial and recurrent training tailored to their particular job responsibilities. Guidelines for the Hiring and Training of Inspectors of the Flight Standards Directorate outline the minimum technical capabilities of technical personnel providing safety oversight and aviation safety inspector training in Flight Standards.[81]

Specific to SSP and SMS, FAA organizations have identified their own training needs. For instance, AVS developed an *AVSSMS Training Plan* that outlines an effective safety management training development and delivery strategy within AVS. The plan will be carried out to meet organizational needs and provide AVS employees the knowledge and skills necessary to succeed as the organization continues to apply safety management principles to safety oversight.

A few safety management related courses available to FAA employees include:

- FAA Safety Risk Management (SRM) Overview (FAA27000023)
- Safety Management System (SMS) Basics for AVS (FAA27000020)
- Fundamentals of Risk Analysis (FAA27200019)
- Apollo Root Cause Analysis (FAA22000001)
- Measuring Organizational Performance (FAA01254)
- Safety Assurance System (SAS) Overview for Managers Workshop (FAA21000070)
- Safety Management System (SMS) Theory and Application (FAA15249001)
- Planning, Conducting, and Reporting Evaluations Course (FAA60000013)
- Overview of Safety Management System (FAA30200994)
- Safety Risk Management (SRM) Panel Facilitation (FAA30201003)
- Safety Risk Management (SRM) Practitioner Course (FAA06000006)
- Safety Management Systems (SMS) (FAA00001038)
- Overview of Safety Management Systems (FAA27100028)
- Safety Management System (SMS) Fundamentals (FAA27100241)
- Introduction to ATO Safety Management Systems (SMS) (FAA66000024)

[81] More information on Model Flight Standards Inspector Training: https://www.faa.gov/about/initiatives/iasa/mcad/. Accessed February 23, 2021.

- Safety Management (FAA21000059)
- Safety Management System (SMS) Practical Application Workshop (PAW) (FAA21000105)
- Bow Tie Method of Safety Risk Management (FAA00001044)
- Hazardous Materials Aviation Safety Course (FAA70300013)
- FAA Compliance Philosophy and the Hazardous Materials Safety Program Briefing (71000014)

In addition, the FAA ATO developed considerable SMS training for its employees, including material on the conduct of SRM, panel facilitation, SRM document writing, leadership roles in SMS, and lessons learned. While designed for a service provider, the coursework has proven to be beneficial to other FAA employees, including those with oversight responsibilities.

4.1.2 NTSB Competencies and Training

The NTSB promotes transportation safety by:

- Maintaining its congressionally mandated independence and objectivity;
- Conducting objective, precise accident investigations and safety studies;
- Performing fair and objective airman and mariner certification appeals; and
- Advocating and promoting NTSB safety recommendations.

Completing this mission requires a dedicated quality workforce, whose competencies keep pace with the increasingly complex technologies of the U.S. transportation systems. The NTSB established competencies and training to ensure its investigators—in the occupations of Accident Investigation, Air Safety Investigation, Aerospace Engineer, Psychologist (Human Performance), Scientist (Chemist, Metallurgist, Meteorologist), and Transportation Specialist—are equipped to meet its safety mission.[82]

NTSB Competencies

In 2008, the NTSB also began work on defining investigative competencies for the key occupations identified in the Strategic Human Capital Plan in order to identify gaps. Information from government-wide competency studies; human resources records, such as position descriptions; and training center core competencies helped define a draft competency model that was revised and completed through focus group meetings with investigators and supervisors. The competency model covers both general and technical competencies needed by accident investigators.

A self-assessment of the competency proficiency levels of the investigator workforce (the "supply") was conducted using an online tool in May 2010. During the same timeframe, each technical office completed an online competency needs assessment (the "demand"). Analysis of the results provided a means to identify gaps in workforce competencies that NTSB will address through application of a variety of human capital tools. The summarized results of the competency assessment project were shared with senior leaders, with managers and supervisors in the technical offices, and with the investigator workforce. The results will be used in establishing training and development plans for the workforce. In addition, the information is

[82] *National Transportation Safety Board Strategic Human Capital Plan FY 2011 - 2016*, published September 30, 2011: https://www.ntsb.gov/about/reports/Pages/default.aspx. Accessed February 23, 2021.

used by managers and supervisors to budget for training and development and to plan for their future hiring priorities.

NTSB Training

The NTSB Training Center provides training for NTSB investigators and others from the transportation community to improve their practice of accident investigation techniques. The curriculum promotes independent, objective, and technically advanced accident investigations that will enhance the safety of all modes of transportation. The mission of the NTSB Training Center is to promote safe transport by:

- Ensuring and improving the quality of accident investigation through critical thought, instruction, and research;
- Communicating lessons learned, fostering the exchange of new ideas and new experience, and advocating operational excellence;
- Providing a modern platform for accident reconstruction and evaluation; and
- Utilizing its high-quality training resources to facilitate family assistance and first responder programs, sister agency instruction, and other compatible federal activity.

A few aviation safety related courses available at the NTSB Training Center[83] include:

- Aircraft Accident Investigation (AS101)
- Rotorcraft Accident Investigation (AS103)
- Aircraft Accident Investigation for Aviation Professionals (AS301)
- Survival Factors in Aviation Accidents (AS302)
- Investigating Human Fatigue Factors (IM303)
- Managing Communications During an Aircraft Accident or Incident (PA302)

4.1.3 Communication of Safety Information

A successful SSP hinges on effective communication strategies and plans that facilitate a common understanding of the future vision of safety management across State agencies; promote commitment; motivate people to become actively engaged; and share lessons learned.

FAA Communication

The FAA communicates with employees in a variety of ways, including, but not limited to training, events/conferences, workshops, broadcast email messages, articles on the employee website and the public website, social media, organizational newsletters, and printed FAA publications.

FAA organizations have communicated the vision for the SSP and the application of safety management principles in its orders, process guidance, implementation plans, communication

[83] NTSB Training Center 2020-2021 Course Schedule: https://www.ntsb.gov/Training_Center/Pages/2020/sched-courses.aspx. Accessed February 23, 2021.

strategy documents, and training plans. A few examples of publicly available documents are the current versions of:

- FAA Order 8000.369, *Safety Management System*;
- FAA Order 8040.4, *Safety Risk Management Policy*;
- FAA Order 5200.11, *FAA Airports (ARP) Safety Management System*;
- FAA Order VS 8000.367, *Aviation Safety (AVS) Safety Management System Requirements*;
- FAA Order 1070.1, *FAA Hotline Program*; and
- FAA Safety Hotline Reporting Form.

Another element of a successful SSP is the role of leadership. FAA leaders take an active role in communicating with and engaging employees by:

- Using Town Hall meetings to update employees on current activities and accomplishments;
- Conducting Site Visits to offices throughout the country;
- Encouraging participation in the DOT IdeaHub, a department-wide online collaborative tool used to create ideas and help shape solutions for improving FAA's workplace;
- Promoting the All Points Safety campaign, a multimedia communications effort intended to increase awareness of and participation in the FAA's proactive safety management;
- Launching the Partnership for Safety to help proactively identify and mitigate operational safety problems by establishing Local Safety Councils and encouraging frontline employees to participate in safety culture improvement; and
- Holding various meetings and conferences to provide managers and other employees the resources and skills needed to better support day-to-day operations.

NTSB Communication

The NTSB has communicated its vision for the application of safety management principles on its website.[84]

Useful management practices critical to a successful SSP include seeking and monitoring employee attitudes, encouraging two-way communication between employees and management, and incorporating employee feedback into new policies and procedures. This type of communication and collaboration across offices at all levels can improve an organization's ability to carry out its mission by providing opportunities to share best practices and helping to ensure that any needed input is provided in a timely manner. To this end, NTSB senior managers hold periodic meetings with staff, conducting outreach to regional offices, and surveying staff about the effectiveness of communication techniques. The NTSB continually monitors employees' views about employee and management communication to address any issues.

4.2 External Communication and Dissemination of Safety Information

The U.S. provides and promotes education, awareness of safety risk, and two-way communication of safety-relevant information to support, among service providers, the

[84] NTSB Safety Management Systems: https://www.ntsb.gov/safety/mwl/Pages/mwl-3.aspx. Accessed February 23, 2021.

development of an organizational culture that fosters effective and efficient safety management principles. The U.S. makes safety training available to the industry and communicates safety information through various methods and media including State and industry conferences/seminars; Congressional briefings and factsheets; presentations, workshops, and panel discussions; video messages; SMS content on the public FAA website; FAA social media; print materials (posters, flyers, and brochures); and FAA publications for external audiences. Section 5.4, *Safety Information Sharing and Exchange*, describes safety information sharing between the U.S. government, industry, and other States; this section elaborates on that communication.

4.2.1 Service Provider Information Exchange

Access to Safety Information

As discussed previously, the U.S. provides effective open access to all regulatory information and FAA orders. Additionally, the U.S. provides safety information and guidance to aviation service providers through publications such as:

- ACs;
- Information for Operators (InFO);
- Safety Alerts for Operators (SAFOs);
- NOTAMs; and
- General Notices (GENOTs).

As discussed earlier in this document, the NTSB maintains a public database of accident investigations and safety recommendations as well as annual statistics on U.S. civil aviation accidents. It also publishes NTSB safety alerts, which are designed to inform the traveling public, transportation operators, and safety officials on safety hazards and practical remedies.

Government/Industry Collaboration

The U.S. also has numerous government/industry collaboration efforts aimed at exchanging safety information with service providers. Efforts are targeted to the needs of sectors or regions. For example, the FAA and General Aviation (GA) leaders meet often for a GA Safety Summit aimed at improving GA safety, one of the FAA's top priorities.[85]

Other examples of Government/Industry collaboration include the following.

Commercial Aviation Safety Team (CAST)

The Commercial Aviation Safety Team (CAST) is a joint government-industry group that includes representatives from Federal agencies, air carriers, labor organizations, manufacturers, and other industry organizations. The team identifies systemic risk in the NAS and develops best practices to inform the commercial aviation community. CAST works with international partners to reduce fatality risk in world-wide commercial aviation. CAST follows a mature

[85] FAA Hosts Fifth General Aviation Summit News Update, October 24, 2017: https://www.faa.gov/news/updates/?newsId=89005&omniRss=news_updatesAoc&cid=101_N_U. Accessed February 23, 2021.

continuous improvement framework built on the proactive identification of current and future risks, developing mitigations as needed, and monitoring the effectiveness of implemented actions. More information on the history and membership of CAST can be found in Section 5.4.3, *Commercial Aviation Safety Team (CAST)*.[86]

General Aviation Joint Steering Committee (GAJSC)

The General Aviation Joint Steering Committee (GAJSC) is a joint government-industry group working to improve general aviation safety. The GAJSC uses a data-driven, consensus-based approach to analyze aviation safety data and develop risk reduction efforts. The GAJSC's goal is to reduce the GA fatal accident rate by 10 percent per 100,000 flight hours by 2028. The GAJSC analyzes GA safety data to develop intervention strategies to prevent or mitigate problems associated with accident causes, called Safety Enhancements. Safety Enhancements may include procedures, training, and equipment installations that, when implemented, may reduce the likelihood of accidents in the future.

SMS Focus Group (SMSFG)

The SMSFG is a voluntary implementation users group that provides a two-way communication mechanism between the SMS Program Office and participants in voluntary implementation of an SMS. It also provides a forum for knowledge sharing among participants. SMSFG Meetings are conducted semi-annually, and offer a forum for Pilot Project Participants to share best practices and lessons learned with each other and the FAA SMS Program Office.

U.S. Helicopter Safety Team (USHST)

The U.S. Helicopter Safety Team (USHST) is a team of U.S. government and U.S. industry leaders formed to address the safety factors ultimately impacting the U.S. civil helicopter accident rate. The team's mission is to use accident analysis to understand the helicopter community's safety issues and use that understanding to promote the development and implementation of risk mitigations, policies, and best practices for all members of the helicopter community. The USHST works in joint government, industry, and operator teams to analyze civil and publicly operated helicopter accident, incident, and safety report data to identify and prioritize the top safety risks and develop risk mitigations to ensure an acceptable level of safety.

Unmanned Aircraft Safety Team (UAST)

The Unmanned Aircraft Safety Team (UAST) is an industry-government team committed to the safe operation of unmanned aircraft systems (UASs) in the NAS. The UAST supports the safe integration of UAS with data-driven safety enhancements and collaboration among members of the UAS industry. UAST is adopting the same collaborative model as GAJSC and CAST.

4.2.2 International Information Exchange

The FAA provides leadership and support to a number of international bodies with the aim of improving aviation safety and ensuring the global harmonization of safety management. Each year, the FAA provides technical assistance and training to regulators and air navigation service

[86] Additional information regarding CAST can be found on the FAA website: https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=23035. Accessed February 23, 2021.

providers in more than 100 countries, continually seeking to expand the agency's network of collaborative partners. These international efforts include the following.

International Groups, Programs, and Events

CAST/ICAO Common Taxonomy Team (CICTT)

International safety data sharing initiatives, such as the CAST/ICAO Common Taxonomy Team (CICTT), contribute to the FAA's air traffic safety improvement objectives. The CICTT includes experts from a variety of backgrounds, all tasked with developing common taxonomies and definitions for aviation accident and incident reporting systems. The result will be a standardized industry language that will improve the quality of information and communication and greatly enhance the aviation community's capacity to focus on common safety issues.[87]

International Visitors Program (IVP)

Each year, approximately 4,000 aviation professionals participate in the International Visitors Program (IVP). Whether touring headquarters or other FAA facilities throughout the U.S., the focus of the IVP is on advancing international cooperation in the research, development, and acquisition of aviation systems and technologies that enhance aviation safety. Through the program, the FAA is able to build and foster stronger relationships with civil aviation counterparts and provide foreign visitors with the opportunity to improve their knowledge of FAA programs and technologies.[88]

NextGen International Outreach

As part of its responsibility for International Leadership, the FAA Office of International Affairs is promoting NextGen internationally. NextGen is a comprehensive upgrade of the NAS that will fundamentally change the way air traffic is managed. FAA Senior Representatives around the world and at FAA Headquarters work with international partners to help other States understand FAA NextGen programs, plans, and activities for moving from a ground-based system of ATC to a satellite-based system of air traffic management. This includes looking at the impact of these systems domestically and internationally in an effort to harmonize global interoperability and standards as the FAA implements NextGen.[89]

ICAO and Global Initiatives Staff

The ICAO and Global Initiatives Staff is based at FAA headquarters in Washington, DC and is responsible for:

- Leading the development of international policies and procedures that provide information and direction to international stakeholders both inside and outside the FAA;
- Managing the agency's activities with ICAO;
- Managing the IVP;
- Providing executive secretariat services for IGIA;

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[87] CAST/ICAO Common Taxonomy Team: http://www.intlaviationstandards.org/. Accessed February 23, 2021.

[88] FAA International Visitors Program: https://www.faa.gov/about/office_org/headquarters_offices/apl/international_affairs/visitors/. Accessed February 23, 2021.

[89] NextGen International Outreach: http://www.faa.gov/about/office_org/headquarters_offices/apl/international_affairs/international_nextgen/. Accessed February 23, 2021.

- Leading FAA strategic and business planning activities for the office and developing FAA international priorities;
- Managing agency efforts to secure funding for international aviation projects from U.S. government and international donor organizations; and
- Serving as the Secretariat for the Agency's Crisis Response Working Group (CRWG) on issues related to U.S. international aviation including the coordination of the FAA's position with other U.S. government agencies.

International Aviation Safety Assessment (IASA)

The FAA established the International Aviation Safety Assessment (IASA) program through public policy in August 1992. This program focuses on a State's ability, not the individual air carrier, to adhere to international standards for personnel licensing, aircraft operations, and maintenance established by ICAO. The purpose of IASA is to assess whether all foreign air carriers that operate to or from the U.S. are properly licensed and have safety oversight provided by a competent Civil Aviation Authority (CAA) in accordance with ICAO standards.

The FAA is working to determine that each country meets its obligations under ICAO and provides proper oversight to each air carrier operating into the U.S. The continued application of this program will result in a lower number of safety-related problems—including accidents and incidents—and an improved level of safety to the flying public.[90]

Safety Management International Collaboration Group (SM ICG)

The U.S. belongs to the SM ICG, a group of 18 aviation regulatory bodies, which has produced multiple guidance products to promote a common understanding of SMS and SSP principles and requirements. The FAA is a founding and permanent member of the SM ICG Steering Committee and one of three rotating chairs. SM ICG products are published on SKYbrary.[91] In addition, the group began holding Industry Day events, which represent a semiannual opportunity for aviation service providers to hear directly from authorities that are working together on safety management.

Global Safety Information Exchange (GSIE)

The U.S. participates in the Global Safety Information Exchange (GSIE). International Air Transport Association (IATA), ICAO, the DOT, and the European Commission (EC) signed an MOU to create the framework and path forward to launch the GSIE.

European Union Aviation Safety Agency (EASA)/FAA International Aviation Safety Conference

The European Union Aviation Safety Agency (EASA)/FAA International Aviation Safety Conference has a longstanding tradition—it has been organized and co-chaired by the two main technical aviation safety authorities of Europe and the U.S. for the last three decades. Since 1983, the conference has been hosted in annually rotating order by the FAA and the Joint Aviation Authorities (JAA), taken over on the European side by the EASA in 2005.

[90] IASA page on FAA website: http://www.faa.gov/about/initiatives/iasa/. Accessed February 23, 2021.

[91] SM ICG main page: http://www.skybrary.aero/index.php/Safety_Management_International_Collaboration_Group_(SM_ICG). Accessed February 23, 2021.

ICAO Panels
The U.S. actively participates in regional aviation safety information groups, such as the ICAO Annex 19 panel. NTSB representatives serve on various ICAO panels and groups, including those focusing on accident investigation and validation of accident and incident data.

International Training

The FAA's contribution to the growth of leadership skills in foreign aviation professionals is an integral component of developing civil aviation organizations worldwide. The FAA is committed to investing in people who will drive aviation safety and efficiency improvement within their aviation authorities. The FAA promotes developmental opportunities for current and potential foreign leaders to mentor and influence aviation leaders and enhance foreign aviation expertise. The FAA is continually looking for new opportunities to develop programs that teach junior level aviation professionals best practices in strategic planning, program management, regulatory practices, and organizational development.

The FAA works with at least 18 countries or regional organizations to develop aviation leaders to strengthen the global aviation infrastructure. The FAA has been successful in the development and recommendation of aviation-focused programs, such as the Department of State International Visitor Leadership Program (IVLP) process, Executive Management Development Training, and management courses at the FAA Academy.

The FAA Academy is committed to improving worldwide aviation safety by providing quality training and related service to the international community. The Academy offers a wide range of training including Technical Operations, Airworthiness, Avionics, Aircraft Certification, Airports, Air Traffic Control, Flight Inspection, Aviation English, and Management. Most of the FAA training courses are offered to international participants. The International Training Program (ITP) is responsible for enrolling international participants and can provide additional information on training courses available at the FAA Academy.

5 Safety Data and Safety Information Collection, Analysis, Protection, Sharing, and Exchange

The U.S. currently collects aviation safety data from numerous sources including oversight processes, mandatory and voluntary reporting programs, and data pertaining to accident and incident investigations. The information is then used to monitor trends in aviation safety, and inform decisions regarding oversight activities and safety in the aerospace system.

The FAA established SDAT to improve safety data and access across the agency to further enable exchange and analysis of aviation safety data. SDAT is focused on improving data standardization and access as well as facilitating the creation of business requirements for data integration across LOBs and SOs to support personnel in making data-informed decisions based on risk.

Figure 4: Data and Information Lifecycle

Figure 4, *Data and Information Lifecycle*, displays the following lifecycle stages:

- **Requirements:** Defining the data and information needed in order to generate valuable safety knowledge.
- **Data Standards:** Defining data specifications to enable the common usage of such data.
- **Data Collection and Storage:** The process of gathering targeted variables in an established systematic fashion for later retrieval and analysis.
- **Data Governance:** Ensuring integrity, protection, usability, and availability of the collected data.

- **Analysis:** The process of examining information with respect to safety.
- **Sharing:** The delivery and exchange of analysis, outlining findings and recommendations.

5.1 Safety Data Collection and Processing Systems

ICAO Annex 19, Safety Management, requires States to establish safety data collection and processing systems (SDCPS) to capture, store, aggregate, and enable the analysis of safety data and safety information to support their safety performance activities. An SDCPS can be composed of processing and reporting systems, safety databases, schemes for exchange of information, and recorded information. Sections 5.1.4, *Mandatory Reporting*, and 5.1.5, *Voluntary Reporting*, describe some of the data collection and processing systems that the FAA uses today.

SDAT envisions the FAA Safety Data Hub, which will serve as the SDPCS for the FAA in the future. It will be built using the principles of the Data and Information Lifecycle and will allow analysts to access data and information in a reliable and repeatable fashion. SDAT will manage the FAA Safety Data Hub by defining requirements for safety information and ensuring that collected data adheres to agency-wide standards and that proper governance is applied.

A Data and Information Lifecycle enables data-driven decision making and forms the basis for the FAA Safety Data Hub. To fully operationalize data-driven decision making, the FAA must identify specific business requirements, which will then determine the data elements that need to be collected. Once data is adequately processed, stored, standardized, and made available through a governance process, it can be analyzed and transformed into safety information that can then be shared, exchanged, and used for informed decision making.

5.1.1 Data-Informed Decision Making

Data-informed decision making is the purpose of an SDCPS, and is the foundation for the FAA Safety Data Hub. In order to acquire the information necessary to make a decision, it is important to first understand what is required to make a decision. The decision making cycle can be described in three distinct phases: Objective, Target, and Measurement.

- **Objective:** A goal that a State's efforts or actions are intended to accomplish. An example objective is to reduce the fatal accident rate for commercial aviation.
- **Target:** A quantification of the objective. An example target is to reduce the fatal accident rate for commercial aviation by 30% over the next ten years.
- **Measurement:** The assignment of a number to a characteristic of an object or event, which can then be compared with other objects or events. For example, a State could measure the number of fatal accidents over a given period of time in order to develop a safety performance indicator (SPI). Tracking of the SPI over time then provides a measure of safety performance.

With relevant measurements, an organization can assess if its objectives and targets are being met. If an organization does not possess the information necessary to accurately measure the target supporting the objective, then the process continues in the Data and Information Lifecycle to reassess the requirements for data collection for decision making.

5.1.2 Data Requirements

Data is needed to identify trends, make informed decisions, evaluate safety performance in relation to defined objectives, and assess risks. The extent to which objectives are achieved is

assessed by using SPIs, which are also generated from data. As data is the basic building block of the decision making process, solid requirements for safety data and information are fundamental for any SDCPS. Proper safety data requirements make it possible for SPIs to accurately measure system safety.

To ensure that analysts are able to obtain proper information from data, foundational work is necessary for data to fit the four following requirements:

- **Business-Oriented:** Data must be fit for the appropriate purpose. It is important that analysts define the data that is necessary to do their jobs.
- **Structured/Standardized:** Data provided should be structured and organized in such a way that it is possible to combine different data sources for a more complete picture of a system.
- **Reliable:** Analysts must have confidence in the data sources they use to make their decisions.
- **Timely:** Without timely data, analysts will lack the tools necessary to identify emerging trends.

The decision making cycle may also reveal the need for further data to be collected. As such, gathering and selecting the data required to effectively manage the system is an ongoing process.

5.1.3 Data Standards

Data standards are the rules by which data is described and recorded. By identifying and applying data standards to a given data set, the ability to analyze and share data is brought closer to its full potential. Standardization enables data to be compared, aggregated, and combined from different sources.

SDAT will utilize the following cross-LOB/SO Standardization Teams to create agency-wide requirements and standards for safety data that will be included in the FAA Safety Data Hub. Table 1, *Data Standardization Team Goals*, describes the Standardization Teams, team goals, and rationales for establishment of these teams in accordance with guidance from the ICAO Safety Management Manual (SMM), Doc 9859.

Table 1 : Data Standardization Team Goals

Standardization Team	Goal	Rationale
Governance	Develop a comprehensive assessment of the current and desired state of data.	Data governance is the authority, control, and decision making over the processes and procedures that support an organization's data management activities. Governance dictates how safety data and safety information are collected and used.
Ontology	Develop harmonized aviation ontologies.	The integration of safety data sets followed by its reduction or replacement improves the reliability and usability of said data. Harmonized ontologies demonstrate the relationships between safety data sets and can be useful for data fusion.

Standardization Team	Goal	Rationale
Oversight	Develop analytical methodologies to improve oversight data throughout the agency.	Safety data and information collected should support the reliable measure of the system performance and the assessment of known risks, as well as the identification of emerging risks. Standards for successful oversight data ensure that SPIs measure their intended objectives.
Taxonomy	Develop a common taxonomy that can be implemented agency wide.	Safety data should ideally be categorized using taxonomies and supporting definitions so that the data can be captured and stored using meaningful terms.
Metadata	Build a desired state, global metadata repository.	Using metadata standards provides a common meaning or definition of the data. It ensures proper use and interpretation by owners and users, and that data is easily retrieved for analysis.
Modeling	Develop modeling standards, including utilized variables and methods.	States are required to establish and maintain a process to analyze the safety data and safety information from the SDCPS and associated safety databases.
Analysis	Develop data analysis and reporting standards, based upon the scientific method.	States are required to establish and maintain a process to analyze the safety data and safety information from the SDCPS and associated safety databases.

Application of these standards allow for optimal safety data collection and retrieval, ease of combination of various data sources, and consistency in analysis, ensuring U.S. compliance with ICAO Annex 19.

5.1.4 Mandatory Reporting

The FAA and the NTSB have established mechanisms to ensure mandatory reporting, evaluation, and processing of accidents and serious incidents at the aggregate State level.

The FAA maintains the SDRS, a reporting system in which aircraft owners/operators and certificated repair stations can report, via a web-based system, maintenance and/or service problems for any aircraft, engine, or component. Service difficulty reporting is mandatory for commercial operators, air carriers, and certificated repair stations. For those persons subject to mandatory service difficulty reporting, FAA regulations provide the specific information required for the occurrence or detection of each failure, malfunction, or defect.

Additional reporting requirements include:

- Manufacturers must report malfunctions, failures, and defects in accordance with a list of requirements found in 14 CFR § 21.3.[92]
- Organizations with designated authorization (ODA) are required, under 14 CFR § 183.63, to report a condition in a product, part or appliance that could result in a finding of an unsafe condition or non-compliance with airworthiness requirements.[93]
- The drug and alcohol Management Information System (MIS) contains valuable safety data on drug and alcohol testing reported by all DOT-regulated employers and contractors, including certificate holders conducting operations under 14 CFR part 121. The MIS reports are submitted annually and include data on post-accident, random, and all other types of required tests. The data is used to establish the annual testing rates for the following calendar year.

Additionally, Federal regulations require operators to notify the NTSB immediately of aviation accidents and certain incidents. Operators of any civil aircraft, or any public aircraft not operated by the Armed Forces or an intelligence agency of the U.S., or any foreign aircraft are required to immediately, and by the most expeditious means available, notify the nearest NTSB office of aircraft accidents and incidents in accordance with 49 CFR part 830.[94] Part 830 defines an accident as an occurrence associated with the operation of an aircraft that takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage. An incident is an occurrence other than an accident that affects or could affect the safety of operations.[95] NTSB maintains a database of accident/incident information, which is publicly available on the NTSB website.[96]

5.1.5 Voluntary Reporting

Voluntary reporting mechanisms in the U.S. facilitate the collection of safety data that may not be captured by a mandatory incident reporting system. 14 CFR part 193 describes when and how the FAA protects voluntarily reported information from disclosure as provided for in 49 USC 40123, Protection of Voluntarily Submitted Information.[97] This approach fosters the resolution of safety issues through corrective action rather than through punishment or discipline, without fear of recrimination, and it can help to educate appropriate parties in preventing a reoccurrence of the same type of safety event. Examples of voluntary reporting mechanisms follow.

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[92] 14 CFR part 21, Certification Procedures for Products and Articles, Section 21.3, Reporting of Failures, Malfunctions and Defects: https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=2&SID=8181dfd9c231bdcaec4e2bf7bdd66274&ty=HTML&h=L&r=PART&n=14y1.0.1.3.9#14:1.0.1.3.9.1.11.3. Accessed February 23, 2021.

[93] 14 CFR part 183, Representatives of the Administrator, Subpart D, Organization Designation Authorization, Section 183.63, Continuing Requirements: Products, Parts or Appliances: http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=8181dfd9c231bdcaec4e2bf7bdd66274&ty=HTML&h=L&r=PART&n=14y3.0.1.5.33#14:3.0.1.5.33.4.3.12. Accessed February 23, 2021.

[94] 49 CFR part 830, Notification and Reporting of Aircraft Accidents or Incidents and Overdue Aircraft, and Preservation of Aircraft Wreckage, Mail, Cargo, and Records, Subpart B, Initial Notification of Aircraft Accidents, Incidents, and Overdue Aircraft: http://www.ecfr.gov/cgi-bin/text-idx?SID=868d4f569d9cba0a8e4cadfed2448bb2&node=49:7.1.4.1.12&rgn=div5. Accessed February 23, 2021.

[95] 49 CFR part 830, Notification and Reporting of Aircraft Accidents or Incidents and Overdue Aircraft and Preservation of Aircraft Wreckage, Mail, Cargo and Records, Section 830.2, Definitions: http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr;sid=bdbd83b90630a32f49bc9b59cc3b8605;rgn=div5;view=text;node=49:7.1.4.1.12;idno=49;cc=ecfr#49:7.1.4.1.12.1.1.2. Accessed February 23, 2021.

[96] NTSB Accident Database and Synopses: https://www.ntsb.gov/_layouts/ntsb.aviation/index.aspx. Accessed February 23, 2021.

[97] 14 CFR part 193, Protection of Voluntarily Submitted Information: http://www.gpo.gov/fdsys/pkg/CFR-2012-title14-vol3/pdf/CFR-2012-title14-vol3-part193.pdf. Accessed February 23, 2021.

Flight Operational Quality Assurance (FOQA)

FOQA is a voluntary safety program designed to improve aviation safety through the proactive use of flight recorded data. Operators use the data to identify and correct deficiencies in all areas of flight operations. Properly used, FOQA data can help carriers take action to reduce or eliminate safety risk, as well as minimize deviations from regulations. Through access to de-identified aggregate FOQA data, the FAA can identify and analyze national trends and target resources to reduce operational risk in the NAS, ATC, flight operations, and airport operations.

The development of a FOQA program occurs in stages. During the planning stage, the policy and direction for the FOQA effort are developed and necessary resources are committed to implement the program. The policies, procedures, resources, and operational processes for collecting, managing, and using FOQA data are laid out in the implementation and operations (I&O) plan as the program blueprint, which an air carrier submits to the FAA for approval. Once the FAA approves the FOQA I&O plan, the air carrier implements the program for analyzing, validating, and taking corrective actions based on FOQA data. It is the responsibility of the air carrier to set up procedures for identifying operational deficiencies and taking corrective action.

Aviation Safety Action Program (ASAP)

The purpose of ASAP is to prevent accidents and incidents by encouraging certificate holder employees to voluntarily report safety issues and events. ASAP provides for the education of appropriate parties and the analysis and correction of safety concerns that are identified in the program. The FAA intends the ASAP to create a nonthreatening environment that encourages employees to voluntarily report safety issues even though they may involve violation of FAA regulations. ASAP is based on a safety partnership between the FAA and the certificate holder and may include any third party, such as an employee labor organization. ASAP allows the reporting and collecting of safety information that may not otherwise be obtainable.

Through the analysis of ASAP data, potential precursors to accidents can be identified. The FAA has determined that identifying these precursors is essential to further increasing aviation safety. Under an ASAP, safety issues are resolved through corrective action rather than through punishment or discipline, and it can help to educate appropriate parties in preventing a reoccurrence of the same type of safety event.[98]

Voluntary Safety Reporting Programs (VSRPs)

AOV provides guidance for establishing an ASAP for ATO credentialed safety personnel in SOC 07–04, *Aviation Safety Action Program (ASAP) For Credentialed ATO Personnel*.[99] The objective of the program is to encourage credentialed personnel to voluntarily report safety information that may be critical to identifying potential precursors to accidents. Under this guidance, safety-related issues are resolved through corrective action rather than through punishment or discipline.

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[98] ASAP: https://www.faa.gov/about/initiatives/asap/. Accessed February 23, 2021.

[99] FAA Safety Oversight Circular 07-04, *Aviation Safety Action Program for Credentialed ATO Personnel*, published September 28, 2007: https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aov/policies_forms/media/SOC%2007-04.pdf. Accessed February 23, 2021.

The ATO, in cooperation with its employee labor organizations and AOV, established two voluntary safety reporting programs for controllers and technicians called the Air Traffic Safety Action Program (ATSAP)[100] and the Technical Operations Safety Action Program (T-SAP). A related Confidential Information Sharing Program (CISP) integrates voluntary safety information self-reported by pilots and air traffic controllers. The ATO Voluntary Reporting Program (VSRP) is modeled after the very successful ASAP program used in the aviation industry. Specifics on the ATO VSRP are contained in FAA Order JO 7200.20, *Voluntary Safety Reporting Programs*.[101]

ATO employees may voluntarily identify and report safety and operational concerns. The collected information is reviewed and analyzed to facilitate early detection and improved awareness of operational deficiencies and adverse trends. The information specified in employee reports is used to identify root causes and determine appropriate remedial actions, which are then monitored for effectiveness. This process promotes collaboration between employee work groups and management for the early identification of hazards and to maintain a proactive approach regarding safety concerns and corrective action recommendations.

Voluntary Disclosure Reporting Program (VDRP)[102]

The VDRP is intended to improve safety compliance by forgoing a civil penalty when a regulated entity promptly discloses to the FAA an apparent violation and takes prompt action satisfactory to the FAA to correct the violation and preclude its recurrence. The FAA regulates aviation product/service provider performance through setting regulatory standards, issuing guidance, and monitoring compliance through periodic inspections. Regulated entities, which have the ultimate responsibility for compliance, have a superior vantage point for monitoring their own performance. Therefore, voluntary disclosure reporting programs can serve an important role in achieving compliance and improving aviation safety.[103]

FAA Hotline Program

The FAA Hotline Program consolidated two hotline programs—the Administrator's Hotline and the Consumer Hotline. The Administrator's Hotline was established to provide FAA employees with high-level management attention for concerns that were not being resolved by established administrative processes. The Consumer Hotline was established for consumers with questions about FAA services. FAA Order 1070.1, *FAA Hotline Program,* prescribes the operations, responsibilities, and requirements of the Hotline Program.[104]

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[100] ATSAP: https://www.atsapsafety.org/login/. Accessed February 23, 2021.

[101] FAA Order JO 7200.20A, *Voluntary Safety Reporting Programs,* effective September 25, 2017: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1031790. Accessed February 23, 2021.

[102] VDRP User Guide: https://av-info.faa.gov/vdrp/UserGuide.pdf. Accessed February 23, 2021.

[103] In addition to automated voluntary disclosure reporting programs, there are manually reported voluntary disclosure reporting programs, such as those included in the Drug Abatement QMS Procedure (AAM-800-007).

[104] FAA Order 1070.1A, *FAA Hotline Program*, effective August 22, 2014: https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1025327. Accessed February 23, 2021.

FAA Safety Hotline

The FAA Safety Hotline provides a single venue for employees and the general public to report concerns involving the FAA. It provides a means for persons with knowledge of unsafe aviation situations, improper recordkeeping, or safety violations to report these without fear of recrimination.[105] Current or former FAA employees may report personnel concerns, inequities, or operational safety ideas that are not being addressed through other agency processes to the FAA Hotline. Individuals may report aviation safety concerns, violations of 14 CFR, concerns involving FAA employees or facilities, maintenance issues, aircraft incidents, and/or aircraft accidents to the FAA Hotline.[106] The FAA Office of Audit and Evaluation collects and forwards all safety-related issues to the appropriate offices.

FAA Safety Recommendation Program

As ASIs, investigators, or any other FAA employee identify potential safety deficiencies, they are encouraged to submit recommendations to correct those deficiencies as part of the FAA Safety Recommendation program. The AVP Recommendations Branch oversees this program by responding to and coordinating the risk mitigation for approximately 300 safety recommendations received each year.

As a component of the FAA SMS, the FAA Safety Recommendation Program gathers critical insight from the field about safety concerns in all areas of the aviation industry, including international safety recommendations. The program provides a vital method of communication for employees to voice safety concerns and ensure that they will be investigated by the appropriate FAA office.[107]

Additional Sources of Data

Additionally, the U.S. established other ways to collect safety information that may not be captured by the mandatory and voluntary reporting mechanisms mentioned above. For example, the U.S. collects safety information through the *Lessons Learned From Transport Airplane Accidents* library, which contains information on most major accidents and their related lessons. The FAA, with support from many other organizations and individuals, plans to continue adding to this material on an annual basis. The objective is to populate the library with many more of the most historically significant, policy shaping accidents, in order to share lessons with others. Although many aviation accidents are extremely tragic events, the lessons learned play an important role in the process to improve aviation safety.[108]

5.1.6 Standardized Taxonomy

The FAA is working on standardizing taxonomy across safety databases to facilitate safety information sharing and exchange. Today, there are multiple taxonomies used across the FAA and AVS. Through the Risk-Based Decision Making Strategic Initiative, the FAA began to establish taxonomies for use across FAA organizations. The team established some high-level taxonomies and drafted Tiers 2, 3 and part of 4 for the hazard taxonomy, but the taxonomy has

[105] FAA Hotline Program: https://hotline.faa.gov/. Accessed February 23, 2021.

[106] Users can fill out a form electronically to report maintenance issues, aircraft incidents, aircraft accidents, or suspected violations of regulations issued by the FAA at https://hotline.faa.gov/. Accessed February 23, 2021.

[107] AVP-400-001, *FAA Safety Recommendation Program* (internal FAA document; public link not available).

[108] Lessons Learned From Transport Airplane Accidents library: https://lessonslearned.faa.gov/transport.cfm. Accessed February 23, 2021.

yet to be implemented. Meanwhile, FAA organizations have established separate and differing taxonomies:

- ATO has integrated ATC common taxonomy elements for Phase of Flight within the ATO's Safety Management Tracking System and Causal Factors with the ATO's Risk Analysis Tools/Processes. The ATO continues to support the FAA workgroups to define an FAA common taxonomy.
- In practice, much of AVS uses the CICTT taxonomy. This includes Joint Aircraft System/Component (JASC) codes as well as occurrence codes. AVS continues to improve by developing an FAA-specific taxonomy called the Aviation Safety Taxonomy.

SDAT established a team to develop and operationalize a Hazard Library for Commercial Aviation in early FY 2018. It will initialize the Taxonomy Standardization Team in 2021.[109] The team will develop a common taxonomy that can be implemented agency wide, including two tiers of aviation taxonomy. The team will also create guidance for aviation taxonomy implementation, determine the level of development required for an FAA-wide aviation taxonomy, and coordinate taxonomy/guidance with international and external partners.

5.2 Safety Data and Safety Information Analysis

Safety analysis is the process of applying statistical or other analytical techniques to check, examine, describe, transform, condense, evaluate, and visualize safety data and safety information in order to discover useful information, suggest conclusions, and support data-driven decision-making. Analysis helps organizations to generate actionable safety information in the form of statistics, graphs, maps, dashboards, and presentations. Safety analysis relies on the simultaneous application of statistics, computing, and operations research; common approaches include the following:

- Descriptive statistics are used to describe or summarize data in ways that are meaningful and useful. They help describe, show, or summarize data to allow patterns to emerge from the data and help to clearly define case studies, opportunities, and challenges.
- Inferential (or inductive) statistics aim to use the data to learn about the larger population the sample of data represents. Inferential statistics uses available data to make generalizations, inferences, and conclusions about the population from which the samples were taken to describe trends.
- Predictive analyses extract information from historical and current data to predict trends and behavior patterns. The patterns found in the data help identify emerging risks and opportunities.

The integration of data along key data elements described in Section 5.1.3, *Data Standards* is important to the analysis process. This will allow for the combination of differing data sources (e.g., Aviation Safety Reporting System [ASRS], SPAS), and the eventual use of modelling and simulation tools that will build a broader picture of system safety. The goals of the analysis process include the following:

- Determining useful information for identifying and reducing safety risks to a level that is as low as reasonably practicable;

[109] FAA Safety Data and Analysis Team: 2019-2023 Strategic Plan (internal FAA document; public link not available).

- Identifying the causes and contributing factors related to hazards and elements which are detrimental to the continuous improvement of aviation safety;
- Examining areas for improvement of the effectiveness of safety controls; and
- Supporting ongoing monitoring of safety trends and performance.

The U.S. also established procedures to develop and process information from aggregated data sources, which are used within the U.S. safety system to monitor trends in aviation safety and identify any safety issues and address them in the most appropriate ways.

5.2.1 Aviation Safety Information Analysis and Sharing (ASIAS)

The ASIAS program is a collaborative effort among industry and the U.S. government to allow unique capabilities in the collection and analysis of aviation safety data.[110] It is a national resource used to discover common, systemic safety problems that span multiple mandatory and voluntary data sources from airlines, fleets, and regions of the national air transportation system. This wide range of data is collected from sources such as internal FAA datasets, airline proprietary safety data, publicly available data, and manufacturer data. The data is fused in order to identify safety trends in the NAS. As of June 2019, ASIAS includes 46 part 121 member air carriers, 94 corporate/business operators, 10 universities, 5 manufacturers, and 2 maintenance, repair, and overhaul organizations. While the program continues to evolve, it now incorporates voluntarily provided safety data from operators that represent 99 percent of U.S. air carrier operations in the NAS.

Created in 2007, ASIAS works closely with CAST. CAST is described further in Sections 5.4.3, *Commercial Aviation Safety Team (CAST)* and 4.2.1, *Service Provider Information Exchange*.

Safety insights derived from ASIAS are also communicated to other aviation safety programs within the FAA, such as the FAA Office of NextGen and FAA safety assurance activities.

ASIAS enables users to perform integrated queries across multiple dynamic databases of safety data, search an extensive warehouse of stored data, and display pertinent elements in multiple formats for efficient trend analysis. The FAA expanded its ASIAS capabilities to aggregate and integrate safety information from across the aviation industry. By developing new analytical methodologies and leveraging state-of-the-art IT, the FAA and its industry stakeholders are able to monitor the effectiveness of implemented safety enhancements, establish baselines and trending capability using safety metrics, and identify emerging risks from safety data from multiple databases.

Starting with fewer than one million digital flight records (also known as FOQA) in 2007, ASIAS now accesses over 29 million digital flight records contributed by commercial air carriers, and 500,000 safety reports submitted by pilots, air traffic controllers, and others. In the corporate/business aviation community, flight data contributions have increased from less than 500 flight records in 2010, to over 140,000 in 2019[111].

[110] ASIAS: http://www.asias.aero/overview.html. Accessed February 23, 2021.

[111] This volume represents records received before decreased traffic during the COVID-19 pandemic.

5.2.2 Aviation Safety Reporting System (ASRS)

The ASRS is an important facet of the continuing effort by government, industry, and individuals to maintain and improve aviation safety. ASRS collects voluntarily submitted aviation safety incident/situation reports from pilots, controllers, and others.[112] It uses the report information to identify system deficiencies and issues, and alerts persons in a position to correct them. The ASRS educates through its newsletter *CALLBACK*, its journal *ASRS Directline,* and through its research studies. Its database is a public repository which serves the needs of the FAA, NASA, and other organizations worldwide that are engaged in research and the promotion of safe flight.

ASRS collects, analyzes, and responds to voluntarily submitted aviation safety incident reports in order to lessen the likelihood of aviation accidents. ASRS data are used to:

- Identify deficiencies and discrepancies in the NAS so that these can be remedied by appropriate authorities;
- Support policy formulation and planning for, and improvements to, the NAS; and
- Strengthen the foundation of aviation human factors safety research. This is particularly important since it is generally conceded that over 66 percent of all aviation accidents and incidents are rooted in human performance errors.

5.2.3 NTSB Accident Data Management System

The NTSB maintains the Aviation Accident Database, which contains investigative data on the following:

a) All civil aviation accidents occurring in the U.S. and its territories;

b) Government public-use accidents occurring under certain conditions;

c) Accidents occurring in foreign states involving civil aircraft of U.S. registry or a U.S.-based operator; and

d) Select incidents that could affect the safety of U.S. aircraft operations.

Data entered into the database come directly from the investigation records of the NTSB and from foreign investigation authorities when the NTSB serves as an accredited representative to an investigation. Board investigators enter accident/incident data using a web-based data entry system.

Established in 1962, the database has undergone several major revisions to incorporate new technologies and data collection standards. The most recent update occurred in December 2013, when the data entry system was updated to include new data sources and investigation management tools. The current version of the database incorporates ICAO Accident/Incident Data Reporting (ADREP), CAST/ICAO Common Taxonomies, the International Register of Civil Aircraft, automated official weather, and airport data sources. Data are regularly converted to the European Coordination Centre for Accident and Incident Reporting Systems (ECCAIRS) data format for sharing with international authorities. Approximately 2,000 new accident and incident records are added to the database each year. The Board publishes annual statistical

[112] ASRS website: http://asrs.arc.nasa.gov/. Accessed February 23, 2021.

summaries of the data, for both commercial and GA, and makes these summaries available via the Internet and other sources. The NTSB provides public access to all of its accident and incident records on the agency's website, where an online search tool is provided.[113]

5.2.4 Safety Performance and Analytical System (SPAS)

SPAS is a web-based application inspectors can use to evaluate current decision support tools designed primarily to assist FAA inspectors and supervisors with surveillance planning, safety assessments, certification, and investigation activities. Using SPAS, inspectors can:

- Identify certificate holders and specific areas that may present a greater risk, thus warranting further surveillance or other action;
- Analyze safety-critical performance measures and profiles;
- Plan surveillance and establish/update surveillance work programs based on analysis; and
- Compile data necessary to support the investigation of accidents, incidents, occurrences, and other safety events.

5.3 Safety Data and Safety Information Protection

The U.S. has strong systems in place to protect safety data and resulting safety information received through voluntary safety reporting systems and related sources. Voluntarily submitted safety data and information is only used to take preventive, corrective, or remedial action that is necessary to maintain or improve aviation safety.[114] This practice, along with positive safety culture, benefits aviation safety, but requires that data be protected from misuse. Robust data collection and storage policies, as well as strong data governance, are therefore necessary to ensure the proper use of safety data, continued participation in voluntary reporting systems, and positive safety outcomes.

5.3.1 Data Collection and Storage

After data standards are clearly defined, data collection and storage can begin as a way to ensure targeted variables are gathered in an established and systematic fashion. SDAT is in the process of working with the EIM program in order to ensure that proper data collection and storage procedures are in place. EIM will ensure that safety data is moved to a central platform, where data standards can then be applied. This central platform should have the ability to contain both raw as well as transformed data, and will delineate the lineage of the data as well as the steps required to apply data standards.

Proper data collection procedures require attention to the provenance of data. System owners must make analysts aware of the following:

- The data owner must be defined. This ensures that the analyst knows who to contact for assistance interpreting the data, builds confidence in the data source, and ensures that system managers know who to contact if there are issues with data loads.
- A timetable for updates to ensure that analysts are aware of when new data is loaded to the system, and the degree of latency one can expect from the data.

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[113] The NTSB website provides access to several items related to the data the NTSB maintains: https://www.ntsb.gov/GILS/Pages/AviationAccident.aspx. Accessed February 23, 2021.

[114] 14 CFR part 193, Protection of Voluntarily Submitted Information: https://www.govinfo.gov/content/pkg/CFR-2012-title14-vol3/pdf/CFR-2012-title14-vol3-part193.pdf. Accessed February 23, 2021.

- Agreements on data acquisition inform analysts of the type of data that is being furnished and how that data is able to be used.

In addition to data provenance, metadata must be collected and made available to analysts. ASIAS has established metrics that enable CAST to monitor and evaluate the effectiveness of deployed safety mitigations. In recent years, CAST has evolved beyond its "historic" approach of examining past accident data to a proactive approach that focuses on detecting risk and implementing mitigation strategies before accidents or serious incidents occur. Examples of metadata that must be collected include:

- Table definitions, which include all tables in a database, their names, use cases, and associated information;
- Column definitions, which include all columns in a database, the tables they are used in, and the type of data stored in each column;
- Business rules surrounding the use of the data in each system; and
- Historical information regarding the evolution of data elements; for example, the meaning or structure of certain data fields in a database may change over time. This should be reflected in the metadata so that analysts are aware of the change in standards.

5.3.2 Data Governance

The current version of FAA Order 1375.1, *Information/Data Management*, establishes policy for managing information and data management across the FAA. Data governance is the process and framework intended to ensure consistent and proper handling of data across the enterprise. This includes the collection, revision, and standardization of data to make certain it is reliable and usable. Data governance is composed of the following aspects:

- Integrity refers to the reliability of sources, information, and events contained in data. Data integrity also includes the maintenance of the accuracy and consistency of data over its entire lifecycle.
- Protection refers to the right of data owners to negotiate how their data is used and to secure sensitive data.
- Operationalization refers to a well-defined data ingest process for each data source describing acquisition and alignment with data standards, and establishes how data can be accessed and shared.
- Usability standards refer to the completeness, validity, consistency, and accuracy of data within a system.
    - Completeness is the percentage of records within the source system having a value within the given subject field.
    - Validity is the degree to which field values adhere to the code tables or range constraints associated with a particular data element.
    - Consistency is based upon reporters of data using a common set of identifiers, abbreviations, and details when reporting information.
    - Accuracy of data accounts for possible programming errors in source systems or errors in data input.

5.4 Safety Information Sharing and Exchange

To have an impact on safety, the results of safety analysis must be shared. Results of safety analysis can highlight areas of high safety risk, and also assist decision makers in:

- Taking immediate corrective actions;
- Implementing safety risk-based surveillance;
- Defining or refining safety policy, safety objectives, SPIs, or Safety Performance Targets (SPTs);
- Setting SPI triggers;
- Promoting safety; and
- Conducting further safety risk assessment.

The results of any safety analysis should be made available to aviation safety stakeholders in a way that can be easily understood. There are many approaches used to present analysis results, and the FAA Safety Data Hub will act as a portal to access safety reports and other products of analysis for approved parties.

- **Imminent safety alert:** Sent to other States or service providers regarding safety hazards with high severity requiring immediate action to mitigate. The FAA has a variety of channels for imminent safety alerts. These include SAFOs and Continued Airworthiness Notifications to the International Community (CANICs). Through the CANIC process, AIR notifies Foreign Civil Aviation Authorities (FCAAs) of pending safety actions or pertinent continued airworthiness information that affect the international aviation community. The FAA Safety Data Hub could also publish imminent safety alerts and provide additional background information on hazards where appropriate.
- **Safety analysis report:** Presents quantitative and qualitative information with a clear description of the degree and source of the uncertainty involved in the analysis findings, and relevant safety recommendations identified in collaboration with subject matter experts if necessary. Safety analysis reports will be published through the FAA Safety Data Hub, which will feature user protections to only allow approved stakeholders to access sensitive reports.
- **Dashboard:** Enables senior executives, managers, and safety professionals to create and view key safety performance metrics. Analysts and decision makers can drill down on these metrics and configure the dashboard to display their top indicators. Dashboards may include information relating to category, cause, and severity of specific hazards. The FAA Safety Data Hub will include dashboard tools based on SDAT discussion of best practices.
- **Safety conferences:** Allows States to share processed safety information. The FAA is heavily involved in international safety conferences and will continue to share safety information in this manner.

The informed decision-making cycle does not end with provision of results. Upon providing results, analysts or decision makers may become aware of additional data points, fields, or requirements that can improve the analysis process. These additional fields' requirements are additional inputs to the data and information lifecycle, beginning the process again. Decision makers are also able to see if enough information has been collected to create an accurate SPI measurement. If necessary, requirements for additional data can then be established before continuing the cycle. This constant re-evaluation of requirements and analysis ensures that the proper data is being collected for system safety analysis.

The U.S. shares safety information with its service providers and other States, as appropriate. Some of the many examples of U.S. aviation safety information exchange mechanisms are described below.

5.4.1 Global Safety Information Exchange (GSIE)

The U.S. promotes information exchange with other States through its participation in the GSIE. GSIE is a collaboration effort launched by ICAO in September 2010 to confidentially share information about aviation safety incidents, enabling ICAO to identify trends that may lead to safety improvements through risk reduction. IATA, ICAO, the DOT, and EC, the executive body of the European Union (EU), signed an MOU to create the framework and path forward to launch the GSIE.

5.4.2 Aviation Safety InfoShare

InfoShare is a *confidential* biannual meeting sponsored by the industry, and facilitated by the FAA, in which government and industry representatives share aviation safety concerns and discuss current aviation safety issues and mitigations, in a protected and secure environment to support SMSs and improve safety in the NAS.

5.4.3 Commercial Aviation Safety Team (CAST)

Established in 1997, CAST developed an integrated, data driven strategy to reduce the commercial aviation fatality risk in the U.S. and to promote new government and industry safety initiatives throughout the world. The nation's impressive safety record is due in part to the aviation industry and government voluntarily investing in the right safety enhancements to reduce the fatality risk in commercial air travel in the U.S. The work of CAST, along with new aircraft, regulations, and other activities, reduced the fatality risk for commercial aviation in the U.S. by 83 percent from 1998 to 2008.

Since the creation of ASIAS in 2007, CAST integrated ASIAS capabilities into its own safety enhancement processes. The group is moving beyond the "historic" approach of examining past accident data to a more proactive approach that focuses on detecting risk, using incident data, and implementing mitigation strategies before accidents or serious incidents occur. The goal over the next decade is to transition to prognostic safety analysis. CAST aims to reduce the U.S. commercial fatality risk by 50 percent from 2010 to 2025.

Government CAST Members include EASA, FAA, NASA, Transport Canada Civil Aviation (TCCA), and U.S. DoD. Employee Group CAST Members include Air Line Pilots Association (ALPA), Coalition of Airline Pilots Associations (CAPA), and National Air Traffic Controllers Association (NATCA). Industry CAST Members include AIA, Airbus, Airports Council International (ACI), Airlines for America (A4A), The Boeing Company, Flight Safety Foundation, General Electric (representing all engine manufacturers), National Air Carrier Association (NACA), and Regional Airline Association (RAA). Various government agencies and industry organizations also attend CAST as observers.[115]

[115] CAST Fact Sheet: https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=23035. Accessed February 23, 2021.

5.4.4 Unmanned Aircraft System (UAS) Integration Office Data Exchange

UAS Low Altitude Authorization and Notification Capability (LAANC)

The FAA's vision for fully integrating drones into the NAS entails drones operating harmoniously, side-by-side with manned aircraft, occupying the same airspace and using many of the same air traffic management systems and procedures. This vision goes beyond the accommodation practices in use today, which largely rely on operational segregation to maintain systemic safety. This vision requires collaboration across industry, government, and academia. The FAA UAS Low Altitude Authorization and Notification Capability (LAANC) Data Exchange is an innovative, collaborative approach between government and private industry facilitating the sharing of airspace data between the two parties. Under the FAA UAS Data Exchange umbrella, the agency will support multiple partnerships, the first of which is the LAANC. LAANC directly supports UAS integration into the airspace. It also provides access to controlled airspace near airports through near real-time processing of airspace authorizations below approved altitudes in controlled airspace.[116]

UAS Test Sites

Since 2013, the UAS Test Sites have supported drone integration by providing an avenue for the drone industry and stakeholder community to conduct more advanced drone research and operational concept validation. The FAA collects and analyzes UAS Test Site data and makes recommendations to improve data quality and consistency. The data requires analysis to determine technical and operational trends to derive conclusions that support critical safety decisions required to integrate UAS into the NAS.[117]

5.4.5 Safety Management International Collaboration Group (SM ICG)

The SM ICG was founded by the FAA, EASA, and TCCA and is a joint cooperation between many regulatory authorities for the purpose of promoting a common understanding of safety management principles and requirements and facilitating their implementation across the international aviation community. The current core membership of the SM ICG includes the Aviation Safety and Security Agency (AESA) of Spain, the National Civil Aviation Agency (ANAC) of Brazil, the Civil Aviation Authority of the Netherlands (CAA NL), the Civil Aviation Authority of New Zealand (CAA NZ), the Civil Aviation Safety Authority (CASA) of Australia, the Direction Générale de l'Aviation Civile (DGAC) in France, the EASA, the Federal Office of Civil Aviation (FOCA) of Switzerland, Japan Civil Aviation Bureau (JCAB), the U.S. FAA, TCCA, and the Civil Aviation Authority of United Kingdom (UK CAA). ICAO participates as an observer.

Members of the SM ICG:

- Collaborate on common SSP/SMS topics of interest;
- Share lessons learned;
- Encourage the progression of a harmonized SMS;

[116] UAS Data Exchange Partnership Programs: https://www.faa.gov/uas/programs_partnerships/data_exchange/. Accessed February 23, 2021.

[117] UAS Test Sites: https://www.faa.gov/uas/programs_partnerships/test_sites/media/UAS-Test-Site-Data-Collection-and-Analysis.pdf. Accessed February 23, 2021.

- Develop and share SMS guidance products with the aviation community; and
- Collaborate with international organizations, such as ICAO and civil aviation authorities that have implemented or are implementing SSP/SMS.

5.4.6 Cooperative Development of Operational Safety and Continued Airworthiness Programs (COSCAPSs)

The U.S. participates in COSCAPSs, such as with EASA, which promote the highest common standards of safety and environmental protection in civil aviation in Europe and worldwide.

5.4.7 Information Sharing with ICAO

The U.S. established procedures and mechanisms for sharing accident and incident information with ICAO. For example, the U.S. participates in the ADREP system, which is operated and maintained by ICAO. The ADREP system receives, stores, and provides States with occurrence data that will assist them in validating safety. In this context, the term "occurrence" includes both accidents and incidents. The system was established in 1976 but has evolved to meet changes in IT and the aviation industry. The version currently in use is ADREP 2000.[118] In addition to ADREP reporting, the U.S. also shares its IASA summary information with ICAO.

In mid-1991, the FAA began to formulate a program to address concerns about proper licensing and safety oversight in other States. This program included visits to twelve countries with airlines seeking authority to operate to and from the U.S. After a trial period, the findings convinced the FAA of the need to formally establish the IASA Program. Notice of the new policy was published in the *Federal Register*, Vol. 57, No. 164, August 24, 1992. The purpose of IASA is to ensure that all foreign air carriers that operate to or from the U.S. are properly licensed and have safety oversight provided by a competent CAA in accordance with ICAO standards.[119]

[118] ICAO ADREP SKYbrary page: http://www.skybrary.aero/index.php/ICAO_ADREP. Accessed February 23, 2021.

[119] IASA: http://www.faa.gov/about/initiatives/iasa/. Accessed February 23, 2021.

Appendix A: ICAO Annex 19 Standards & Recommended Practices (SARPs)

This appendix contains the International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARPs) for the State Safety Program (SSP) Framework as documented in ICAO Annex 19, Safety Management, Second Edition, Chapter 3, State safety management responsibilities; Chapter 5, Safety data and safety information collection, analysis, protection, sharing and exchange; and Appendices 1 and 3.

Chapter 3 introduces a requirements for the implementation and maintenance of an SSP by a State. The SSP elements in this chapter also relate to the eight Critical Elements (CEs) of State Safety Oversight (SSO), detailed in Appendix 1. An SSP is an integrated set of regulations and activities aimed at improving safety by the State. The implementation of an SSP is commensurate with the size and complexity of the State's aviation system and necessitates coordination among the authorities responsible for individual elements of civil aviation functions in the State. The SSP requirements detailed in Chapter 3 and the SMS requirements for aviation service providers, detailed in Chapter 4, are complementary.

Chapter 3. State Safety Management Responsibilities

Note 1.— The State safety oversight (SSO) system critical elements (CEs) found in Appendix 1 constitute the foundation of an SSP.

Note 2.— Safety management provisions pertaining to specific types of aviation activities are addressed in the relevant Annexes.

Note 3.— Basic safety management principles applicable to the medical assessment process of licence holders are contained in Annex 1. Guidance is available in the Manual of Civil Aviation Medicine *(Doc 8984).*

1. State safety program (SSP)

2. State safety policy, objectives and resources

    2.1 Primary aviation legislation

    2.2 Specific operating regulations

    2.3 State system and functions

    2.4 Qualified technical personnel

    2.5 Technical guidance, tools and provision of safety-critical information

3. State safety risk management

    3.1 Licensing, certification, authorization and approval obligations

    3.2 Safety management system obligations

    3.3 Accident and incident investigation

3.4 Hazard identification and safety risk assessment

3.5 Management of safety risks

4. State safety assurance

4.1 Surveillance obligations

4.2 State safety performance

5. State safety promotion

5.1 Internal communication and dissemination of safety information

5.2 External communication and dissemination of safety information

3.1. State safety program (SSP)

States shall establish and maintain an SSP that is commensurate with the size and complexity of the State's civil aviation system, but may delegate safety management-related functions and activities to another State, Regional Safety Oversight Organization (RSOO) or Regional Accident and Incident Investigation Organization (RAIO).

Note 1.— States retain responsibility for safety management-related functions and activities delegated to another State, RSOO or RAIO.

Note 2.— Guidance on an SSP and the delegation of safety management-related functions and activities are contained in the Safety Management Manual (SMM) *(Doc 9859).*

3.2. State safety policy, objectives and resources

3.2.1 Primary aviation legislation

3.2.1.1 States shall establish primary aviation legislation in accordance with section 1 of Appendix 1.

3.2.1.2 Recommendation.— *States should establish an enforcement policy that specifies the conditions and circumstances under which service providers with an SMS are allowed to deal with, and resolve, events involving certain safety issues, internally, within the context of their SMS and to the satisfaction of the appropriate State authority.*

3.2.2 Specific operating regulations

3.2.2.1 States shall establish specific operating regulations in accordance with section 2 of Appendix 1.

3.2.2.2 States shall periodically review specific operating regulations, guidance material and implementation policies to ensure they remain relevant and appropriate.

3.2.3 State system and functions

3.2.3.1 States shall establish State system and functions in accordance with section 3 of Appendix 1.

3.2.3.2 Recommendation.— *States should identify, define and document the requirements, obligations, functions and activities regarding the establishment and maintenance of the SSP, including the directives to plan, organize, develop, maintain, control and continuously improve the SSP in a manner that meets the State's safety objectives.*

3.2.3.3 Recommendation.— *States should establish a safety policy and safety objectives that reflect their commitment regarding safety and facilitate the promotion of a positive safety culture in the aviation community.*

3.2.3.4 Recommendation.— *The safety policy and safety objectives should be published and periodically reviewed to ensure that they remain relevant and appropriate to the State.*

3.2.4 Qualified technical personnel

States shall establish requirements for the qualification of technical personnel in accordance with section 4 of Appendix 1.

Note.— The term "technical personnel" refers to those persons performing safety-related functions for or on behalf of the State.

3.2.5 Technical guidance, tools and provision of safety-critical information

States shall establish technical guidance and tools and provide safety-critical information in accordance with section 5 of Appendix 1.

3.3. State safety risk management

3.3.1 Licensing, certification, authorization and approval obligations

States shall meet the licensing, certification, authorization and approval obligations in accordance with section 6 of Appendix 1.

3.3.2 Safety management system obligations

3.3.2.1 States shall require that the following service providers under their authority implement an SMS:

a) approved training organizations in accordance with Annex 1 that are exposed to safety risks related to aircraft operations during the provision of their services;

b) operators of aeroplanes or helicopters authorized to conduct international commercial air transport, in accordance with Annex 6, Part I or Part III, Section II, respectively;

Note.— When maintenance activities are not conducted by an approved maintenance organization in accordance with Annex 6, Part I, 8.7, but under an equivalent system as in Annex 6, Part I, 8.1.2, or Part III, Section II, 6.1.2, they are included in the scope of the operator's SMS.

c) approved maintenance organizations providing services to operators of aeroplanes or helicopters engaged in international commercial air transport, in accordance with Annex 6, Part I or Part III, Section II, respectively;

d) organizations responsible for the type design or manufacture of aircraft, engines or propellers in accordance with Annex 8;

e) air traffic services (ATS) providers in accordance with Annex 11; and

f) operators of certified aerodromes in accordance with Annex 14, Volume I.

Note.— Further provisions related to the implementation of SMS by service providers can be found in Chapter 4.

3.3.2.2 Recommendation.— *States should ensure that safety performance indicators and targets established by service providers and operators are acceptable to the State.*

Note.— Guidance on the identification of appropriate safety performance indicators and targets is contained in the Safety Management Manual (SMM) *(Doc 9859).*

3.3.2.3 The State of Registry shall establish criteria for international general aviation operators of large or turbojet aeroplanes in accordance with Annex 6, Part II, Section 3, to implement an SMS.

Note.— Further provisions related to the implementation of SMS by international general aviation operators can be found in Chapter 4.

3.3.2.4 The criteria established by the State of Registry in accordance with 3.3.2.3 shall address the SMS framework and elements contained in Appendix 2.

Note.— Guidance on establishing the criteria to implement an SMS for international general aviation operators is contained in the Safety Management Manual (SMM) *(Doc 9859).*

3.3 Accident and incident investigation

States shall establish a process to investigate accidents and incidents in accordance with Annex 13, in support of the management of safety in the State.

3.4 Hazard identification and safety risk assessment

3.3.4.1 States shall establish and maintain a process to identify hazards from collected safety data.

Note 1. — Further information regarding safety data collection, analysis and the sharing and exchange of safety information can be found in Chapter 5.

Note 2.— Additional information to identify hazards and safety issues on which to base preventive actions may be contained in the Final Reports of accidents and incidents.

3.3.4.2 States shall develop and maintain a process that ensures the assessment of safety risks associated with identified hazards.

3.3.5 Management of safety risks

3.3.5.1 States shall establish mechanisms for the resolution of safety issues in accordance with section 8 in Appendix 1.

3.3.5.2 Recommendation.— *States should develop and maintain a process to manage safety risks.*

Note 1.— Actions taken to manage safety risks may include: acceptance, mitigation, avoidance or transfer.

Note 2.— Safety risks and safety issues often have underlying factors which need to be carefully assessed.

3.4. State safety assurance

3.4.1 Surveillance obligations

3.4.1.1 States shall meet the surveillance obligations in accordance with section 7 of Appendix 1.

Note.— The surveillance of the service provider takes into consideration the safety performance as well as the size and complexity of its aviation products or services.

3.4.1.2 Recommendation.— *States should establish procedures to prioritize inspections, audits and surveys towards those areas of greater safety concern or need*.

Note.— Organizational risk profiles, outcomes of hazard identification and risk assessment, and surveillance outcomes may provide information for the prioritization of inspections, audits and surveys.

3.4.1.3 Recommendation.— *States should periodically review the safety performance of an individual service provider.*

3.4.2 State safety performance

3.4.2.1 States shall establish the acceptable level of safety performance to be achieved through their SSP.

Note 1.— An acceptable level of safety performance for the State can be achieved through the implementation and maintenance of the SSP as well as safety performance indicators and targets showing that safety is effectively managed and built on the foundation of implementation of existing safety-related SARPs.

Note 2.— Guidance on establishing safety performance indicators and targets, as well as an acceptable level of safety performance, is contained in the Safety Management Manual (SMM) *(Doc 9859).*

3.4.2.2 Recommendation.— *States should develop and maintain a process to evaluate the effectiveness of actions taken to manage safety risks and resolve safety issues.*

Note.— Safety assessment results may be used to support the prioritization of actions to manage safety risks.

3.4.2.3 Recommendation.— *States should evaluate the effectiveness of their individual SSPs to maintain or continuously improve their overall level of safety performance.*

3.5. State safety promotion

3.5.1 Internal communication and dissemination of safety information

Recommendation.— *States should promote safety awareness and the sharing and exchange of safety information to support, within the State aviation organizations, the development of a positive safety culture that fosters an effective SSP.*

3.5.2 External communication and dissemination of safety information

Recommendation.— *States should promote safety awareness and the sharing and exchange of safety information with the aviation community to foster the maintenance and improvement of safety and to support the development of a positive safety culture.*

Note 1.— Refer to Chapter 5, 5.4, for further details regarding safety information sharing and exchange.

Note 2.— Promoting safety awareness could include identifying accessible safety training for the aviation community.

Chapter 5. Safety data and safety information collection, analysis, protection, sharing and exchange

Note.— The objective of this chapter is to ensure the continued availability of safety data and safety information to support safety management activities.

5.1. Safety data collection and processing systems

5.1.1 States shall establish safety data collection and processing systems (SDCPS) to capture, store, aggregate and enable the analysis of safety data and safety information.

Note 1.— SDCPS refers to processing and reporting systems, safety databases, schemes for exchange of information, and recorded information including but not limited to:

a) data and information pertaining to accident and incident investigations;

b) data and information related to safety investigations by State authorities or aviation service providers;

c) mandatory safety reporting systems as indicated in 5.1.2;

d) voluntary safety reporting systems as indicated in 5.1.3; and

e) self-disclosure reporting systems, including automatic data capture systems, as described in Annex 6, Part I, Chapter 3, as well as manual data capture systems.

Note 2.— Guidance related to SDCPS is contained in the Safety Management Manual (SMM) *(Doc 9859).*

Note 3.— The term "safety database" may refer to a single or multiple database(s).

Note 4.— SDCPS may include inputs from State, industry and public sources, and may be based on reactive and proactive methods of safety data and safety information collection.

Note 5.— Sector-specific safety reporting provisions are contained in other Annexes, PANS and SUPPs. There is a recognized benefit to the effective implementation of an SSP in having an integrated approach for the collection and analysis of the safety data and safety information from all sources.

5.1.2 States shall establish a mandatory safety reporting system that includes the reporting of incidents.

5.1.3 States shall establish a voluntary safety reporting system to collect safety data and safety information not captured by mandatory safety reporting systems.

5.1.4 Recommendation.— *State authorities responsible for the implementation of the SSP should have access to the SDCPS as referenced in 5.1.1 to support their safety responsibilities, in accordance with the principles in Appendix 3.*

Note.— State authorities responsible for the implementation of the SSP include accident investigation authorities.

5.1.5 Recommendation.— *The safety database should use standardized taxonomy to facilitate safety information sharing and exchange.*

Note.— States are encouraged to use an ADREP-compatible system. More information on ADREP can be found in Annex 13, Chapter 7.

5.2. Safety data and safety information analysis

5.2.1 States shall establish and maintain a process to analyse the safety data and safety information from the SDCPS and associated safety databases.

Note 1.— Specific State provisions for the identification of hazards as part of their safety risk management and safety assurance processes can be found in Chapter 3.

Note 2.— The purpose of the safety data and safety information analysis performed by the State is to identify systemic and cross-cutting hazards that might not otherwise be identified by the safety data analysis processes of individual service providers and operators.

Note 3.— The process may include predictive methods of safety data analysis.

5.3. Safety data and safety information protection

5.3.1 States shall accord protection to safety data captured by, and safety information derived from, voluntary safety reporting systems and related sources in accordance with Appendix 3.

Note.— Sources include individuals and organizations.

5.3.2 Recommendation.— *States should extend the protection referred to in 5.3.1 to safety data captured by, and safety information derived from, mandatory safety reporting system and related sources.*

Note 1.— A reporting environment where employees and operational personnel may trust that their actions or omissions that are commensurate with their training and experience will not be punished is fundamental to safety reporting.

Note 2.— Guidance related to both mandatory and voluntary safety reporting systems is contained in the Safety Management Manual (SMM) *(Doc 9859).*

5.3.3. Subject to 5.3.1 and 5.3.2, States shall not make available or use safety data or safety information collected, stored or analysed in accordance with 5.1 or 5.2 for purposes other than maintaining or improving safety, unless the competent authority determines, in accordance with Appendix 3, that a principle of exception applies.

5.3.4. Notwithstanding 5.3.3, States shall not be prevented from using safety data or safety information to take any preventive, corrective or remedial action that is necessary to maintain or improve aviation safety.

Note.— Specific provision aimed at ensuring that there is no overlap with the protection of investigation records in Annex 13 is contained in Appendix 3, 1.2.

5.3.5. States shall take necessary measures, including the promotion of a positive safety culture, to encourage safety reporting through the systems referred to in 5.1.2 and 5.1.3.

Note. — Guidance related to positive safety culture is contained in the Safety Management Manual (SMM) *(Doc 9859.)*

5.3.6 Recommendation.— *States should facilitate and promote safety reporting by adjusting their applicable laws, regulations and policies, as necessary.*

5.3.7 Recommendation.— *In support of the determination referred to in 5.3.3, States should institute and make use of appropriate advance arrangements between their authorities and State bodies entrusted with aviation safety and those entrusted with the administration of justice. Such arrangements should take into account the principles specified in Appendix 3.*

Note.— These arrangements may be formalized through legislation, protocols, agreements or memoranda of understanding.

5.4. Safety information sharing and exchange

Note.— Sharing refers to giving, while exchange refers to giving and receiving in return.

5.4.1 If a State, in the analysis of the information contained in its SDCPS, identifies safety matters considered to be of interest to other States, that State shall forward such safety information to them as soon as possible. Prior to sharing such information, States shall agree on the level of protection and conditions on which safety information will be shared. The level of protection and conditions shall be in line with Appendix 3.

5.4.2 States shall promote the establishment of safety information sharing or exchange networks among users of the aviation system, and facilitate the sharing and exchange of safety information, unless national law provides otherwise.

Note.— Information on the sharing of safety information can be found in the ICAO Code of Conduct on the Sharing and Use of Safety Information in the Global Aviation Safety Plan *(Doc 10004).*

Appendix 1. State safety oversight (SSO) system critical elements (CEs)

Note 1.— Guidance on the critical elements (CEs) of a system that enables a State to discharge its responsibility for safety oversight is contained in the Safety Oversight Manual, *Part A*, The Establishment and Management of a State's Safety Oversight System *(Doc 9734).*

Note 2.— The term "relevant authorities or agencies" is used in a generic sense to include all authorities with aviation safety management and oversight responsibility which may be established by States as separate entities, such as: Civil Aviation Authorities, Airport Authorities, ATS Authorities, Accident Investigation Authority, and Meteorological Authority.

Note 3.— The SSO system CEs are applied, as appropriate, to authorities performing safety oversight functions as well as authorities performing investigation of accidents and incidents or other State safety management activities.

Note 4.— See Appendix 5 to Annex 6, Part I, and Appendix 1 to Annex 6, Part III, for provisions specific to the safety oversight of air operators.

1. Primary aviation legislation (CE-1)

1.1 States shall promulgate a comprehensive and effective aviation law, commensurate with the size and complexity of their aviation activity and consistent with the requirements contained in the Convention on International Civil Aviation, to enable the oversight and management of civil aviation safety and the enforcement of regulations through the relevant authorities or agencies established for that purpose.

Note.— This includes ensuring that the aviation law remains relevant and appropriate to the State.

1.2 The aviation law shall provide personnel performing safety oversight functions access to the aircraft, operations, facilities, personnel and associated records, as applicable, of individuals and organizations performing an aviation activity.

2. Specific operating regulations (CE-2)

States shall promulgate regulations to address, at a minimum, national requirements emanating from the primary aviation legislation, for standardized operational procedures, products, services, equipment and infrastructures in conformity with the Annexes to the Convention on International Civil Aviation.

Note.— The term "regulations" is used in a generic sense and includes but is not limited to instructions, rules, edicts, directives, sets of laws, requirements, policies and orders.

3. State system and functions (CE-3)

3.1 States shall establish relevant authorities or agencies, as appropriate, supported by sufficient and qualified personnel and provided with adequate financial resources for the management of safety.

3.2 States authorities or agencies shall have stated safety functions and objectives to fulfil their safety management responsibility.

Note.— This includes the participation of the State aviation organizations in specific activities related to the management of safety in the State, and the establishment of the roles, responsibilities and relationships of such organizations.

3.3 Recommendation.— *States should take necessary measures, such as remuneration and conditions of service, to ensure that qualified personnel performing safety oversight functions are recruited and retained*.

3.4 States shall ensure that personnel performing safety oversight functions are provided with guidance that addresses ethics, personal conduct and the avoidance of actual or perceived conflicts of interest in the performance of official duties.

3.5 Recommendation.— *States should use a methodology to determine their staffing requirements for personnel performing safety oversight functions, taking into account the size and complexity of the aviation activities in their State.*

Note.— In addition, Appendix 5 to Annex 6, Part I, and Appendix 1 to Annex 6, Part III, require the State of the Operator to use such a methodology to determine its inspector staffing requirements. Inspectors are a subset of personnel performing safety oversight functions.

4. Qualified technical personnel (CE-4)

4.1 States shall establish minimum qualification requirements for the technical personnel performing safety-related functions and provide for appropriate initial and recurrent training to maintain and enhance their competence at the desired level.

4.2 States shall implement a system for the maintenance of training records for technical personnel.

5. Technical guidance, tools and provision of safety-critical information (CE-5)

5.1 States shall provide appropriate facilities, comprehensive and up-to-date technical guidance material and procedures, safety-critical information, tools and equipment, and transportation means, as applicable, to the technical personnel to enable them to perform their safety oversight functions effectively and in accordance with established procedures in a standardized manner.

5.2 States shall provide technical guidance to the aviation industry on the implementation of relevant regulations.

6. Licensing, certification, authorization and approval obligations (CE-6)

States shall implement documented processes and procedures to ensure that individuals and organizations performing an aviation activity meet the established requirements before they are allowed to exercise the privileges of a licence, certificate, authorization or approval to conduct the relevant aviation activity.

7. Surveillance obligations (CE-7)

States shall implement documented surveillance processes, by defining and planning inspections, audits and monitoring activities on a continuous basis, to proactively assure that aviation licence, certificate, authorization and approval holders continue to meet the established requirements. This includes the surveillance of personnel designated by the Authority to perform safety oversight functions on its behalf.

8. Resolution of safety issues (CE-8)

8.1 States shall use a documented process to take appropriate actions, up to and including enforcement measures, to resolve identified safety issues.

8.2 States shall ensure that identified safety issues are resolved in a timely manner through a system which monitors and records progress, including actions taken by individuals and organizations performing an aviation activity in resolving such issues.

Appendix 3. Principles for the protection of safety data, safety information and related sources

Note 1.— The protection of safety data, safety information and related sources is essential to ensure their continued availability, since the use of safety data and safety information for purposes other than maintaining or improving safety may inhibit the future availability of such data and information, with a significant adverse effect on safety.

Note 2.— In view of their different legal systems, States have the flexibility to draft their laws and regulations in accordance with their policies and practices.

Note 3.— The principles contained in this appendix are aimed at assisting States to enact and adopt national laws, regulations and policies to protect safety data and safety information gathered from safety data collection and processing systems (SDCPS), as well as related sources, while allowing for the proper administration of justice and necessary actions for maintaining or improving aviation safety.

Note 4.— The objective is to ensure the continued availability of safety data and safety information by restricting their use for purposes other than maintaining or improving aviation safety.

1. General principles

1.1 States shall, through national laws, regulations and policies protecting safety data, safety information and related sources, ensure that:

a) a balance is struck between the need for the protection of safety data, safety information and related sources to maintain or improve aviation safety, and the need for the proper administration of justice;

b) safety data, safety information and related sources are protected in accordance with this appendix;

c) the conditions under which safety data, safety information and related sources qualify for protection are specified; and

d) safety data and safety information remain available for the purpose of maintaining or improving aviation safety.

Note.— The protection of safety data, safety information and related sources is not intended to interfere with the proper administration of justice or with maintaining or improving safety.

1.2 When an investigation under Annex 13 has been instituted, accident and incident investigation records listed in 5.12 of Annex 13 shall be subject to the protections accorded therein instead of the protections accorded by this Annex.

2. Principles of protection

2.1 States shall ensure that safety data or safety information is not used for:

a) disciplinary, civil, administrative and criminal proceedings against employees, operational personnel organizations;

b) disclosure to the public; or

c) any purposes other than maintaining or improving safety; unless a principle of exception applies.

2.2 States shall accord protection to safety data, safety information and related sources by ensuring that:

a) the protection is specified based on the nature of safety data and safety information;

b) a formal procedure to provide protection to safety data, safety information and related sources is established;

c) safety data and safety information will not be used in a way different from the purposes for which they were collected, unless a principle of exception applies; and

d) to the extent that a principle of exception applies, the use of safety data and safety information in disciplinary, civil, administrative and criminal proceedings will be carried out only under authoritative safeguards.

Note 1.— The formal procedure may include that any person seeking disclosure of safety data or safety information will provide the justification for its release.

Note 2.— Authoritative safeguards include legal limitations or restrictions such as protective orders, closed proceedings, in-camera review, and de-identification of data for the use or disclosure of safety information in judicial or administrative proceedings.

3. Principles of exception

Exceptions to the protection of safety data, safety information and related sources shall only be granted when the competent authority:

a) determines that there are facts and circumstances reasonably indicating that the occurrence may have been caused by an act or omission considered, in accordance with national laws, to be conduct constituting gross negligence, willful misconduct or criminal activity;

b) after reviewing the safety data or safety information, determines that its release is necessary for the proper administration of justice, and that the benefits of its release

outweigh the adverse domestic and international impact such release is likely to have on the future collection and availability of safety data and safety information; or

c) after reviewing the safety data or safety information, determines that its release is necessary for maintaining or improving safety, and that the benefits of its release outweigh the adverse domestic and international impact such release is likely to have on the future collection and availability of safety data and safety information.

Note 1.— In administering the decision, the competent authority takes into account the consent of the source of the safety data and safety information.

Note 2.— Different competent authorities may be designated for different circumstances. The competent authority could include, but is not limited to, judicial authorities or those otherwise entrusted with aviation responsibilities designated in accordance with national law.

4. Public disclosure

4.1 States that have right-to-know laws shall, in the context of requests made for public disclosure, create exceptions from public disclosure to ensure the continued confidentiality of voluntarily supplied safety data and safety information.

Note.— Laws, regulations and policies commonly referred to as right-to-know laws (freedom-of-information, open records, or sunshine laws) allow for public access to information held by the State.

4.2 Where disclosure is made in accordance with section 3, States shall ensure that:

a) public disclosure of relevant personal information included in the safety data or safety information complies with applicable privacy laws; or

b) public disclosure of the safety data or safety information is made in a de-identified, summarized or aggregate form.

5. Responsibility of the custodian of safety data and safety information

States shall ensure that each SDCPS has a designated custodian to apply the protection to safety data and safety information in accordance with applicable provisions of this appendix.

Note.— The "custodian" may refer to an individual or organization.

6. Protection of recorded data

Note 1.— Ambient workplace recordings required by national laws, for example, cockpit voice recorders (CVRs) or recordings of background communication and the aural environment at air traffic controller work stations, may be perceived as constituting an invasion of privacy for operational personnel that other professions are not exposed to.

Note 2.— Provisions on the protection of flight recorder recordings and recordings from air traffic control units during investigations instituted under Annex 13 are contained therein. Provisions on the protection of flight recorder recordings during normal operations are contained in Annex 6.

6.1 States shall, through national laws and regulations, provide specific measures of protection regarding the confidentiality and access by the public to ambient workplace recordings.

6.2 States shall, through national laws and regulations, treat ambient workplace recordings required by national laws and regulations as privileged protected data subject to the principles of protection and exception as provided for in this appendix.

Appendix B: Acronyms/Abbreviations

A4A - Airlines for America

AAM - Office of Aerospace Medicine

AC - Advisory Circular

ACI - Airports Council International

AD - Airworthiness Directive

ADREP - Accident/Incident Data Reporting

AESA - Aviation Safety and Security Agency of Spain

AFN - Office of Finance and Management

AIA - Aerospace Industries Association

AIDS - Accident/Incident Database System

AIP - Airport Improvement Program

AIR - Aircraft Certification Service

ALPA - Air Line Pilots Association

AME - Aviation Medical Examiner

AMO - Approved Maintenance Organization

AMSIS - Aerospace Medicine Safety Information System

ANAC - National Civil Aviation Agency of Brazil

ANG - Office of Next Generation Air Transportation System (NextGen)

ANSP - Air Navigation Service Provider

AOV - Air Traffic Safety Oversight Service

APA - Administrative Procedure Act

API - Office of International Affairs

ARC - Aviation Rulemaking Committee

ARP - Office of Airports

ASAP - Aviation Safety Action Program

ASE - Aviation Safety Engineer

ASH - Office of Security & Hazardous Materials Safety

ASI - Aviation Safety Inspector

ASIAS - Aviation Safety Information Analysis and Sharing

ASRS - Aviation Safety Reporting System

AST - Office of Commercial Space Transportation

ATC - Air Traffic Control

ATC - Amended Type Certification

ATCS - Air Traffic Control Specialist

ATO - Air Traffic Organization

ATSAP - Air Traffic Safety Action Program

AVIATOR - Automated Vacancy Information Access Tool for On-Line Referral

AVP Office of Accident Investigation and Prevention

AVS - Aviation Safety Organization

AVSSMS - Aviation Safety Safety Management System

AXH - Office of Hazardous Materials Safety

CAA - Civil Aviation Authority

CAA NL - Civil Aviation Authority of the Netherlands

CAA NZ - Civil Aviation Authority of New Zealand

CAMI - Civil Aerospace Medical Institute

CANIC - Continued Airworthiness Notification to the International Community

CAP - Corrective Action Plan

CAPA - Coalition of Airline Pilots Associations

CASA - Civil Aviation Safety Authority of Australia

CAST - Commercial Aviation Safety Team

CE - Critical Element

CFR - Code of Federal Regulations

CICTT - CAST/ICAO Common Taxonomy Team

CISP - Confidential Information Sharing Program

CIT - Content Integration Team

CMA - Continuous Monitoring Approach

CMRIS - Consolidated Management Resource Information System

COS - Continued Operational Safety

COSCAP - Cooperative Development of Operational Safety and Continued Airworthiness Program

CRWG - Crisis Response Working Group

D&M - Design and Manufacturing

DC - District of Columbia

DGAC - Direction Générale de l'Aviation Civile (CAA in France)

DHS - Department of Homeland Security

DoD - Department of Defense

DOT - Department of Transportation

DRS - Dynamic Regulatory System

EASA - European Aviation Safety Agency

EC - European Commission

ECCAIRS - European Coordination Centre for Accident and Incident Reporting Systems

eFSAS - Enhanced Flight Standards Automation System

EIM - Enterprise Information Management

EIS - Enforcement Information System

eLMS - electronic Learning Management System

EO - Executive Order

EU - European Union

FAA - Federal Aviation Administration

FCAA - Foreign Civil Aviation Authorities

FOCA - Federal Office of Civil Aviation of Switzerland

FOIA - Freedom of Information Act

FOQA - Flight Operational Quality Assurance

FS - Flight Standards

FSIMS - Flight Standards Information Management System

FY - Fiscal Year

GA - General Aviation

GAJSC - General Aviation Joint Steering Committee

GAMA - General Aviation Manufacturers Association

GENOT - General Notice

GSA - General Services Administration

GSIE - Global Safety Information Exchange

HIRMT - Hazard Identification, Risk Management and Tracking tool

HMASI - Hazardous Materials Aviation Safety Inspector

I&O - Implementation and Operations

IASA - International Aviation Safety Assessment

IATA - International Air Transport Association

ICAO - International Civil Aviation Organization

ICAP - Interagency Committee for Aviation Policy

IDP - Individual Development Plan

IGIA - Interagency Group on International Aviation

IIC - Inspectors in Charge

InFO - Information for Operators

IT - Information Technology

ITP - International Training Program

IVLP - International Visitor Leadership Program

IVP - International Visitors Program

JAA - Joint Aviation Authorities

JASC - Joint Aircraft System/Component

JCAB - Japan Civil Aviation Bureau

JPDO - Joint Planning and Development Office

KSA - Knowledge, Skills, and Abilities

LAANC - Low Altitude Authorization and Notification Capability

LOB - Line of Business

LOSA - Line Operational Safety Audit

MIS - Management Information System

MOU - Memorandum of Understanding

MRO - Maintenance, Repair, and Overhaul

MSAD - Monitor Safety/Analyze Data

NACA - National Air Carrier Association

NAS - National Aerospace Standard

NAS - National Airspace System

NASA - National Aeronautics and Space Administration

NATCA - National Air Traffic Controllers Association

NCA - North Central Association

NextGen - Next Generation Air Transportation System

NOTAM - Notice to Airmen

NPRM - Notice of Proposed Rulemaking

NTSB - National Transportation Safety Board

ODA - Organizations with Designated Authorization

OMB - Office of Management and Budget

OPR - Office of Primary Responsibility

OST - Office of the Secretary of Transportation

PC - Production Certificate

PHMSA - Pipeline and Hazardous Materials Safety Administration

PL - Public Law

PMA - Parts Manufacturer Approval

PTRS - Program Tracking and Reporting Subsystem

QA - Quality Assurance

QMS - Quality Management System

RAA - Regional Airline Association

RBRT - Risk Based Resource Targeting

RCISS - Regulation and Certification Infrastructure for System Safety

RGL - Regulatory and Guidance Library

RWI - Rulemaking Work Instructions

SAFO - Safety Alert for Operators

SAIB - Special Airworthiness Information Bulletin

SARPs - Standards and Recommended Practices

SAS - Safety Assurance System

SASO - System Approach for Safety Oversight

SDAT - Safety Data and Analysis Team

SDCPS - Safety Data Collection and Processing System

SDRS - Service Difficulty Report System

SM ICG - Safety Management International Collaboration Group

SMM - Safety Management Manual

SMS - Safety Management System

SMSFG - Safety Management System Focus Group

SMSVP - Safety Management System Voluntary Program

SNPRM - Supplemental Notice of Proposed Rulemaking

SO - Staff Office

SOC - Safety Oversight Circular

SOP - Standard Operating Procedure

SPAS - Safety Performance Analysis System

SPI - Safety Performance Indicator

SPT - Safety Performance Target

SRM - Safety Risk Management

SSO - State Safety Oversight

SSP - State Safety Program

STC - Supplemental Type Certificate

TC - Type Certificate

TCCA - Transport Canada Civil Aviation

TSA - Transportation Security Administration

T-SAP - Technical Operations Safety Action Program

TSO - Technical Standard Order

UAS - Unmanned Aircraft System

UAST - Unmanned Aircraft Safety Team

UK CAA - Civil Aviation Authority of United Kingdom

U.S. - United States

USC - United States Code

USCA - United States Code Annotated

USHST - U.S. Helicopter Safety Team

USOAP - Universal Safety Oversight Audit Program

VDRP - Voluntary Disclosure Reporting Program

VSRP - Voluntary Safety Reporting Program

Appendix C: Related Documents

International Civil Aviation Organization (ICAO) Documents

- ICAO Safety Management Manual (SMM), Doc 9859
- ICAO Standards and Recommended Practices (SARPs):
    - Annex 1: Personnel Licensing
    - Annex 2: Rules of the Air
    - Annex 6: Operation of Aircraft (International Commercial Air Transport – Aeroplanes; International General Aviation – Aeroplanes; and International Operations – Helicopters)
    - Annex 7: Aircraft Nationality and Registration Marks
    - Annex 8: Airworthiness of Aircraft
    - Annex 10: Aeronautical Telecommunications (Radio Navigation Aids; Communications Procedures; Communications Systems; Surveillance Radar and Collision Avoidance Systems; and Aeronautical Radio Frequency Spectrum Utilization)
    - Annex 11: Air Traffic Services
    - Annex 13: Aircraft Accident and Incident Investigation
    - Annex 14: Aerodrome Design and Construction, and Heliports
    - Annex 18: The Safe Transport of Dangerous Goods by Air
    - Annex 19: Safety Management, including State Safety Program Framework Attachment
- ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air, Doc 9284

United States (U.S.) Legislation

- Title 49 of the United States Code (USC) —Transportation
    - 49 USC Subtitle I — Department of Transportation¸ Section 106
    - 49 USC Subtitle II — Other Government Agencies, Chapter 11
        - 49 USC 1131, General Authority
        - 49 USC 1132, Civil Aircraft Accident Investigations
- The Federal Aviation Act of 1958
- The Airport and Airway Development Act of 1970
- Independent Safety Board Act of 1974
- The Wendell H. Ford Aviation Investment and Reform Act for the 21st Century
- The Aviation and Transportation Security Act of 2001
- The Homeland Security Act of 2002

- The Vision 100 — Century of Aviation Reauthorization Act of 2003
- The Airline Safety and FAA Extension Act of 2010
- The FAA Modernization and Reform Act of 2012
- The Administrative Procedure Act (APA)
- The Regulatory Flexibility Act
- The Paperwork Reduction Act
- The Hazardous Materials Transportation Act
- The Freedom of Information Act
- The Privacy Act

U.S. Executive Orders

- EO 12866, *Regulatory Planning and Review*
- EO 11382, *Establishment of the Department of Transportation*
- EO 13771, *Reducing Regulation and Controlling Regulatory Costs*

U.S. Regulations

- Title 14 of the Code of Federal Regulations (CFR), Aeronautics and Space
    - 14 CFR part 5, Safety Management Systems
    - 14 CFR part 21, Certification Procedures for Products and Parts
    - 14 CFR part 119, Certification: Air Carriers and Commercial Operators
    - 14 CFR part 120, Drug and Alcohol Testing Program
    - 14 CFR part 121, Operating Requirements: Domestic, Flag, and Supplemental Operations
    - 14 CFR part 129, Operations: Foreign Air Carriers and Foreign Operators of U.S.-Registered Aircraft Engaged in Common Carriage
    - 14 CFR part 135, Operating Requirements: Commuter and On Demand Operations and Rules Governing Persons on Board Such Aircraft
    - 14 CFR part 139, Certification of Airports
    - 14 CFR part 145, Repair Stations
    - 14 CFR part 183, Representatives of the Administrator
    - 14 CFR part 193, Protection of Voluntarily Submitted Information
- Title 49 of the CFR, Transportation
    - 49 CFR part 40, Procedures for Transportation Workplace Drug and Alcohol Testing Programs
    - 49 CFR part 172, Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, Training Requirements, and Security Plan
    - 49 CFR part 173, Shippers General Requirements For Shipments and Packagings

- 49 CFR part 175, Carriage By Aircraft

U.S. Multi-Agency Aviation Safety Documents

- *Integrated Plan for the Next Generation Air Transportation System*, published December 2004
- *Department of Transportation Review Plan*
- *The JPDO Safety Management System Standard*, 2008
- *A Systems Approach to Measuring Safety Performance – The Regulator Perspective*

U.S. Aviation Safety Plans and Reports

- *FAA Strategic Initiatives Summary*, 2014
- *FAA FY 2020 Performance and Accountability Report*
- *FAA SMS Implementation Plan*
- *FAA AVSSMS Implementation Plan*
- *NTSB Fiscal Year 2021 Annual Strategic Performance Plan*

Federal Aviation Administration (FAA) Orders[120]

- FAA Order 8000.369, *Safety Management System*
- FAA Order 1220.2, *FAA Procedures for Handling National Transportation Safety Board Recommendations*
- FAA Order 2150.3, *FAA Compliance and Enforcement Program*
- FAA Order 8000.81, *Designation of Flight Operational Quality Assurance (FOQA) Information as Protected from Public Disclosure under 14 CFR part 193*
- FAA Order 8000.82, *Designation of Aviation Safety Action Program (ASAP) Information as Protected from Public Disclosure Under 14 CFR part 193*
- FAA Order 8000.89, *Designation of Voluntary Disclosure Reporting Program (VDRP) Information as Protected from Public Disclosure under 14 CFR part 193*
- FAA Order 1100.161, *Air Traffic Safety Oversight*
- FAA Order 8000.86, *Air Traffic Oversight Compliance Process*
- FAA JO 1000.37, *Air Traffic Organization Safety Management System*
- FAA Order VS 8000.367, *Aviation Safety Safety Management System Requirements*
- FAA Order 1800.56, *National Flight Standards Work Program Guidelines*
- FAA Order 8900.1, *Flight Standards Information Management Systems (FSIMS)*
- FAA Order 9120.1, *Drug and Alcohol Compliance and Enforcement Inspector Handbook*
- *Antidrug and Alcohol Misuse Prevention Program Operations Specifications* (A449)

[120] Orders listed are the base version and are for identification purposes only. The current version of identified orders (as of February 2021) were used for the content in this SSP document.

- FAA Order 8020.11, *Aircraft Accident and Incident Notification, Investigation, and Reporting*
- FAA Order 5280.5, *Airport Certification Program Handbook*
- FAA Order 5200.11*, FAA Airports Safety Management System*
- FAA Order JO 7210.632, *Air Traffic Organization Occurrence Reporting*
- FAA Order 1070.1. *FAA Hotline Program*
- FAA Order 8040.4, *Safety Risk Management Policy*
- FAA Order 8110.107, *Monitor Safety/Analyze Data*
- FAA Order 1650.9, *Transportation of Hazardous Materials*
- FAA Order JO 7200.20, *Voluntary Safety Reporting Programs*

FAA Internal Processes and Guidance

- FAA's *Rulemaking Work Instructions (RWI)*
- *ATO Safety Management System Manual*
- *FAA FS SMS Guidebook*
- Air Traffic Safety Oversight Service (AOV) Surveillance Process document, AOV 002-001
- FAA Order 8020.11D, *Aircraft Accident and Incident Notification, Investigation and Reporting*
- *Aviation Safety Information Analysis and Sharing (ASIAS) Study Process*, AVP-200-001
- *FAA Office of Airports Safety Management System (SMS) Desk Reference*
- FAA Order 8900.1, *Flight Standards Information Management Systems (FSIMS)*, Volume 18

FAA Guidance

- Advisory Circular (AC) 120-92, *Safety Management Systems for Aviation Service Providers*
- *Safety Management System (SMS) Assurance Guide*
- *Safety Management System (SMS) Implementation Guide*
- *The Design and Manufacturing (D&M) SMS Pilot Project Guide*
- AC 150/5200-37, *Introduction to Safety Management Systems (SMS) for Airport Operators*
- Letter of Authorization (A049) - Notice 8900.18 - Recording Operations Specifications for Part 145 Repair Stations
- *The D&M SMS Pilot Project Guide*
- AC 150/5200-37, *Introduction to Safety Management Systems (SMS) for Airport Operators*
- Letter of Authorization (A049) - Notice 8900.18 - Recording Operations Specifications for Part 145 Repair Stations
- VDRP User Guide
- *FAA Safety Recommendation Program*
- AC 121-40, *14 CFR Part 121 and Part 135 Dangerous Goods Transportation Operations*

FAA Safety Management Training Courses

- FAA Safety Risk Management (SRM) Overview (FAA27000023)
- Safety Management System (SMS) Basics for AVS (FAA27000020)
- Fundamentals of Risk Analysis (FAA27200019)
- Apollo Root Cause Analysis (FAA22000001)
- Measuring Organizational Performance (FAA01254)
- Safety Assurance System (SAS) Overview for Managers Workshop (FAA21000070)
- Safety Management System (SMS) Theory and Application (FAA15249001)
- Planning, Conducting, and Reporting Evaluations Course (FAA60000013)
- Overview of Safety Management System (FAA30200994)
- Safety Risk Management (SRM) Practitioner Course (FAA06000006)
- Continued Operational Safety (COS) of a Safety Management System (SMS) using SAS (FAA21000150)
- Safety Risk Management (SRM) Panel Facilitation (FAA30201003)

National Transportation Safety Board (NTSB) Accident Investigation Training Courses

- Aircraft Accident Investigation (AS101)
- Rotorcraft Accident Investigation (AS102)
- Aircraft Accident Investigation for Aviation Professionals (AS 301)
- Survival Factors in Aviation Accidents (AS302)
- Investigating Human Fatigue Factors (IM303)
- Managing Communications During an Aircraft Accident or Incident (PA302)

International Documents

- Safety Management International Collaboration Group (SM ICG) product, *A Systems Approach to Measuring Safety Performance – The Regulator Perspective*
- *Technical Instructions for the Safe Transport of Dangerous Goods By Air*

Relevant Websites

- 14 CFR on the U.S. Government Publishing Office website: http://www.gpo.gov/fdsys/pkg/CFR-2004-title14-vol1/content-detail.html
- Accident/Incident Data Reporting (ADREP) site: https://www.icao.int/safety/ADREP/Forms/AllItems.aspx
- Airport Improvement Program (AIP): http://www.faa.gov/airports/aip/
- Aviation Safety Action Program (ASAP): https://www.faa.gov/about/initiatives/asap/
- Aviation Safety Information Analysis and Sharing (ASIAS): http://www.asias.aero/overview.html
- Aviation Safety Reporting System (ASRS) website: http://asrs.arc.nasa.gov/

- Air Traffic Safety Action Program (ATSAP): https://www.atsapsafety.org/login/
- Office of Hazardous Materials Safety (AXH) website: https://www.faa.gov/hazmat/
- Commercial Aviation Safety Team (CAST) Fact Sheet: https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=23035
- CAST/ICAO Common Taxonomy Team (CICTT): http://www.intlaviationstandards.org/
- DOT Review Plan: http://www.dot.gov/regulations/dots-review-plan
- DOT Transportation Safety Institute (TSI): https://www.transportation.gov/transportation-safety-institute
- FAA Academy courses: https://www.academy.jccbi.gov/catalog/
- FAA Harmonized Operational Metrics: https://www.faa.gov/data_research/aviation_data_statistics/operational_metrics/
- FAA International Visitors Program: https://www.faa.gov/about/office_org/headquarters_offices/apl/international_affairs/visitors/
- FAA Regulations and Policies: http://www.faa.gov/regulations_policies/
- FAA Safety Hotline: https://hotline.faa.gov/
- Flight Operational Quality Assurance (FOQA): https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afx/afs/afs200/afs280/descriptions/
- FOIA: https://www.foia.gov/
- International Aviation Safety Assessments (IASA): http://www.faa.gov/about/initiatives/iasa/
- International Air Transport Association (IATA): https://www.iata.org/whatwedo/cargo/dgr/Pages/index.aspx
- Interagency Committee for Aviation Policy (ICAP): http://www.gsa.gov/portal/category/21234
- Lessons Learned From Transport Airplane Accidents library: https://lessonslearned.faa.gov/transport.cfm
- Next Generation Air Transportation System (NextGen) International Outreach: http://www.faa.gov/about/office_org/headquarters_offices/apl/international_affairs/international_nextgen/
- NTSB Accident Reports: https://www.ntsb.gov/investigations/AccidentReports/Pages/AccidentReports.aspx
- NTSB Most Wanted: https://www.ntsb.gov/safety/mwl/Pages/default.aspx
- NTSB Office of Aviation website: https://www.ntsb.gov/about/organization/AS/Pages/office_as.aspx
- NTSB website: http://www.ntsb.gov
- Pipeline and Hazardous Materials Safety Administration (PHMSA): https://www.phmsa.dot.gov/
- SAS: https://www.faa.gov/about/initiatives/sas/
- System Approach for Safety Oversight (SASO): http://www.faa.gov/about/initiatives/saso/

- SM ICG SKYbrary site: http://www.skybrary.aero/index.php/Safety_Management_International_Collaboration_Group_(SM_ICG)
- Title 49 USC: http://www.gpo.gov/fdsys/pkg/USCODE-2011-title49/html/USCODE-2011-title49.htm
- United Nations Economic Commission for Europe (UNECE): http://www.unece.org/trans/main/dgdb/dgsubc3/c32017.html