

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION National Policy

ORDER 8010.2A

Effective Date: 3/27/24

SUBJ: Aviation Safety (AVS) Service Difficulty Reporting System

The Administrator promotes Continued Operational Safety (COS) as part of its safety mission. COS is a responsibility shared by the Federal Aviation Administration's (FAA) Aviation Safety (AVS) Aircraft Certification Service (AIR) and Flight Standards Service (FS) and could include the Air Traffic Organization (ATO). In this effort, the Administrator (acting in accordance with Title 49 of the United States Code (49 U.S.C.) § 44701) provides service difficulty reporting requirements so it can collect, in a centralized location, data and information concerning in-service product and article failures, malfunctions, and defects that endangered or could endanger the safe operation of an aircraft. To facilitate this collection, the Administrator describes in this order the AVS Service Difficulty Reporting *System*¹ (SDRS) (*emphasis on system*) and promotes leveraging Safety Management System (SMS) constructs when a service difficulty reporting regulation requires a decision or opinion.

Title 14 of the Code of Federal Regulations (14 CFR) part 5 requires 14 CFR part 121 certificate holders (CH) to develop and implement an SMS. The Administrator also strongly encourages all other aviation service providers to implement the SMS into their business processes.² In addition, AVS has an SMS³ obligation. When an unsafe event occurs, the SMS Safety Assurance (SA) process requires responsible stakeholder(s) to acquire data and information, investigate (exhaustively) what went wrong, and as necessary, apply Safety Risk Management (SRM)⁴ decision-making techniques. Stakeholders need to determine if the design of their operation is safe and what actions (if any) are necessary to prevent its reoccurrence. SMSs will continue to become more sophisticated and SA/SRM decision-making will increasingly integrate into operations. As the data and information from these advancements are shared and incorporated into SDRS, the system will improve, as will safety in the National Airspace System (NAS).

a. The FS SDRS database located at https://sdrs.faa.gov/ is only one of a group of constituent system elements service difficulty reporting needs to achieve its safety goals. Other elements include stakeholder personnel and defined procedures. SDRS stakeholders are product and article manufacturers, air carriers, operators, repair stations, and AVS's AIR and FS. Trust, followed by open and transparent sharing of safety data

¹ System (FAA Order 8040.4, Safety Risk Management Policy). An integrated set of constituent elements that are combined in an operational or support environment to accomplish a defined objective. These elements include people, hardware, software, firmware, information, procedures, facilities, services, and other support facets. ² Advisory Circular (AC) 120-92, Safety Management Systems for Aviation Service Providers.

³ FAA Order VS 8000.367, AVS Safety Management System (AVSSMS) Requirements, and Order 8000.369, Safety Management System.

⁴ Order 8040.4.

and information between stakeholders, enables all parties to address unsafe conditions proactively.

b. The value of preserving sterile SDR safety data and information in the AVS database hinges on the data having sufficient safety focus and detail to provide benefit to stakeholders' SMS processes. With sufficient quantity and quality of safety-focused SDR data, stakeholders can use the AVS database to supplement their SA and SRM processes, identify hazards, and as necessary, take proactive measures to either eliminate the hazard and/or mitigate the associated risk.



Figure 1. SDR SRM Information Sharing Expectation

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Hugh Thomas for Lawrence Fields Executive Director, Flight Standards Service

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, <i>2211108</i> , <i>2010</i> , <i></i>	
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Chapter 1. Administrative

1. Purpose of This Order. This order explains Service Difficulty Report (SDR) requirements and promotes application of Safety Management System (SMS) principles to the safety data and information the aviation community reports to the Federal Aviation Administration's (FAA) Aviation Safety (AVS) Aircraft Certification Service (AIR) and Flight Standards Service (FS).

2. Audience. This order applies to AIR and FS personnel who have Service Difficulty Reporting System (SDRS) duties and responsibilities. These personnel include those responsible for SDRS policy, automation, sterilization, and protection of data and information. It also includes AVS personnel tasked to review, collate, analyze, assess, and act on SDR safety data and information.

3. Where You Can Find This Order. You can find this order on the MyFAA employee website at https://employees.faa.gov/tools_resources/orders_notices and the Dynamic Regulatory System (DRS) at https://drs.faa.gov. Operators and the public can find this order on the FAA's website at https://www.faa.gov/regulations_policies/orders_notices and DRS.

4. What This Order Cancels. FAA Order 8010.2, Flight Standards Service Difficulty Program, dated February 22, 1978, was canceled July 26, 2011.

5. Purpose of SDR. SDR regulations (Title 14 of the Code of Federal Regulations (14 CFR) part 91, § 91.1415; part 121, § 121.703; part 125, § 125.409; part 135, § 135.415; and part 145, § 145.221) require U.S. operators to submit to an FAA-centralized location the statistical data and information describing a failure, malfunction, or defect that endangered, may endanger, or is serious enough to threaten the safe operation of an aircraft. An SDR is a source, but not the sole source, of data and information stakeholders (manufacturer, operator, repair station, and the FAA) use to determine if a failure, malfunction, or defect is or was a flight safety hazard. The FAA promotes through some of its regulations and encourages all other stakeholders through Advisory Circular (AC) 120-92, Safety Management Systems for Aviation Service Providers, to exercise SMS constructs as they investigate and react to flight hazards and their associated risk. The FAA provides AVS safety inspector and engineering personnel with SMS policy and guidance they must follow to identify new or potential hazards to safe flight. Under its SMS, AVS personnel are required to analyze and assess SDR data and information. When necessary, and after thorough investigation, AVS safety personnel have the Administrator's authority to react accordingly to hazards and risk that threaten safety of flight in the National Airspace System (NAS).

6. What is SDRS? The AVS SDRS is people following safety policy who are working interdependently and using automation to disseminate, collate, and assess reported data and information. Their safety assessments determine what (if any) action is necessary to control risk associated with reported safety hazards. Preservation of sterile SDR safety data and information in the AVS database, permits persons authorized to access it and apply SMS and Safety Risk Management (SRM) principles to identify hazards and mitigate risk.

7. Means of Reporting.

a. SDRS Database. The SDRS website (https://sdrs.faa.gov/) is preferred.

b. FAA Forms. Forms are acceptable but not preferred. Obtain FAA Forms from a local certificate management office (CMO)/Flight Standards District Office (FSDO) or the Automation Systems Management Branch (AFS-950).

(1) Air carrier certificate holders (CH), repair stations, and part 91 subpart K (part 91K) program managers may use FAA Form 8070-1, Service Difficulty Report.

(2) General Aviation (GA) operators who choose to participate may use FAA Form 8010-4, Malfunction or Defect Report.

8. How to Gain Access to SDRS. Contact AFS-950 by email at 9-AMC-SDR-ProgMgr@faa.gov, or by U.S. mail at:

SDR Program Manager Automation Systems Management Branch (AFS-950) P.O. Box 25082 Oklahoma City, OK 73125

9. Clarifications.

a. Synchronizing Terms and Titles. Federal Register Document (FR Doc.) 70 FR 76974, Service Difficulty Reports (December 29, 2005), tells us the FAA synchronized the titles in §§ 121.703, 125.409, 135.415, and 145.221 to "Service difficulty reports." The regulations governing part 91K were under development at the same time the FAA was synchronizing SDR regulatory titles. As a result, § 91.1415 carries the old title of "CAMP: Mechanical reliability reports." The SDRS website (https://sdrs.faa.gov) directs GA reporting to create a Malfunction or Defect (M or D) Report using FAA Form 8010-4. An SDR may be submitted (but is not preferred) using FAA Form 8070-1.

b. Educational Materials. Section 326 of Public Law (PL) 115-254, FAA Reauthorization Act of 2018, ("the Act") directs the FAA to establish and make publicly available, educational materials for pilots, flight attendants (F/A), and Aviation Maintenance Technicians (AMT) on how to respond to incidents on board aircraft involving smoke or fumes. The Act also requires the FAA to issue guidance to pilots, F/As, and AMTs on reporting incidents of smoke or fumes on board commercial aircraft through SDRS. In response, the FAA created a web page to support the development of educational materials for operators to provide awareness and/or training to pilots, F/As, and AMTs. Additionally, this web page supports air carriers as they develop programs to prevent, recognize, and respond to the presence of fumes, particularly those associated with the aircraft air supply system-sourced fumes, and incorporate cabin air quality educational materials for Crewmembers and AMTs" web page on the FAA website.⁵)

⁵ https://www.faa.gov/about/initiatives/cabin_safety/section_326/education_material.

c. Objective. The objective to report a failure, malfunction, or defect in a product or article is the same regardless of title and terminology. The data and information in these reports is collected and stored in the SDRS database by AFS-950 in Oklahoma City, Oklahoma.

10. AVS Evolution Effect on Service Difficulty Reporting. AVS restructuring, technology advancements, oversight methodology changes, and cancellation of Order 8010.2 are contributing factors causing SDR processing, analysis, assessment, and action to drift and become inconsistent. This updated order corrects the SDR drift. See Figure 1-1, AVS Evolution Effect on Service Difficulty Reporting, below.

11. Distribution. The FAA will distribute this order to all AVS, AIR, and FS personnel who have service difficulty reporting duties and responsibilities.

12. Directive Feedback Information. Direct questions or comments to the Aircraft Maintenance Division (AFS-300) at 202-267-1675. For your convenience, FAA Form 1320-19, Directive Feedback Information, is the last page of this order. Note any deficiencies found, clarifications needed, or suggested improvements regarding the contents of this order on FAA Form 1320-19.

Figure 1-1. AVS Evolution Effect on Service Difficulty Reporting



Chapter 2. Leveraging Safety Management Constructs to Make SDR Decisions

1. Background.

a. Manufacturers go to great lengths to produce highly reliable products and articles; however, utilization and environment will quickly reveal where improvements are necessary. Reporting mechanical reliability issues and unsafe conditions is a means to identify these types of hazards the U.S. Department of Commerce established in the 1930s. In 1940, the Civil Aeronautics Administration (CAA) put forth in the FR and the CFR the Civil Aeronautics Manuals (CAM) issued by the Office of Aviation Safety for the guidance of the public. CAM 42, Supplement No. 1, 42.96 Reporting of Malfunctioning and Defects,⁶ dated June 16, 1949, required immediate reporting of mechanical difficulties of a hazardous nature (like today's SDR) and submission of a monthly report of chronic conditions that collectively are hazardous due to their repetitious nature (like today's Mechanical Interruption Summary Reports (MISR)).

b. As aviation evolved, the CAA put forth SDR regulations that required operators to report "the occurrence or detection of a failure, malfunction, or defect that endangered, or could have endangered, the safe operation of the aircraft." Complaints arose that this statement was too ambiguous and as a result, the CAA put forth CAM 42.508 and 42.509, which included an enumerated list of safety events that require a report while maintaining the original language.

c. In 1964, the FAA established §§ 121.703 and 121.705 from CAM 42.508 and 42.509. In the early 1970s, the FAA put forth manufacturing requirements 14 CFR part 21, §§ 21.3 and 21.4. In 1978, with deregulation, the FAA put forth §§ 135.415 and 135.417. In 1980, the FAA addressed specific events that pose a risk to part 121 Extended Operations (ETOPS) by establishing § 121.374(h) with a reference to § 121.703; and part 125 by publishing § 125.409. In 2001, the FAA identified the need for repair stations to report articles they find defective as well as their relationships with parts 121 and 135 CHs and published § 145.221. In 2003, §§ 91.1415 and 91.1417 requires program managers of part 91K fractional ownership operations to report failures, malfunctions, and defects and provide a Mechanical Interruption Summary (MIS) to the FAA. In 2007, the FAA addressed specific events that pose a risk to part 135 ETOPS by publishing part 135 appendix G, specifically part 135 appendix G, § G135.2.8(h) which references to § 135.415. Today, the FAA is working to establish reporting requirements for unmanned aircraft.

d. Reviewing the history shows the CAA also established a means by which they would manage the risks contained in these reports. The reports emitting from CAM 42, supplement No. 1, went to the Washington, D.C. office of the CAA's Air Carrier Maintenance Division where they would receive immediate attention regarding corrective action, which this CAA division would disseminate to all concerned industry groups daily or monthly as appropriate. The Air Carrier Maintenance Division maintained a follow-up system to assure permanent corrective action on any hazardous mechanical difficulty and would disseminate progress of this action on various items through supplements to the daily summarization of all reported hazards. The results of this CAA procedure enabled the CAA to direct immediate corrective action by the

⁶ https://drs.faa.gov/browse/excelExternalWindow/FAA000000000000CAM42_061649PDF.0001?modalOpened =true.

concerned air carrier operator and/or the manufacturer. Additionally, this procedure provided for concerted actions against costly and hazardous mechanical deficiencies collectively by air carriers, manufacturers, and the CAA.

e. In 1978, the FAA established in Order 8010.2 its Service Difficulty Reporting Program which carried it through the introduction of automation and electronic reporting. The FAA canceled this order in 2011 without immediately replacing it; however, duties and responsibilities were somewhat engrained, and the Aviation Data Systems Branch (AFS-620), regional personnel, CMOs, and FSDOs continued to collect, analyze, and assess SDR data and information. However, with the FS reorganization and the elimination of its regions, management of SDR data and information is very inconsistent, making this order necessary.

2. General. This order explains how the FAA manages SDR data and information today and provides references to other orders that contain more specific information regarding SDRs, MISs, and the management of risk that an individual report or summary may identify.

a. Safety Management. The FAA as an organization exercises safety management under an SMS⁷ and exercises a Safety Assurance (SA)⁸/SRM⁹ decision-making process. The Administrator places strong emphasis for all aviation service providers to develop and foster strong safety cultures and perform under an SMS¹⁰ that routinely exercises the SA and SRM decision-making process.

(1) Advancements in technology coupled with the FAA's promotion of safety management sheds a new perspective on the original regulatory language to report: "*The occurrence or detection of a failure, malfunction, or defect that endangered or could have endangered the safe operation of the aircraft.*" These regulatory phrases, "*when it determines*,"¹¹ "*in their opinion*,"¹² "*any event that would jeopardize the safe flight and landing of the airplane*,"¹³ and "*any serious failure, malfunction, or defect of an article*"¹⁴ all indicate an SA/SRM decision is necessary.

(2) Today, technology advancements like digital communication, computer reporting, Engine Condition Monitoring (ECM), and Integrated Aircraft Health Management (IAHM) have empowered the aeronautical industry with the ability to communicate safety data and information rapidly. The aviation community's ability to communicate, identify, and improve reliability issues and fix unsafe conditions is more efficient today than it has ever been. As technology evolves, it empowers the aviation community to advance its endless pursuit of reliability and safety beyond what the FAA could possibly prescribe in a regulation.

⁷ Order VS 8000.367, AVS Safety Management System (AVSSMS) Requirements.

⁸ Order 8900.1, Volume 10 overview provided at https://www.faa.gov/sites/faa.gov/files/about/initiatives/saso/librar y/SAS_Overview.pdf.

⁹ Order 8040.4.

¹⁰ AC 120-92.

¹¹ Title 14 CFR part 21, § 21.3.

¹² Sections 91.1415, 121.703, and 135.415.

¹³ Section 121.374(h) and part 135 appendix G, § G135.2.8.

¹⁴ Section 145.221.

b. Service Difficulty Reporting. For service difficulty reporting to achieve its purpose, it is reliant on high quality, qualitative, and useful data and information. The regulations establish the minimum data and information required for an SDR. The reports of most value to stakeholders are those that are safety-focused in their description with sufficient explanation to elaborate on the issue or event encountered. The data and information must be accurate, complete, timely, and useful. It must include sophisticated, well-described corrective action(s). The SDRS web-based automated database (as well as FAA Forms 8010-4 and 8070-1 if necessary) all have Office of Management and Budget (OMB) approval for this purpose.

(1) SMSs will continue to become more sophisticated and SA/SRM decision-making will increasingly integrate into operations. As the data and information from these advancements are shared with SDRS, the system will improve. Open and transparent sharing of safety data and information enables the FAA to trust and verify investigations of a potentially unsafe event are thorough and exhaustive. When necessary, corrective actions may be developed based on the outcomes of SA/SRM processes. Corrective actions may be either mandatory or voluntary depending on the level of risk. Product and article manufacturers, operators, repair stations, and the FAA all must continue to exercise trust, integrate modern technology, and exercise SA/SRM decision-making concepts into repeatable processes and proactive systems that produce safer and more reliable service to the public.

(2) Submitters, not the FAA, are responsible for quality reports, accurate data and information, and timeliness in accordance with the regulations. It is the FS SA office's responsibility to contact the submitter and work with them to clarify a report that contains data and information lacking quality, essential details, or inaccuracies; or to address a compliance issue.

3. Overview of Aviation Service Provider SMS/SDR Advisory Guidance.

a. AC 20-109, Service Difficulty Reporting System (Air Operator/Air Agency/General Aviation/Unmanned Aircraft Systems). This AC describes methods the Administrator prescribes per §§ 91.1415, 125.409, and 135.415 and accepts per §§ 121.703 and 145.221 for reporting in-service product and article failures, malfunctions, and defects. The FAA also encourages service difficulty reporting by the GA community. The preferred method of reporting for all operators is through the SDRS website at https://sdrs.faa.gov/.

b. AC 21-9, Manufacturers Reporting Failures, Malfunctions, or Defects. This AC provides information to assist manufacturers of aeronautical products and articles in reporting to the FAA any defect in any product or article they manufacture. Instead of using the SDRS, manufacturers are advised to contact the responsible Aircraft Certification Service office in the region where the person required to make the report is located within 24 hours after it determines a failure, malfunction, or defect requires a report per § 21.3(e)(1).

c. AC 120-92, Safety Management Systems for Aviation Service Providers. This AC provides a description of regulatory requirements, guidance, and methods of developing and implementing an SMS that align with 14 CFR part 5. Aviation service providers who are required, encouraged, and interested in developing an SMS should refer to this AC's guidance regarding design and implementation.

4. Overview of FAA SMS/SDR Orders.

a. FAA Order VS 8000.367, AVS Safety Management System (AVSSMS) Requirements. This order provides requirements to be met by all AVS services and offices in support of the AVSSMS. The focus of this order is aviation safety. It does not address occupational safety, health, or personnel safety issues, unless those issues affect aviation safety.

b. FAA Order 8000.368, Flight Standards Service Oversight. This order provides guidance for FS staff and offices in meeting the requirements specified in FAA Order VS 8000.367 and Order 8000.369, Safety Management System. It describes FS statutory responsibilities with respect to aviation safety oversight and evolving system safety and SMS-based initiatives. These initiatives contribute to enhanced methodologies for managing risk and improving safety in aviation. Additionally, this order discusses the incorporation of system safety and is inclusive of SMS concepts into the future FS oversight approach.

c. FAA Order 8000.369, Safety Management System. This order establishes the FAA's SMS policy and requirements. The FAA allocates resources, conducts safety oversight, and makes risk-based decisions by exercising its SMS. The FAA uses the SMS to schedule a variety of means such as audits, evaluations, inspections, and mandated corrective actions that confirm product/article manufacturing design, operational reliability, compliance, and safety.

d. FAA Order 8020.11, Aircraft Accident and Incident Notification, Investigation, and Reporting. This order establishes FAA procedures and responsibilities for the ATO to notify FS of an event that needs investigation and reporting. Chapter 1, General Information, provides valuable definitions such as "event," "occurrence," "incident," "significant event," "substantial damage," etc. Chapter 6, FAA Incident Investigation and Reporting, directs FAA investigations of ATO preliminary findings FS receives through the Air Traffic Quality Assurance (ATQA) or the Comprehensive Electronic Data Analysis and Reporting (CEDAR) system. Chapter 6 also provides SDR expectations.

e. FAA Order 8040.4, Safety Risk Management Policy. This order establishes the SRM pillar of the FAA's SMS. SRM policy and procedures in Order 8040.4 direct AVS personnel through an SRM decision-making process they can apply as they review SDR data and information. Following the Order 8040.4 SRM process is how AVS (FAA AIR/FS) makes decisions and provides recommendations to aviation service providers. Application of SRM in parallel with FAA SA oversight functions ensures identification of hazards management of risk associated with those hazards.

f. FAA Order 8110.42, Part Manufacturer Approval Procedures. This order describes the procedures for evaluating an application for a Parts Manufacturer Approval (PMA) for replacement and modification articles on type-certificated products. It includes SDR interfacing guidance and information.

g. FAA Order 8110.107, Monitor Safety/Analyze Data. This order addresses AIR's SMS process through the interrelated SA and SRM functions. In basic terms, "Monitor Safety" corresponds to SA and "Analyze Data" corresponds to SRM.

h. FAA Order 8120.22, Production Approval Procedures. This order provides guidance for Aircraft Certification Service (AIR) personnel to accomplish certain agency responsibilities. These include the evaluation and approval of production activities of manufacturers and their suppliers producing products or articles in accordance with 14 CFR. It includes SDR interfacing guidance and information.

i. FAA Order 8120.23, Certificate Management of Production Approval Holders. This order provides guidance for AIR certificate management (CM). Chapter 4, Section 3, Investigation of Service Difficulties, offers service difficulty investigation guidance concerning the production activities of manufacturers and their suppliers producing products and articles in accordance with 14 CFR.

j. FAA Order 8900.1, Volume 3, Chapter 32, Section 14, Review the Operator's Mechanical Interruption Summary for Parts 91K, 121, and 135. This section provides guidance for monitoring an operator's fleet performance by tracking mechanical irregularities that occur during scheduled operations. Each SDR should be in the MIS.

k. Order 8900.1, Volume 3, Chapter 32, Section 15, Review/Process a Part 121, 125, 135, or 145 Service Difficulty Report or Part 91K Mechanical Reliability Report. This order provides guidance aviation safety inspectors (ASI) must use to assess an aviation service provider's service difficulty reporting process design set forth in their required manual. In addition, it provides guidance that ASIs use to assess the performance of that design.

I. Order 8900.1, Volume 4, Chapter 6, Section 3, Extended Operations Surveillance and Oversight. This section explains reportable ETOPS events identified in § 121.374(h) or part 135 appendix G, § G135.2.8(h) *are additional SDR* requirements. To prevent duplicate reporting, the ETOPS CH needs only to reference the SDRS "identifier" when they report to the FS office within the 96 hours the ETOPS rules require.

m. Order 8900.1, Volume 7, Chapter 1, Section 2, Incident and Occurrence Investigations. This section supplements Order 8020.11 and provides detailed ASI guidance for documenting FAA incident and occurrence investigations.

n. Order 8900.1, Volume 8, Chapter 5, Section 6, Review, Analyze, and Assess a Service Difficulty Report. This order directs FS Air Carrier Safety Assurance (ACSA) and General Aviation Safety Assurance (GASA) offices to access the SDRS web-based automated database when they receive an SDR submission from a person they oversee. These reviews:

- Ensure the entry of data and information into the SDRS web-based automated database is usable, accurate, and complete, and meet their submission requirements.
- Ensure corrective actions control risk and are acceptable to the Administrator.

o. Order 8900.1, Volume 10, Safety Assurance System Policy and Procedures. This order contains FS Safety Assurance System (SAS) policy and procedures that include standardized protocols ASIs use to evaluate CH programs. It is through SAS that FS ACSA and GASA offices plan activities, direct resources, collect Design Assessment (DA) and Performance

Assessment (PA) data, analyze the collected data, assess risk, and direct FAA actions accordingly.

(1) Master List of Functions (MLF) Element 4.4.2 (AW) Mechanical Interruption Summary (MIS)/Service Difficulty Reports (SDR) is the primary element used to document FS SA assessments of a part 121 or 135 CH's service difficulty reporting process.

(2) MLF Element 4.4.6 (AW) Record Systems is the element used to document FS SA assessments of a repair station's service difficulty reporting process.

(3) Part 91K program manager and part 125 CH regulations require them to prepare and follow a manual acceptable to the Administrator. ASIs who identify problems with the design or performance of the Mechanical Reliability Report (MRR) process in a part 91K program manager's manual or the design or performance of the service difficulty reporting process in a part 125 CH's manual will document them in SAS using the following activity codes as appropriate:

- For initial certification: 3302/5302,
- If reviewing a manual revision: 3303/5303,
- If the review is a routine review of a submission: 3325/5325,
- To investigate an SDR significant item: 3326/5326, or
- When performing surveillance of manual procedures: 3626/5626.

5. AVS Leveraging of Its SMS to Make SDR Decisions. The AVS SMS described in Order VS 8000.367 is fully functional regarding service difficulty reporting when FS and AIR exercise the SDR guidance stated above and apply the SA and SRM processes described in Order 8040.4 as a routine part of their SDR decision-making duties and responsibilities.

6. Safety Goals and Expectations. The safety expectation of SDR requirements is to collect and store sterile safety data and information in a centralized location. FAA systematic processing of safety data and information through its organization enables stakeholders to identify hazards and support SA/SRM processes. The FAA's SDRS is one of several resources it uses to monitor the effectiveness of product and article designs, maintenance programs, and corrective actions for cases when corrective actions were implemented.

Chapter 3. Manufacturer Service Difficulty Reporting Requirements

Note: A manufacturer in this order is a person who holds a type certificate (TC) (including amended TC or Supplemental TC (STC)), a Parts Manufacturer Approval (PMA), or a Technical Standard Order Authorization (TSOA), or the licensee of a TC.

1. Manufacturer Reporting Requirements.

a. Section 21.3. Section 21.3 details the requirements for reporting failures, malfunctions, and defects of products and articles. These requirements apply to a holder of a TC, amended TC, STC, PMA, or TSOA, or the licensee of a TC. These entities should notify the FAA of:

(1) Any failure, malfunction, or defect in the products or articles they manufacture that have resulted in any of the occurrences specified in § 21.3(c). Examples of such occurrences include fires, accumulation of toxic gases, propeller structural failure, flammable fluid leakage, brake system failure, and flight-control system malfunction.

(2) Any defect in any product or article that has left their quality system and that could result in any one of the occurrences specified in 21.3(c).

b. Manufacturer and Operator Responsibilities. Manufacturers and operators share in the responsibility to put safety first and continuously improve operational reliability. As a result, strong safety relationships between them are established. Section 21.3(f) requires manufacturers to be aware of reported service difficulties and accident investigations that § 21.3(c) may or may not list.

c. Operator and Manufacturer Collaboration. When an *operator* makes the manufacturer aware of a safety issue and/or reports in SDRS a failure, malfunction, or defect that *in the operator's opinion* (SMS analysis) endangered or may endanger the safe operation of an aircraft, the manufacturer and the operator (often times together) should be investigating them. The goal of these investigations is to determine the extent of the issue and what (if any) action is required to correct the defect.

d. Manufacturer Reports Containing ETOPS Reliability Data and Information. Section 21.4 requires the holder of a TC for an airplane approved for ETOPS and the holder of a TC for an engine installed on an airplane approved for ETOPS to report monthly to their respective FAA certification branch on the reliability of the world fleet of those airplanes and engines. The responsible TC holder (TCH) must investigate any cause of an in-flight shutdown (IFSD) resulting from an occurrence attributable to the design of its product and report the results of that investigation to its responsible FAA certification branch. This reporting may be combined with the reporting required by § 21.3.

2. Purpose of a Manufacturer FAA Report. Manufacturers who maintain strong safety relationships with those who operate their aircraft and are diligent in their review of SDRs concerning the products and articles they produce are often able to provide the earliest possible notification of a hazardous condition to the FAA and ensure appropriate corrective action as they comply with §§ 21.3 and 21.4.

3. Manufacturer Method of Reporting. AC 21-9 covers manufacturer reporting expectations. The method and manner of reporting should be in accordance with § 21.3(e).

a. Contact the FAA Certification Branch. Each manufacturer should contact the nearest FAA certification branch in the region in which the person required to make the report is located within 24 hours after it has been determined that the failure, malfunction, or defect required to be reported has occurred.

b. Purpose of Reporting. Reporting to the FAA certification branch:

(1) Ensures an understanding of the rules.

(2) Establishes the most expeditious means of conveying the required information in a manner and form acceptable to the FAA.

(3) Determines the person(s) to contact.

(4) Establishes a means of keeping the appropriate FAA office informed of progress and providing additional information on those cases where only preliminary information is available.

c. What Manufacturers Should Not Report. Section 21.3(d) details conditions under which manufacturer reports are not required. These include:

(1) The cause of a failure, malfunction, or defect was improper maintenance or improper usage.

(2) A product or article manufactured by a foreign manufacturer under a U.S. TC issued under § 21.29, or an approval under § 21.621; or exported to the United States under § 21.502.

(3) Engine TCHs are not required to report engine shutdown if the engine TCH knows the failure was reported by another person under part 91, 121, 125, 135, or 145, or reports it under the accident reporting provisions of Title 49 of the Code of Federal Regulations (49 CFR) part 830 of the National Transportation Safety Board (NTSB) regulations.

(4) In cases where the manufacturer becomes aware of a defect during the normal manufacturing cycle of a product or article (e.g., under its documented quality system), the manufacturer does not need to notify the FAA if the product or article has not left its quality system. Manufacturers should review their quality system to ensure they define clearly the systems limits.

(5) The reporting rules do not apply to foreign manufacturers whose products or articles have approval under the applicable import certification provisions of part 21 (refer to § 21.29). The FAA relies on foreign countries' and jurisdictions' civil aviation authorities (as provided under their bilateral agreements with the United States) to stay informed of hazardous conditions occurring in these products or articles.

Chapter 4. Parts 91K, 121, 125, 135, and 145 Reporting Requirements

1. Parts 121, 135, and "91K With a CAMP" Requirements.

a. Design and Follow Manual Procedures (per §§ 43.13(a), 121.133, 121.135, 121.369(b), 135.21(a), and 135.427(b)).

(1) Part 119 CHs and part 91K program managers with a Continuous Airworthiness Maintenance Program (CAMP) are required to design a manual acceptable to the Administrator that ensures compliance with the regulations.

(2) Part 119 CH and part 91K program manager manuals must ensure compliance with §§ 91.1415, 121.705, and 135.415. Their manual must provide methods, procedures, and controls that ensure timely and accurate reporting of in-service product or article failures, malfunctions, and defects.

(3) Part 119 CHs with an ETOPS authorization have additional reporting requirements under § 121.374(h) and part 135 appendix G, § G135.2.8(h) when they conduct ETOPS.

b. Reporting Requirements and Criteria (per §§ 91.1415(a), 121.703(a), and 135.415(a)). Sections 91.1415(a), 121.703(a), and 135.415(a) (while not all-encompassing) provide a list of events that require an SDR.

c. Report All Unsafe Conditions (per §§ 91.1415(c), 121.703(c), and 135.415(c)). Parts 121, 135, and "91K with a CAMP" operators shall report any other failure, malfunction, or defect in an aircraft that occurs or is detected at any time if, *in its opinion*, that failure, malfunction, or defect has endangered or *may endanger the safe operation of an aircraft*.

d. Additional Reporting Criteria for Part 121.

(1) Section 121.703(a)(17) requires part 121 air carriers to make a report when emergency evacuation systems (EES) or components (including all exit doors, passenger emergency evacuation lighting systems, or evacuation equipment) fail, malfunction, or are defective during an actual emergency or during training, testing, maintenance, demonstrations, or inadvertent deployment.

(2) Because these systems, components, and parts are the last line of defense in an emergency, the FAA encourages part 135 air carriers and part 91K program managers to report failures, malfunctions, and defects with them, if installed.

e. Parts 121, 135, and "91K With a CAMP" Must Establish Controls That Prevent Duplicate Reporting.

(1) Dual Operations. CHs who operate the same aircraft under dual certificates (part 121/135) or who are a part 121, 135, or 145 CH who is also an authorized part 91K program manager shall only report the occurrence of a failure, malfunction, or defect as it occurs on each aircraft and as required by the regulations under which the aircraft was operating.

(2) Both Manufacturer and Operator (per §§ 91.1415(f), 121.703(f), and 135.415(f)). If a part 91K, 121, or 135 operator is also a Design Approval Holder (DAH) and reports a failure, malfunction, or defect under § 21.3 or under the accident reporting provisions of 49 CFR part 830, the parts 91K, 121, and 135 operational reporting requirements do not apply.

f. Parts 121, 135, and "91K With a CAMP" Report Timeframe.

(1) Parts 121 and 135 (per §§ 121.703(d), and 135.415(d)). Parts 121 and 135 operators shall submit each report required by this section, covering each 24-hour period beginning at 0900 local time of each day and ending at 0900 local time on the next day, to the FAA offices in Oklahoma City, OK, or on the SDRS website at https://sdrs.faa.gov (preferred method).

(a) Each report of occurrences during a 24-hour period shall be submitted to the collection point within the next 96 hours. However, a report due on Saturday or Sunday may be submitted on the following Monday, and a report due on a holiday may be submitted on the next business day.

(b) The agency's position regarding reportable events discovered during maintenance, preventive maintenance, and alteration on parts 121, 125, and 135 aircraft out-of-service for more than 72 hours is the CH (or repair station acting on behalf of the CH) will provide the report within 96 hours of completing the aircraft log or airworthiness release that returns the aircraft to service.¹⁵

(2) Part "91K With a CAMP" (per §§ 91.1415(d)). Program managers must send each report required by this section, in writing, covering each 24-hour period beginning at 0900 hours local time of each day and ending at 0900 hours local time on the next day, to the FS office that issued the program manager's management specifications (MSpecs).

(a) Each report of occurrences during a 24-hour period must be mailed or transmitted to that office within the next 72 hours. However, a report that is due on Saturday or Sunday may be mailed or transmitted on the following Monday, and one that is due on a holiday may be mailed or transmitted on the next business day.

(b) For aircraft operated in areas where mail is not collected, reports may be mailed or transmitted within 72 hours after the aircraft returns to a point where the mail is collected.

(c) Part 91K program managers must ensure reportable events discovered during maintenance, preventive maintenance, and alteration on aircraft out-of-service more than 72 hours are provided within 72 hours (the § 91.1415 requirement) of completing the aircraft log or airworthiness release.

(3) Timeliness (per §§ 91.1415(g) and (h), 121.703(g) and (h), and 135.415(g) and (h)). No person may withhold reporting even though not all the required information may be available. When the CH or program manager receives additional information, including information from the manufacturer or other agency, concerning a report, the CH or program

¹⁵ Refer to Information for Operators (InFO) 12005, Title 14 of the Code of Federal Regulations (14 CFR) Part 121, § 121.703 "Service Difficulty Reports."

manager must expeditiously submit it as a supplement to the first report and reference the date and place of submission of the first report.

g. Transmission Details (per §§ 91.1415(e), 121.703(e), and 135.415(e)).

(1) Report Manner and Form. Transmit reports of a product or article failure, malfunction, or defect in a manner and form acceptable to the FAA. The SDRS automated database available at https://sdrs.faa.gov/ is the Administrator's preferred method of reporting.

(2) Report Content. These reports must include as much of the following information as is available and applicable:

(a) Sections 91.1415(e), 121.703(e), and 135.415(e):

- Type and identification number of the aircraft;
- The name of the operator;
- The date;
- The nature of the failure, malfunction, or defect;
- Identification of the part and system involved, including available information pertaining to type designation of the major component and time since overhaul;
- Apparent cause of the failure, malfunction, or defect (e.g., wear, crack, design deficiency, or personnel error); and
- Other pertinent information necessary for a more complete identification, determination of seriousness, or corrective action.

(b) Additional content required by § 121.703(e):

- Flight number and stage during which the incident occurred (e.g., preflight, takeoff, climb, cruise, descent landing, and inspection);
- The emergency procedure affected (e.g., unscheduled landing and emergency descent);
- Whether the part was repaired, replaced, sent to the manufacturer, or other action taken; and
- Whether the aircraft was grounded.

2. Parts 121 and 135 ETOPS Reporting Requirements and Criteria (per §§ 121.374(h) and G135.2.8(h)).

a. ETOPS SDR Federal Register Background Information.

(1) FR Doc. 72 FR 1808, Extended Operations (ETOPS) of Multi-Engine Airplanes, (January 16, 2007). FR Doc. 72 FR 1808, Paragraph D, Operator Reporting Requirements, explains during the ETOPS Aviation Rulemaking Advisory Committee (ARAC) meeting there was considerable discussion about the maintenance reporting requirements *in* § 121.374(h) and

*those in § 121.703.*¹⁶ Section 121.703 did not contain all the requirements found in longstanding ETOPS policy expressed in AC 120-42, Extended Operations (ETOPS and Polar Operations). The final rule therefore codifies longstanding ETOPS reporting policy within §§ 121.374(h) and G135.2.8(h) without ambiguity. *In particular*, the reporting requirements for "problems with systems critical to ETOPS" and "any other event detrimental to ETOPS" were taken directly from AC 120-42 and the ARAC proposal.

(2) Amendments 70 FR 76974 and 72 FR 26540. To further clarify, amendment 70 FR 76974 amended §§ 121.703(d) and 135.415(d) (*just before the ETOPS rule was published*), changing the service difficulty reporting time from 72 hours to 96 hours, thus reducing the number of supplemental SDRs. To further support the understanding above, amendment 72 FR 26540, Extended Operations (ETOPS) of Multi-Engine Airplanes (May 10, 2007), conformed the reporting hours in §§ 121.374 and G135.2.8(h) to the rule changes in §§ 121.703(d) and 135.415(d).

b. Reporting ETOPS Occurrences. ETOPS requirements in §§ 121.374(h) and G135.2.8(h) codify a set of occurrences which constitute a *hazard to an ETOPS flight* that carry additional SDR reporting requirements. Reporting ETOPS occurrences in SDRS is and always has been the expectation. Due to the inherent risk of ETOPS operations, §§ 121.374(h) and G135.2.8(h) make it clear that ETOPS operators must notify their responsible Flight Standards office in writing when *failure, malfunction, or defect occurs or is detected during an ETOPS flight*. Engaging the responsible FS SA office helps remove ambiguity and allows AVS to react to the ETOPS risk appropriately.

(1) To comply, a part 121 or 135 CH authorized to conduct ETOPS operations must have a Continuing Analysis and Surveillance System (CASS) (or reliability program) supplemented and enhanced for ETOPS that is event-oriented and includes procedures to report the following events:

(a) IFSDs, except planned IFSDs performed for flight training.

(b) Diversions and turnbacks for failures, malfunctions, or defects associated with any airplane or engine system.

(c) Uncommanded power or thrust changes or surges.

(d) Inability to control the engine or obtain desired power or thrust.

(e) Inadvertent fuel loss or unavailability, or uncorrectable fuel imbalance in flight.

(f) Failures, malfunctions, or defects associated with ETOPS significant systems.

(g) Any event that would jeopardize the safe flight and landing of the airplane on an ETOPS flight. $^{\rm 17}$

¹⁶ The arguments would be the same for part 135 operators regarding §§ 135.415 and G135.2.8(h).

¹⁷ SMS decision.

(2) The CH must investigate the cause of each event listed above and submit findings and a description of corrective action to its responsible Flight Standards office. The report must include the information specified in §§ 121.703(e) and 135.415. The corrective action must be acceptable to its responsible Flight Standards office.

3. Part 125 CHs (§ 125.409).

a. What Are the Responsibilities of a Part 125 CH?

(1) Part 125 CHs are required by part 125, § 125.71 to design a manual acceptable to the Administrator that ensures compliance with the regulations.

(2) Part 125 CHs must ensure compliance with § 125.409. Their manual must provide methods, procedures, and controls that ensure timely and accurate reporting of in-service product or article failures, malfunctions, and defects as prescribed by the Administrator. The SDRS automated database available at https://sdrs.faa.gov/ is the Administrator's preferred method of reporting.

b. Reporting Requirement. Each part 125 operator (per § 125.409(b)) shall submit each report, covering each 24-hour period beginning at 0900 local time of each day and ending at 0900 local time on the next day, to the FAA office in Oklahoma City, OK, or online at https://sdrs.faa.gov/. Each report of occurrences during a 24-hour period shall be submitted to the collection point within the next 96 hours. However, a report due on Saturday or Sunday may be submitted on the following Monday, and a report due on a holiday may be submitted on the next business day. The agency's position regarding reportable events discovered during maintenance, preventive maintenance, and alteration on aircraft out-of-service for more than 72 hours is that the CH will provide the report within 96 hours of completing the aircraft log or airworthiness release.

4. Part 145 Repair Station CHs (§ 145.221).

a. What Are the Responsibilities of a Part 145 Repair Station CH?

(1) Part 145 repair station CHs are required by § 145.207 to prepare and follow a Repair Station Manual (RSM) acceptable to the Administrator that ensures compliance with the regulations.

(2) Part 145 repair station CH manuals must ensure compliance with § 145.221. Their manual should provide (as a best practice) methods, procedures, and controls that ensure timely and accurate reports. The part 145 repair station must report to the FAA within 96 hours after it discovers any serious failure, malfunction, and defect of an article.

b. Reporting Requirement. Per § 145.221(a), a certificated repair station (CRS) must report to the FAA within 96 hours after it discovers any serious failure, malfunction, or defect of an article.

(1) A serious failure,¹⁸ malfunction, or defect is any failure, malfunction, or defect in an aircraft or its related parts and articles that occurs or is detected at any time if, in the opinion of the repair station, that failure, malfunction, or defect has endangered or may endanger the safe operation of an aircraft. The requirements in §§ 91.1415, 121.703, and 135.415 list required issues that must be reported for those operations. It includes failures, malfunctions, and defects, as described in this paragraph.

(2) Articles received for maintenance, preventive maintenance, or alteration by repair stations undergo preliminary, in-process, hidden damage, and/or final inspections.

(a) When an unusual or unknown discrepancy is the cause of the article's failure or malfunction, or the failure or malfunction was caused by a design or production defect, it shall be further evaluated to determine if the condition would have required a specifically enumerated DAH or operator report.

I. If such a report would have been required, a § 145.221 report must be generated and reported.

2. However, not all parts that require repair need reported. Report only *serious*¹⁹ failures, malfunctions, or defects.

(b) To avoid overreporting, § 145.221 reporting requirements are intended to ensure that unknown, unanticipated, and serious matters that compromise the aircraft's ability to continue safe flight and/or landing are reported.

(c) Apply the following process to align the repair station requirements with the operational reports to identify serious failures, malfunctions, and defects that endanger the safe flight and landing of an aircraft:

I. A CRS may submit (per § 145.221(d)) an SDR for parts 91K, 121, 125, and 135 operators they are performing work for, who are primarily responsible for mechanical reliability and service difficulty reporting.

2. The repair station must submit the reports to the FAA within 96 hours. Repair stations authorized to report a serious failure, malfunction, or defect for a part 121, 125, or 135 operator must not report (per § 145.221(e)) the same failure, malfunction, or defect under § 145.221(d).

3. The agency's position regarding reportable events discovered during maintenance, preventive maintenance, and alteration on parts 121, 125, and 135 aircraft out-of-service for more than 72 hours is the CH (or repair station acting on behalf of the CH) will provide the report within 96 hours of completing the aircraft log or airworthiness release that returns the aircraft to service.

¹⁸ SMS decision.

¹⁹ SMS decision.

4. The repair station is required (per § 145.221(e)) to send a copy of the report they submit (per § 145.221(d)) to the part 91K, 121, 125, or 135 operator.

c. Duplicate Reporting. The holder of a Repair Station Certificate that is also the holder of a part 121, 125, or 135 certificate, or is a DAH, does not need (per § 145.221(c)) to report a failure, malfunction, or defect if the failure, malfunction, or defect is reported under part 21, 91K, 121, 125, or 135.

d. Transmission Details.

(1) General. The report must be (per § 145.221(a)) in a format acceptable to the FAA. The SDRS automated database available at https://sdrs.faa.gov/ is the Administrator's preferred method of reporting.

(2) Report Content. The report must include (per § 145.221(b)) as much of the following information as is available:

- Aircraft registration number;
- Type, make, and model of the article;
- Date of the discovery of the failure, malfunction, or defect;
- Nature of the failure, malfunction, or defect;
- Time since last overhaul, if applicable;
- Apparent cause of the failure, malfunction, or defect; and
- Other pertinent information that is necessary for a more complete identification, determination of seriousness, or corrective action.

5. Part 91 Operations. The part 91 operators consist of aircraft owners, operators, pilots, maintainers, public aircraft, and part 91K program managers without a CAMP.

a. What is the Responsibility of the Part 91 Operators? The FAA encourages all owners, operators, public aircraft operators of type-certificated products, and maintenance personnel to participate in the reporting of product and article failures, malfunctions, and defects as they experience or identify them.

b. Reporting Requirements and Criteria. While not mandatory, AC 20-109 contains reporting criteria and guidance allowing all aircraft owners, public aircraft operators, operators, part 91K program managers without a CAMP, maintenance personnel, and pilots to participate in the aeronautical industry's efforts to achieve high levels of safety.

c. Reporting. All owners, operators, public aircraft operators of type-certificated products, part 91K program managers without a CAMP, maintenance personnel, and pilots may report as prescribed by the Administrator. The SDRS automated database available at https://sdrs.faa.gov/ is the Administrator's preferred method of reporting.

Chapter 5. SDR Processing Responsibilities and Duties

1. SDRS Process. The AVS SDRS is people, policy, and automation working interdependently to disseminate, collate, and assess reported data and information that focuses risk management actions on reported safety hazards. The success of SDRS is reliant on open and transparent safety data and information sharing between product and article manufacturers, air carriers, operators, repair stations, and the FAA's AVS AIR and FS organizations. The service difficulty reporting process also includes the FAA's ATO, when it notifies FS of an event an operator experiences that FS should inquire about and possibly investigate.

2. Industry Aviation-Service-Provider Service Difficulty Reporting Responsibilities.

a. Manufacturer Reporting. When a holder of a TC (including amended TCs or STCs), a PMA, or a TSOA or the licensee of a TC determines after investigation a failure, malfunction, or defect resulted in or could result in a safety of flight issue, they are responsible to report it. In addition, manufacturers must report to the FAA any product or article it manufactures that has left its quality system and that it determines could result in a safety of flight issue listed in $\S 21.3(c)$.

Note: AC 21-9 directs manufacturers to submit reports required by §§ 21.3 and 21.4, and 14 CFR part 183, § 183.63 per agreements they establish with the appropriate AIR certification branch.

b. CHs and Part 91K Program Managers. When a part 121, 125, 135, or 145 CH or part 91K program manager experiences and/or identifies a failure, malfunction, or defect and determines after investigation it resulted in or could have resulted in a safety of flight issue, they are required to report it (as applicable) per §§ 91.1415, 121.703, 125.409, 135.415, and 145.221.

c. GA Owners, Operators, and Mechanics. Additionally, for persons who operate or maintain aeronautical products and articles in GA, AC 20-109 encourages (not recommends) them to report service difficulties when they determine after investigation it resulted in or could have resulted in a safety of flight issue.

3. AVS's FS Service Difficulty Reporting Oversight Responsibilities.

a. The Aircraft Maintenance Division (AFS-300). AFS-300 is the FS office responsible for SDRS direction, policy, oversight procedures, and guidance material.

b. The Safety Analysis and Promotion Division (AFS-900), Automation Systems Management Branch (AFS-950). AFS-950 is the FAA's centralized office that collects, protects, and distributes SDR data and information. As a means of compliance with the service difficulty reporting requirements, AFS-950 offers the aviation community the SDRS web-based automated database at https://sdrs.faa.gov. The SDRS web-based automated database presents the reported data and information in a manner that is reviewable by manufacturers, operators, maintainers, AIR, and FS.

(1) AFS-950 offers (at these locations) the following SDR collection methods that are prescribed by and acceptable to the Administrator:

(a) SDRS at https://sdrs.faa.gov/. Submitting an SDR is an operational requirement which includes Unmanned Aircraft System (UAS) failures and malfunctions identified in the operational requirements under which the UAS is operating.

(b) Those without internet access or a computer can visit their responsible FAA office, retrieve FAA Form 8010-4 for GA or FAA Form 8070-1 for air carriers, and send it via U.S. mail to:

SDR Program Manager Automation Systems Management Branch (AFS-950) P.O. Box 25082 Oklahoma City, OK 73125

(c) Contact AFS-950 by email at 9-AMC-SDR-ProgMgr@faa.gov or by mail at the above address.

(2) Identify and protect personal identification information and the privacy of voluntary information that these reports may contain.

(3) Participate in FAA SDRS annual cybersecurity assessments.

(4) Contact a product/article manufacturer or in-service provider when AFS-950 receives FAA Form 8070-1, FAA Form 8010-4, or an unstructured email report. Encourage the product/article manufacturer or in-service provider to use SDRS or the UAS SDRS and initiate contact between a responsible Flight Standards office and the product/article manufacturer or in-service provider.

(5) Interface with OMB annually to renew OMB No. 2120-0663.

c. ACSA and GASA Offices. ACSA and GASA oversee certificated *persons*²⁰ that produce, use, and maintain aeronautical products and articles. Within FS ACSA and GASA offices, Airworthiness principal inspectors (PI) review, investigate, assess, and evaluate product and article reliability, performance, maintenance practices, and maintenance program effectiveness.

(1) Order 8900.1, Volume 3, Chapter 32, Section 15 provides guidance Airworthiness ASIs must use to review methods of compliance a person describes within their manual to comply with the service difficulty reporting requirements of §§ 91.1415, 121.703, 125.409, 135.415, and 145.221.

(a) Part 119 CHs, per §§ 121.133, 125.71, and 135.21; part 145 repair stations, per § 145.207; and part 91K program managers, per § 91.1023 are required to design a manual acceptable to the Administrator that ensures compliance with the regulations.

²⁰ As defined in 14 CFR part 1, § 1.1.

(b) While part 135 single-pilot operators may be exempt from producing a manual, they must provide a statement of compliance with the regulations applicable to them.

(2) Order 8900.1, Volume 8, Chapter 5, Section 6, Review, Analyze, and Assess a Service Difficulty Report, directs ACSA and GASA offices to access the SDRS web-based automated database to review SDR submissions from persons they oversee. To receive email notifications when a CH submits an SDR, the PI and/or designee should contact the System Approach for Safety Oversight (SASO) Automation and Program Team at 9-AFS-900-SAFE@faa.gov. SDR reviews are necessary to ensure:

- Data and information entered into the SDRS web-based automated database is usable, accurate, and complete;
- Submissions meet the intent of the requirements under which they are submitted; and
- Stated corrective actions are acceptable to the Administrator and risk mitigation is to an acceptable level.

(a) When reports contain errors or are persistently inaccurate, these indicate problems with the submitter's methods of reporting and is a signal to the PI to review manual design and performance.

(b) When SDR data and information contain information that indicates an unsafe condition exists in a product or article and the condition is likely to exist or develop in other products of the same design, they are encouraged to confer with the Aircraft Evaluation Division (AED) or the responsible Aircraft Certification Service office for clarity and understanding of the issue. They are also encouraged to address the issue with the submitter who should be working closely with the manufacturer in regard to developing corrective actions.

Note: FR Doc. 70 FR 76974 recognized entering SDR data and information directly into a database bypasses ACSA and GASA oversight offices. Therefore, it states "*The PMI would be instructed by internal agency procedures to review the individual SDR for their assigned certificate holder through an internal FAA computer system that would access the SDR database*." Order 8900.1, Volume 8, Chapter 5, Section 6 contains the PMI instructions to review SDR submissions to which 70 FR 76974 refers.

d. FS Aircraft Evaluation Division (AED) Review of SDRs. The AED assists and coordinates with aircraft manufacturers, operators, Aircraft Certification Service offices, and other FS offices with product-specific COS issues. They are available 24/7 to support COS. If consultation is required with the AED and an Aircraft Certification Service office for further technical clarification regarding the content of an Airworthiness Directive (AD) and its Service Bulletins, the AED will act as liaison with the responsible Aircraft Certification Service office. The AED will be the first organization contacted to liaise with the responsible Aircraft Certification Service office. The AED will work and act with the responsible Aircraft Certification Service office to resolve complex compliance issues. If an ASI needs information

or data from the manufacturer, the AED/Aircraft Certification Service office is able to obtain it.²¹ An AED ASI is a technical resource for FS who serves as a liaison with AIR and the responsible Aircraft Certification Service office.

(1) The AED is an FS technical resource that has fully qualified ASIs who are subject matter experts (SME) in their respective fields and serves as a liaison between FS personnel and the responsible Aircraft Certification Service office. The AED consists of personnel specializing in Airworthiness (Maintenance and Avionics), Operations, Cabin Safety, and Human Factors. They are specific fleet SMEs for most aircraft types. The AED fleet contact list is located at https://www.faa.gov/about/office_org/field_offices/aed/aed_fleet_contact_list. The AED branches are as follows:

(a) The Air Carrier Branch (AFS-110) is responsible for 14 CFR part 25 airplanes, such as Boeing and Airbus.

(b) The Corporate Aviation Branch (AFS-120) is responsible for part 25 airplanes, such as Bombardier and Gulfstream.

(c) The General Aviation Branch (AFS-130) is responsible for those airplanes certified under 14 CFR part 23, including commuter category airplanes and Special Federal Aviation Regulation (SFAR) 41 airplanes, some small airplanes certificated under part 25, and gliders and airships.

(d) The Rotorcraft Branch (AFS-140) is responsible for rotorcraft certificated under 14 CFR parts 27 and 29, and vertical lift.

(e) The Propulsion Systems Branch (AFS-150) is responsible for aircraft engines and propellers certificated under 14 CFR parts 33 and 35.

(f) The Standards and Policy Branch (AFS-160) is responsible for the AED policy.

(g) The Emerging Technologies Branch (AFS-170) is responsible for emerging technologies such as UAS, Urban Air Mobility (UAM), Advanced Air Mobility (AAM), etc.

(2) The AED's responsibilities include:

(a) The AED ASIs provide operational and airworthiness support to AIR and FS from initial certification of an aircraft, entry into service, and throughout the aircraft's operational life cycle.

(b) The AED has ASIs familiar with Order 8120.23, which provides guidance for AIR CM. Specifically, Order 8120.23, Chapter 4, Section 3 offers service difficulty investigation guidance concerning the production activities of manufacturers and their suppliers producing products and articles in accordance with 14 CFR. As necessary, the AED can help FS communicate to AIR condition(s) (such as in-service issues) identified within an SDR that show

²¹ For more information, refer to the AED's website at https://www.faa.gov/about/office_org/headquarters_offices/a vs/offices/afx/afs/afs100.

reliability of a product or article is deteriorating or, if possible, a quality system problem exists at the manufacturer affecting the airworthiness or operation of an assigned aircraft/powerplant. The AED monitors:

1. The SDRS database at https://sdrs.faa.gov/;

2. The FS SAS Consolidated Analytics report titled "SDR Workbook," which enables FS ASIs to collate SDRS data and information and evaluate aircraft/powerplant reliability; and

3. The AED internal SharePoint sites (which AFS-150 maintains in addition to the SDRS database) that contain ETOPS event data and information.

(c) Providing expert consultation in support of investigations, analysis, and implementation of corrective actions related to assigned aircraft/powerplant.

(d) Familiarity with DAH safety-related issues within reports to the responsible Aircraft Certification Service offices required by §§ 21.3 and 21.4.

(e) Evaluate aircraft, its systems, and manufacturer-recommended procedures for unique characteristics.

(f) Perform aircraft maintainability evaluations to determine the acceptability of instructions for continued airworthiness (ICA).

(g) Validate maintenance procedures for product manufacturers by ensuring a product meets established standards through sampling and teardown.

e. The Safety Analysis and Promotion Division (AFS-900). The Safety Analysis Program Office (SAPO) is responsible for providing analytic support to FS offices of ACSA, GASA, Safety Standards, and Foundational Business in support of their Risk-Based Decision-Making (RBDM) processes and standardizes analysis techniques, processes, training, and interfaces.

(1) Order 8900.1, Volume 10, Chapter 1, Section 2, Safety Assurance System: Introduction to SAS Business Process and Tools, Subparagraph 10-1-2-5B7), National Safety Analysis (NSA), describes NSA as a national-level function providing analytical support to identify new hazards, ineffective controls, instances of nonconformance with requirements intended to control safety risk, or other safety issues within the extended aviation community. The FS SAPO is the FS office responsible for this function.

(a) A *new hazard* is one where current directives do not adequately control the associated risk, or risk controls do not exist to effectively mitigate risk such as new or emerging technology that did not previously exist in the NAS.

(b) An SDR (or a group of SDRs) can contain data and information that identifies an unsafe condition or emerging safety risk which current ADs do not adequately control (i.e., a new hazard). SDR-identified hazards or emerging safety risk can be systemic or a potentially systemic safety issue that could impact multiple aircraft and/or CH fleets.

(2) When FS SA identifies a new hazard, the PI may add the action "Request National Level Hazard Analysis" during the Certificate Holder Assessment Tool (CHAT); Data Collection; or the Analysis, Assessment, and Action (AAA) process. These processes enable a PI to request national-level support to address a safety issue.

(3) SAPO supports AVS review of SDR data and information by producing and maintaining a SDR Workbook on SAPO's Consolidated Analytics site, accessible from the SAS home page under SAS Resources.

(4) *Upon request*, SAPO can provide analytical support to FS SA Airworthiness PIs, the AED ASIs, and engineers from the responsible Aircraft Certification Service office when necessary to identify new hazards, emerging risk, and negative reliability trends.

(5) To facilitate SDR email notifications for a PI and/or their designee, the individual seeking the notifications may contact the SASO Automation and Program Team at 9-AFS-900-SAFE@faa.gov.

4. AVS's Office of Accident Investigation and Prevention (AVP-100). AVP-100 is the AVS office responsible for directing aircraft accident investigation policy and standards for the FAA. The Executive Director, Office of Accident Investigation and Prevention (AVP-1) directs the FAA's response to notification of an accident, incident, or occurrence through AVP-100. Order 8020.11 establishes FAA procedures and responsibilities for notification, investigation, and reporting a notable aircraft safety event.

a. Order 8020.11 Definitions. AVP defines the following terms in Order 8020.11:

(1) FAA Investigator-in-Charge (IIC). FAA personnel assigned to supervise and coordinate all FAA employees participating in an investigation. In each investigation, the FAA IIC is responsible for the management of all FAA resources and for determining whether the facts of the investigation indicate that any of the nine FAA responsibilities were involved in the event. During an NTSB investigation, the FAA IIC serves as the party coordinator for the FAA. During an international investigation, the FAA IIC typically serves as a technical advisor to the U.S. NTSB investigator who has been assigned as the U.S. Accredited Representative to the foreign investigative authority in accordance with the International Civil Aviation Organization (ICAO) Annex 13 protocol.

(2) Aircraft Accident. An occurrence associated with the operation of an aircraft, which 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.

(3) Event. Something notable that happened in the NAS, which includes accidents, incidents, and occurrences.

(4) Incident. An occurrence other than an accident, associated with the operation of an aircraft, which affects or could affect the safety of operations.

(5) Occurrence. An abnormal event other than an accident or incident.

(6) Serious Injury. Any injury which: (1) requires hospitalization for more than 48 hours, commencing within 7 days from the date an injury was received; (2) results in a fracture of any bone (except simple fractures of fingers, toes, or nose); (3) causes severe hemorrhages, or nerve, muscle, or tendon damage; (4) involves any internal organ; or (5) involves second- or third-degree burns, or any burns affecting more than 5 percent of the body surface.

(7) Significant Event. Any air traffic event in the NAS that may attract regional/national media or political attention, any aircraft proximity with less than 33 percent of the standard, any report of a near midair collision (NMAC) with evasive action, or any major event that requires immediate upward notification to the service area or headquarters level.

(8) Substantial Damage. Damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component.

Note: Substantial damage is not an engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowling, dented skin, small puncture holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips.

b. Event Notification.

(1) FS receives preliminary reports through the ATQA data system or through the CEDAR system. Order 8020.11 directs ATO personnel to document preliminary event data and information in a Mandatory Occurrence Report (MOR) and Electronic Occurrence Report (EOR). This information encompasses factual data necessary to determine the need for an accident/incident/occurrence investigation. The ATO can also provide initial event notification by:

- Manually completing and transmitting FAA Form 8020-9, Aircraft Accident/Incident Preliminary Notice, or
- Manually completing and transmitting FAA Form 8020-11, Incident Report.

(2) Until the FAA identifies an event as an incident, it is an occurrence. Not every event brought to the FAA's attention has an obvious impact on the safety of operations, nor are they readily identifiable as an incident. Until the FAA identifies an event as an incident, it is an occurrence. The advantage of labeling an event as an occurrence is that it allows for analysis of facts and data, followed by an assessment of risk, without generating unnecessary reports and premature safety actions.

c. Event Investigation. Order 8020.11, Chapter 3, FAA Investigation Guidelines, provides guidelines that ensure a thorough investigation. FS will assign an IIC to investigate certain events. Order 8900.1, Volume 7, Chapter 1, Section 2 supplements Order 8020.11 with specific FS SA guidance ASIs need to investigate and report incidents and occurrences.

(1) Active investigation and quality reporting is foundational to the FAA's SMS. As stated previously, leveraging safety management constructs (SA and SRM) enables the FAA to

determine what if any controls are necessary to mitigate risk within the NAS associated with a reported hazard or hazard the FAA identifies through investigation, analysis, and assessment. Possible controls include regulatory changes, ADs, revision of manufacturing design standards, or adjustments to ICAs.

(2) Upon notification, the responsible FS SA office manager will ensure they are the correct office to investigate the event and add the task to the SAS Office Workload List (OWL) or redirect the investigation.

(3) Upon assignment, an FS SA ASI will refer to Order 8020.11 and investigate the preliminary event information following Order 8900.1, Volume 7, Chapter 1, Section 2.

d. Reporting. AVP-100 requires FS SA ASIs to use FAA Form 8020-23, FAA Accident/Incident Report, to document event facts and data they collect during investigation and submit it to AFS-950 within 30 calendar days for data quality review. After review and acceptance, AFS-950 moves the form from ATQA to the FAA Accident and Incident Data System (AIDS).

(1) FAA Form 8020-23 Recording. If an aircraft operational accident or incident is associated with a failure, malfunction, or defect that requires an SDR, ASIs must enter the SDR operator control number into FAA Form 8020-23.

(2) SAS Activity Recording (AR). FS ASIs must record their investigations using the SAS AR code Order 8900.1, Volume 7, Chapter 1, Section 2 requires.

5. AVS's AIR Service Difficulty Reporting Responsibilities. Responsible Aircraft Certification Service offices perform under AIR authority in Title 49 of the United States Code (49 U.S.C.) Subtitle VII.

a. Order 8120.23.

(1) These offices conduct and implement (per Order 8120.23) CM of production activities of manufacturers and their suppliers who are producing products and articles. Order 8120.23 provides guidance and assigns responsibility for the implementation of the AIR CM of production activities of manufacturers and their suppliers producing products and articles in accordance with 14 CFR.

(2) Personnel in these offices must refer to Order 8120.23, Chapter 4, Additional Oversight Responsibilities, and Chapter 5, ACAIS, when investigating service difficulties submitted in accordance with § 21.3 and for storing audit data resulting from Production Approval Holder (PAH) CM activities.

b. Order 8110.107.

(1) Range of the Monitor Safety/Analyze Data (MSAD) Process. The MSAD process analyzes in-service fleet data to determine mitigations and identify mandatory corrective action(s) for COS issues. The MSAD process covers everything from receiving data to

determining mitigation of fleet hazards. It also discusses possible follow-on actions, such as ADs, Special Airworthiness Information Bulletins (SAIB), and others.

(2) MSAD High-Level Overview. The MSAD process provides a data-driven, risk-based approach for SA and SRM that supports aviation products throughout their life cycle. An ASE following the MSAD process will review aviation safety data to identify hazards, and then perform both a risk and causal analysis of the potential hazard that led to the issue. An AD, SAIB, other mitigation, or recommendations may be initiated at several points within the MSAD process. Event data, hazard information, risk analysis, causal analysis, and mitigation data is stored as a record for future use in accordance with FAA Order 1350.14, Records Management.

(3) SDRS is a source, *but not the sole source*, of AIR data and information the AED monitors and analyzes through its MSAD process.



Figure 5-1. Monitor Safety/Analyze Data Process

Note: References in Figure 5-1 refer to Order 8110.107. The numbers in parenthesis refer to the chapter and paragraph where the topic is discussed in more detail. For example, 2.5 indicates Chapter 2, paragraph 5.

c. AIR Certificate Management Sections.

(1) Per Order 8120.23, Chapter 2, Subparagraph 2-3b, Additional CM Responsibilities, AIR Certificate Management Sections have the responsibility to provide oversight of the production activities by manufacturers and their suppliers and to investigate service difficulties that involve quality system problems. Oversight of these offices requires AIR to ensure regulatory compliance, which includes §§ 21.3 and 21.4 as applicable. This oversight will require AIR offices to interface with, use, and review (as applicable) data and information within SDRS.

(2) Order 8120.23 directs the AIR Certificate Management Section oversight over the production activities by manufacturers and their suppliers. Order 8120.23 requires these offices to interface with, use, and review SDRS.

6. ATO, FS, and AIR Interdependence.

a. Air Traffic Investigations. Investigating an air traffic event in accordance with Order 8900.1, Volume 7, Chapter 1, Section 2 may require ASIs to contact ATO quality assurance (QA) and quality control (QC) groups that work together to provide FS occurrence notifications and related traffic data.

b. Identifying Reliability Trends and Unsafe Conditions. When SDRS identifies reliability trends and unsafe conditions in a report, PIs must communicate them to the responsible FAA certification branch and the AIR Certificate Management Section.

c. Consider Initiating an SRM. When SA office personnel identify a potential hazard or ineffective control, the PI may initiate SRM in accordance with Order 8900.1, Volume 17, Safety Management System, or refer the concern to SAPO or the Safety Risk Management Division (AFB-400).

d. Immediate Safety Concerns. Decisions by FS SA Airworthiness PIs may be necessary to address an immediate safety concern; ideally, however, before acting *or shortly thereafter*, the Airworthiness PI should discuss the matter and confirm the appropriateness of any actions they take or intend to take with the AED and/or the responsible FAA certification branch and/or the appropriate AIR Certificate Management Section.

7. SDR Regulatory Safety Objective.

a. Identify Hazards. The public directs the FAA in § 21.3(f) to determine (as the regulator) if action is required to correct a defect in an existing product or article. The FAA must notify a manufacturer when its safety assessments and analysis of reported data and information conclude an unsafe condition exists.

b. Correct Defects and Manage Risk. Section 21.3(f) requires the manufacturer to report to the FAA (when requested) the results of its investigation and any action taken or proposed by the holder of that production approval to correct that defect. If action is required to correct the defect in an existing product or article, the holder of that production approval must send the data necessary for issuing an appropriate AD to the FAA.

c. AVS Safety Actions. When AVS collects reported operational data and information that show a product or article is a hazard to safe flight and landing because it is prone to malfunction or failure or is defective, manufacturers, operators, maintainers, responsible Aircraft Certification Service offices, AIR Certificate Management Sections, the Office of Safety Standards (OSS), CMOs, and FSDOs must work together to determine what corrective action (if any) is necessary.

d. AVS Safety Outputs. AVS safety outputs include:

- Trend monitoring.
- CH maintenance and inspection program adjustments.
- Manufacturer maintenance and inspection program adjustments.
- Safety Alerts (https://www.faa.gov/aircraft/safety/alerts/).
- Safety Programs (https://www.faa.gov/about/initiatives/).
- Safety Reporting (https://www.faa.gov/aircraft/safety/report/).
- Issuance of an AD. When SDR data and information identify an unsafe condition, the AIR Certificate Management Section responsible for the product will draft, coordinate, and issue ADs based on information provided by FS, the responsible Aircraft Certification Service office, or AIR Certificate Management Section staff.





Appendix A. Service Difficulty Reporting Technical Terms and Definitions

1. Airworthiness Approval (§ 21.1). Airworthiness approval means a document issued by the Federal Aviation Administration (FAA) for an aircraft, aircraft engine, propeller, or article, which certifies that the aircraft, aircraft engine, propeller, or article conforms to its approved design and is in a condition for safe operation, unless otherwise specified.

2. Airframe (§ 1.1). Airframe means the fuselage, booms, nacelles, cowlings, fairings, airfoil surfaces (including rotors but excluding propellers and rotating airfoils of engines), and landing gear of an aircraft and their accessories and controls.

3. Article (§ 21.1). Article means a material, part, component, process, or appliance. Per § 145.3(b), article means an aircraft, airframe, aircraft engine, propeller, appliance, or component part. The part 145 definition includes what part 21 defines as products (aircraft, engines, propellers) but excludes "material" and "process," which are included in the part 21 definition of article because they are relevant to manufacturing.

a. Article Manufacturer (§ 21.601(b)(5)). An article manufacturer is the person who controls the design and quality of the article produced (or to be produced, in the case of an application), including any related parts, processes, or services procured from an outside source.

b. Appliance (§ 1.1). Appliance means any instrument, mechanism, equipment, part, apparatus, appurtenance, or accessory, including communications equipment, that is used or intended to be used in operating or controlling an aircraft in flight, is installed in or attached to the aircraft, and is not part of an airframe, engine, or propeller.

c. Commercial Part (§ 21.1). Commercial part means an article that is listed on an FAA-approved Commercial Parts List included in a Design Approval Holder's (DAH) instructions for continued airworthiness (ICA) required by § 21.50.

4. Continued Safe Flight and Landing (§ 23.2000). This phrase (applicable to part 23) is used universally within this guidance. It means an airplane (or aircraft) is capable of continued controlled flight and landing, possibly using emergency procedures, without requiring exceptional pilot skill or strength. Upon landing, some airplane damage may occur as a result of a failure condition.

5. Corrosion Classifications (Advisory Circular (AC) 43-4, Corrosion Control of Aircraft).

a. Corrosion Level 1.

(1) Damage occurring between successive inspections that is within allowable damage limits;

(2) Damage occurring between successive inspections that does not require structural reinforcements, replacement, or new damage tolerance-based inspections;

(3) Corrosion occurring between successive inspections that exceeds allowable limits but can be attributed to an event not typical of operator usage of other aircraft in the same fleet; or

(4) Light corrosion occurring repeatedly between inspections that eventually requires structural reinforcements, replacement, or new damage tolerance-based inspections.

b. Corrosion Level 2.

(1) Corrosion occurring between any of the two successive corrosion inspection tasks that requires a single rework or blend-out which exceeds the allowable limit; or

(2) Corrosion occurring between successive inspections that is widespread and requires a single blend-out approaching the allowable rework limit (i.e., it is not light corrosion as provided for in Corrosion Level 1, definition 3).

c. Corrosion Level 3. Corrosion occurring during the first or subsequent accomplishments of a corrosion inspection task that the operator determines to be an urgent airworthiness concern.

6. Design Approval (§ 21.1). Design approval means a type certificate (TC) (including amended TCs and Supplemental TCs (STC)) or the approved design under a Parts Manufacturer Approval (PMA), Technical Standard Order Authorization (TSOA), letter of Technical Standard Order (TSO) design approval, or other approved design.

7. Design Approval Holder (DAH) (Aircraft Certification Continued Operational Safety web page). A DAH is the holder of a TC, a PMA, or a TSOA, or the licensee of a TC.

Note: References to a TC include STCs unless noted otherwise.

8. During Flight (§§ 91.1415, 121.703, and 135.415). During flight means the period from the moment the aircraft leaves the surface of the earth on takeoff until it touches down on landing.

9. Interface Component (§ 21.1). Interface component means an article that serves as a functional interface between an aircraft and an aircraft engine, an aircraft engine and a propeller, or an aircraft and a propeller. An interface component is designated by the holder of the TC or the STC who controls the approved design data for that article.

10. Manufacturer (based on §§ 21.1, 21.3, and 21.601). A person the FAA authorizes to build aeronautical products and articles is a manufacturer. The person must show to the satisfaction of the Administrator that they control the design, production, and quality of a product or article. Control includes the design and quality of all parts and processes used to build and produce the product or article including services obtained from outside sources. The FAA issues the following authorizations to those who build and produce aeronautical products and articles:

- DAH;
- Production Approval Holder (PAH);
- TC holder (TCH), including amended TCs or STCs;
- PMA;
- TSO; and
- Licensee of a type-certificated product or article.

11. Product (§ 21.1). Product means an aircraft, aircraft engine, or propeller.

a. Aircraft (§ 1.1). Aircraft means a device that is used or intended to be used for flight in the air.

(1) Airplane (§ 1.1). Airplane means an engine-driven fixed-wing aircraft heavier than air that is supported in flight by the dynamic reaction of the air against its wings.

(2) Helicopter (§ 1.1). Helicopter means a rotorcraft that, for its horizontal motion, depends principally on its engine-driven rotors.

(3) Rotorcraft (§ 1.1). Rotorcraft means a heavier-than-air aircraft that depends principally for its support in flight on the lift generated by one or more rotors.

(4) Unmanned Aircraft System (UAS) (per the FAA website at https://www.faa.gov/faq/ what-unmanned-aircraft-system-uas). A UAS is an unmanned aircraft and the equipment necessary for the safe and efficient operation of that aircraft. An unmanned aircraft is a component of a UAS. It is defined by statute as "an aircraft that is operated without the possibility of direct human intervention from within or on the aircraft" (Public Law (PL) 112-95, Section 331(8), Unmanned Aircraft). An Unmanned Aerial Vehicle (UAV) is the aircraft component of a UAS. A UAV refers only to the aircraft itself and none of the other accessories and equipment that make it work.

b. Aircraft Engine (§ 1.1). Aircraft engine means an engine that is used or intended to be used for propelling aircraft. It includes turbosuperchargers, appurtenances, and accessories necessary for its functioning, but does not include propellers.

c. Propeller (§ 1.1). Propeller means a device for propelling an aircraft that has blades on an engine-driven shaft and that, when rotated, produces by its action on the air, a thrust approximately perpendicular to its plane of rotation. It includes control components normally supplied by its manufacturer but does not include main and auxiliary rotors or rotating airfoils of engines.

12. Production Approval (§ 21.1). Production approval means a document issued by the FAA to a person that allows the production of a product or article in accordance with its approved design and approved quality system, and can take the form of a production certificate, a PMA, or a TSOA.

13. State of Design (§ 21.1). State of Design means the country or jurisdiction having regulatory authority over the organization responsible for the design and continued airworthiness of a civil aeronautical product or article.

14. State of Manufacture (§ 21.1). State of Manufacture means the country or jurisdiction having regulatory authority over the organization responsible for the production and airworthiness of a civil aeronautical product or article.

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15. Supplier (§ 21.1). Supplier means a person at any tier in the supply chain who provides a product, article, or service that is used or consumed in the design or manufacture of, or installed on, a product or article.

Appendix B. AVS Safety Management Terms and Definitions

1. Accident (Order 8000.369). An unplanned event or series of events that results in death, injury, or damage to, or loss of, equipment or property.

a. Aircraft Accident (Order 8000.369). 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.

b. Unmanned Aircraft Accident (Order 8000.369). An occurrence associated with the operation of any public or civil Unmanned Aircraft System (UAS) that takes place between the time that the system is activated with the purpose of flight and the time that the system is deactivated at the conclusion of its mission, in which:

(1) Any person suffers death or serious injury, or

(2) The aircraft has a maximum gross takeoff weight of 300 pounds or greater and sustains substantial damage.

2. Aerospace System (Order 8000.369). U.S. airspace, all manned and unmanned vehicles operating in that airspace, all U.S. aviation operators, airports, airfields, air navigation services, pilots, regulations, policies, procedures, facilities, equipment, and all aviation-related industry.

3. Analysis (Order 8040.4). The process of identifying a question or issue to be addressed, examining the issue, investigating the results, interpreting the results, and possibly making a recommendation. Analysis typically involves using scientific or mathematical methods for evaluation. Regarding service difficulty reporting, examining an event, investigating its cause, and interpreting the results is how a manufacturer "*determines*," an operator forms "*its opinion*," and a repair station judges if a failure, malfunction, or defect in an article is "serious."

a. Determine (New Oxford American Dictionary #2). Ascertain or establish exactly, typically the result of research and calculation. The word "determine" is a verb associated with a subject. Regarding service difficulty reporting and § 21.3, the subject is the effect a product or article failure, malfunction, or defect has on the safety of a flight.

b. Opinion (New Oxford American Dictionary #2). The beliefs or views of a group of people. Regarding service difficulty reporting and §§ 91.1415, 121.703, and 135.415, an operator's Continuing Analysis and Surveillance System (CASS) and/or its Safety Management System (SMS) has the responsibility to identify and report any failure, malfunction, or defect that it concludes endangered or may endanger the safe operation of an aircraft.

c. Serious (New Oxford American Dictionary #3). Significant or worrying because of possible danger or risk; not slight or negligible. Regarding service difficulty reporting and § 145.221, a repair station has the responsibility to report any failure, malfunction, or defect in an article that its SMS concludes (if left unattended) will likely compromise the continued safe flight and landing of an aircraft.

4. Assessment (Order 8040.4). Process of measuring or judging the value or level of something.

5. Common Cause Failure (Order 8040.4). A failure that occurs when a single fault results in the corresponding failure of multiple system components or functions.

6. Corrective Action (Order 8000.369). Any action to mitigate a safety issue. Corrective actions by the FAA include mandatory actions like Airworthiness Directives (AD) and rule changes, to correct an unsafe condition. Includes nonmandatory actions and recommendations like Special Airworthiness Information Bulletins (SAIB) and Aviation Alerts. Includes actions that either directly corrects the safety problem and/or mitigates risk with operational limitations or restrictions, like grounding a product from further flight.

7. Risk (Order 8110.107). Expression of the severity and probability of an undesired event.

a. Corrected Risk (Order 8110.107). Residual risk that remains after corrective action is taken. When highly effective corrective action is taken, residual risk is considered to be zero.

b. Uncorrected Risk (Order 8110.107). Risk that accumulates over time in the affected fleet if no corrective action is taken for a certain safety issue.

8. Effect (Order 8040.4). The real outcome that has occurred or the credible predicted outcome expected if the hazard exists in the defined system state.

9. Event (Order 8110.107). Any individual occurrence involving an aircraft or its components. Described in terms of what is observed (the symptoms) or recorded during the occurrence. Events typically trigger investigations that seek causes of a safety issue. The safety issue (or condition) is then evaluated for safety implications.

10. Evaluation (Order 8000.369). Denotes the process whereby data is assembled, analyzed, and compared to expected performance to aid in making systematic decisions.

11. Fleet (Order 8110.107). Aircraft, engine, or propeller products of a type currently in service affected by a certain safety issue.

12. Hazard (§ 5.5). A condition that could foreseeably cause or contribute to an aircraft accident as defined in Title 49 of the Code of Federal Regulations (49 CFR) part 830, § 830.2.

a. New Hazard (Order 8900.1, Volume 10, Chapter 7, Section 2). A new hazard is one where the associated risk is not controlled adequately by current directives or safety risk controls do not exist to effectively mitigate risk. The hazard may be associated with a systemic or a potentially systemic system safety issue that may apply to multiple certificate holders (CH).

b. Failure. The product not functioning on the product (i.e., aircraft, aircraft engine, or propeller) as designed.

- c. Malfunction. Failure to function as designed.
- d. Defect. A shortcoming, imperfection, or lack.

13. Incident (Order 8000.369). An occurrence other than an accident that affects or could affect the safety of operations.

14. Product/Service Provider (Order 8000.369). An organization engaged in the delivery of aviation products or services. Order 8900.1, Volume 8, Chapter 5, Section 6, Review, Analyze, and Assess a Service Difficulty Report, uses the term "*product/article manufacturer or in-service provider*" to identify persons who are engaged in the delivery and in-service use of products and articles required to be identified per 14 CFR part 45.

15. Safety (Order 8000.369). The state in which the risk of harm to persons or property damage is acceptable.

16. Safety Issue (Order 8110.107). Cause(s), contributing factor(s), or finding(s) that led to, or could lead to, an unsafe outcome. The FAA renders safety decisions on issues/causes, not events. For example, investigation of an uncommand flight control surface movement (an event) might reveal that the cause was a circuit failure in the autopilot's computer. Circuit failure is the safety issue/cause to evaluate for safety implications, and to take corrective action against.

17. Safety Management System (SMS) (§ 5.5). The formal, top-down, organization-wide approach to managing safety risk and assuring the effectiveness of safety risk controls. It includes systematic procedures, practices, and policies for the management of safety risk.

a. Safety Assurance (SA) (§ 5.5). Processes within the SMS that function systematically to ensure the performance and effectiveness of safety risk controls and that the organization meets or exceeds its safety objectives through the collection, analysis, and assessment of information.

b. Safety Culture (Order 8000.369). The shared values, actions, and behaviors that demonstrate a commitment to safety over competing goals and demands.

c. Safety Performance Target (Order 8040.4). A measurable goal used to verify the predicted residual safety risk of a hazard's effect.

d. Safety Risk Management (SRM) (§ 5.5). A process within the SMS composed of describing the system; identifying the hazards; and analyzing, assessing, and controlling safety risk.

e. Safety Risk or Risk (§ 5.5). The composite of predicted severity and likelihood of the *potential effect of a hazard*.

(1) Likelihood (Order 8000.369). The estimated probability or frequency, in quantitative or qualitative terms, of a hazard's effect or outcome.

(2) Severity (Order 8000.369). The consequence or impact of a *hazard's effect or outcome* in terms of degree of loss or harm.

f. Types of Safety Risk. (These are Order 8040.4 types of safety risk.)

(1) Initial Risk. The predicted severity and likelihood of a hazard's effects or outcomes when it is first identified and assessed; includes the effects of preexisting safety risk controls in the current environment.

(2) Residual Risk. The remaining predicted severity and likelihood that exists after implementation of all selected safety risk control techniques.

g. Safety Risk Levels. (These are Order 8040.4-defined risk levels.)

(1) High Risk. Severity and likelihood map to the red cells in the risk matrix. This safety risk requires mitigation, tracking, and monitoring, and only the highest level of management within lines of business (LOB) and Staff Offices can accept it.

(2) Medium Risk. Severity and likelihood map to the yellow cells in the risk matrix. This safety risk is acceptable without additional mitigation. Medium risk requires the FAA to track and monitor it.

(3) Low Risk. Severity and likelihood map to the green cells in the risk matrix. Low safety risk is acceptable without restriction or limitation and hazards do not require management, but the FAA must document and report its safety risk assessment that led to this conclusion.

h. Safety Risk Acceptance (Order 8040.4). The decision by the appropriate management official to authorize the operation without additional safety risk mitigation.

i. Safety Risk Analysis or Risk Analysis (Order 8040.4). The first three steps of the Safety Risk Management (SRM) process (analyze the system, identify hazards, and analyze safety risk) whereby hazards are characterized objectively for their severity and probability. The process can be either qualitative or quantitative.

j. Safety Risk Control or Control (§ 5.5). A means to reduce or eliminate the effects of hazards. The terms "Control," "Mitigation," and "Safety Risk Control" are used synonymously.

k. Preliminary Risk Assessment (Order 8040.4). An initial assessment of the risk posed by a safety issue, often performed with limited data or qualitative information. This assessment is meant to quickly determine an issue's potential risk and urgency and is followed by comprehensive and quantitative analysis as data and circumstances permit unless the issue is deemed to entail very little risk.

18. Safety Objective (§ 5.5). A measurable goal or desirable outcome related to safety.

19. Safety Performance (§ 5.5). Realized or actual safety accomplishment relative to the organization's safety objectives.

20. Single Point Failure (Order 8040.4). An element of a system or operation for which no backup (i.e., redundancy) exists. Single-pilot operations are an exception.

21. System (Order 8040.4). An integrated set of constituent elements combined in an operational or support environment to accomplish a defined objective. These elements include people, hardware, software, firmware, information, procedures, facilities, services, and other support facets.

Directive Feedback Information

Please submit any written comments or recommendations for improving this directive or suggest new items or subjects to be added to it. Also, if you find an error, please tell us about it.

Subject: Order 8010.2A, Aviation Safety (AVS) Service Difficulty Reporting System

To: Directive Management Officer, AFB-120 Directives Mailbox (9-AWA-AFB-120-Directives@faa.gov)

(Please mark all appropriate line items)

An error (procedural or typographical) has been noted in paragraph _____ on page ______.

Recommend paragraph ______ on page ______ be changed as follows: *(attached separate sheet if necessary)*

In a future change to this order, please include coverage on the following subject: *(briefly describe what you want added)*

Other comments:

I would like to discuss the above. Please contact me.

Submitted by:	Date:
Telephone Number:	Routing Symbol: