U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject: Incorporation of Fuel Tank System Instructions for Continued Airworthiness into Operator Maintenance or Inspection Programs

Date: 5/25/12 **AC No:** 120-97A
Initiated by: AFS-300 **Change:**

On May 7, 2001, the Transport Airplane Fuel Tank System Design Review, Flammability Reduction and Maintenance and Inspection Requirements final rule was published in the Federal Register (FR). It has since been referred to as the 2001 Fuel Tank Safety (FTS) rule. It adopted amendments to part 25, Special Federal Aviation Regulation (SFAR) 88 and operating requirements related to SFAR 88. The operating requirements included requirements to implement instructions for continued airworthiness (ICA) that design approval holders (DAH) developed in compliance with SFAR 88. On November 8, 2007, the Federal Aviation Administration (FAA) published the Enhanced Airworthiness Program for Airplane Systems (EAPAS)/FTS final rule. The purpose of the rule is to help ensure the continued safety of transport category airplanes by improving the design, installation, and maintenance of electrical wiring systems. The EAPAS/FTS rule amended the operating requirements to implement FTS actions developed in accordance with SFAR 88. Integrating the incorporation of the fuel tank system and electrical wiring interconnection system (EWIS) requirements helps to ensure compatibility and to eliminate duplication. Additionally, the EAPAS/FTS rule redesignates (replaces) Title 14 of the Code of Federal Regulations (14 CFR) part 91, § 91.410(b); part 121, § 121.370(b); part 125, § 125.248(b); and part 129, § 129.32(b) of the FTS rule. The new sections are §§ 91.1507, 121.1113, 125.507 and 129.113. These new rules also clarify language with reference to the approval process of the operator's program. This advisory circular (AC) only addresses the fuel tank system safety requirements and describes acceptable means of compliance (AMC) accordingly. The current edition of AC 120-102, Incorporation of Electrical Wiring Interconnection Systems Instructions for Continued Airworthiness into an Operator's Maintenance Program, addresses EWIS requirements in the EAPAS/FTS rule.

ORIGINAL SIGNED by
/s/ John S. Duncan for

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CHAPTER 1. GENERAL

1-1. PURPOSE. This advisory circular (AC) provides information regarding compliance with the fuel tank system maintenance and inspection program requirements in Title 14 of the Code of Federal Regulations (14 CFR) for part 91 and part 125 operators, and part 121 and part 129 air carriers hereafter referred to as operators. Instructions for continued airworthiness (ICA) (refer to Appendix 3, Definitions) include fuel tank system inspection tasks, intervals, methods, instructions/procedures, airworthiness limitations, and fuel tank system critical design configuration control limitations (CDCCL), which are a specific type of airworthiness limitation.

1-2. APPLICABILITY. This AC applies to operators of transport-category turbine-powered airplanes with a type certificate (TC) issued after January 1, 1958, that, as a result of original type certification or later increase in capacity, have a maximum TC'd passenger capacity of 30 or more, or a maximum payload capacity of 7,500 pounds or more. In addition, this AC applies to operators of transport-category airplanes of any size that include 14 CFR part 25, § 25.981, amendment 25-102 or later, in the original certification basis of the airplane or in the certification basis of modifications to the airplane.

a. Avoiding Compliance. In the past, some designers and operators avoided applying requirements for airplanes over a specific capacity by getting a design change approval for a slightly lower capacity. Referencing the capacity resulting from original certification removes this means of avoiding compliance. Also, an airplane design could be originally certified with a capacity slightly lower than the minimum specified in the rule, but through later design changes, the capacity could be increased above this minimum. The reference to later increase in capacity in the rule ensures that, if this occurs, the airplane would have to meet the requirements of the rule.

b. FAA Oversight Office. The Aircraft Certification Office (ACO) or the office of the Transport Airplane Directorate has oversight responsibility for the relevant TC or Supplemental Type Certificate (STC), as determined by the Administrator. (Refer to Appendix 4, FAA Oversight Offices by Airplane Manufacturer.)

c. Required ICA. Operators are required to incorporate ICA into their maintenance or inspection program that are required by Special Federal Aviation Regulations (SFAR) 88 or § 25.1529 and part 25 Appendix H, and that have been approved by the FAA Oversight Office. Operators are not required to use the design approval holder's (DAH) fuel tank ICA. While we think it is likely that operators will use the DAH ICA, we acknowledge that they are able develop their own or to contract with third parties to develop them. Operator-developed ICA must be approved by the FAA Oversight Office.

1-3. BACKGROUND. Since 1959, there have been 18 fuel tank explosions on transport category airplanes. Most notably, on July 17, 1996, a 25-year old Boeing 747-100 series airplane, operating as Trans World Airlines (TWA) Flight 800, was involved in an in-flight breakup after takeoff from John F. Kennedy International Airport in New York, resulting in 230 fatalities. The National Transportation Safety Board (NTSB) determined the probable cause of the TWA 800 accident was an explosion of the center wing fuel tank (CWT) due to ignition of the flammable fuel vapor and air mixture in the tank. The source of ignition energy for the

explosion could not be determined conclusively, though the NTSB determined that it was most likely a combination of failures involving the fuel quantity indicator system (FQIS). FQIS wires are designed to carry "intrinsically safe" levels of electrical energy inside fuel tanks. Without an additional failure, a short of FQIS wires inside a tank would not have sufficient energy to create an ignition source. The NTSB determined the most likely ignition source was an existing FQIS failure inside the CWT and a FQIS wiring failure outside the CWT. The internal failure created the condition for an ignition source if high electrical energy was applied to the FQIS wiring inside the CWT. The external failure applied excessive electrical energy on the FQIS wires that enter the CWT. This accident, in particular, prompted the FAA to examine the underlying safety issues surrounding fuel tank explosions, the adequacy of existing regulations, the service history of airplanes certificated to these regulations, and existing fuel tank system maintenance practices.

1-4. ACs (current editions). The ACs listed below provide information that may support the method of compliance established by this AC. An electronic copy of the following ACs can be downloaded from the Internet at http://fsims.faa.gov/. The Regulatory and Guidance Library (RGL) is a set of searchable databases that contain regulatory, guidance, and aviation product information. The RGL contains certain CFRs and SFARs from 14 CFR in their current version as well as historical versions. A paper copy may be ordered from the U.S. Department of Transportation (DOT), Subsequent Distribution Office, M30, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785.

- AC 25-8, Auxiliary Fuel System Installations.
- AC 25-19, Certification Maintenance Requirements.
- AC 25.981-1, Fuel Tank Ignition Source Prevention Guidelines.
- AC 25.981-2, Fuel Tank Flammability Reduction Means.
- AC 120-16, Air Carrier Maintenance Programs.
- AC 120-102, Incorporation of Electrical Wiring Interconnection Systems Instructions for Continued Airworthiness into an Operators Maintenance Program.
- AC 121-22, Maintenance Review Board Report Maintenance Type Board, and OEM/TCH Inspection Program Procedures.

1-5. RELATED CFRs. The following 14 CFR parts and sections apply:

- Part 21, Special Federal Aviation Regulation No. 88—Fuel Tank System Fault Tolerance Evaluation Requirements.
- Section 25.981, Fuel Tank Ignition Prevention.
- Section 25.1529, Instructions for Continued Airworthiness.
- Part 25, Appendix H, Instructions for Continued Airworthiness.
- Part 26, Continued Airworthiness and Safety Improvements for Transport Category Airplanes.
- Section 43.13, Performance Rules (general).
- Section 43.16, Airworthiness Limitations.
- Part 91, Subpart E, Maintenance, Preventive Maintenance, and Alterations, § 91.403 (c) Airworthiness Limitations.
- Part 91, Subpart L, Continued Airworthiness and Safety Improvements, § 91.1507, Fuel Tank System Inspection Program.

- Part 121, Subpart AA, Continued Airworthiness and Safety Improvements, § 121.1113, Fuel Tank System Maintenance Program,
- Part 125, Subpart M, Continued Airworthiness and Safety Improvements, § 125.507, Fuel Tank System Inspection Program,
- Part 129, Subpart B, Continued Airworthiness and Safety Improvements, § 129.113, Fuel tank system maintenance program.

1-6. FAA FUEL TANK SYSTEM POLICY STATEMENT. The FAA's Transport Airplane Directorate, in coordination with Flight Standards Service (AFS), other National Aviation Authorities (NAA), and various industry representatives, developed FAA policy memorandum ANM112-05-001, Policy Statement on Process for Developing SFAR 88-related Instructions for Maintenance and Inspection of Fuel Tank Systems, dated October 6, 2004. This policy statement provided standardized guidance to the DAH for developing maintenance instructions as a method of compliance with SFAR 88.

a. Processes for Developing ICA. The policy identified two categories of potential ignition source related ICA and provided two processes for developing those ICA:

(1) A safety critical action that is needed to address unsafe conditions is an airworthiness limitation item (ALI). ALIs are maintenance and inspection instructions that must be performed at the listed intervals and are adopted using the Airworthiness Directive (AD) process. That process, used for SFAR 88, is described in part 5 of the policy statement.

(2) The remaining actions (that do not address unsafe conditions but are necessary to maintain the continued airworthiness of the ignition source prevention features of the design) were to be evaluated using a process based on the principles of Maintenance Steering Group-3rd Task Force (MSG-3). That process is described in part 6 of the policy statement.

b. Categories of SFAR 88 ICA. These two categories of SFAR 88 ICA have been referred to as "Unsafe Condition" and "No Unsafe Condition" related ICA. The "Unsafe Condition" ICA are incorporated in the applicable airplane Airworthiness Limitations Section (ALS) mandated by AD. The "No Unsafe Condition" ICA are identified in the DAH maintenance documents under Air Transport Association of America (ATA) *i* Spec 2200, ATA 28 for the airplane.

c. Design Review. The policy could also be useful to an operator in performing a design review of any field-approved auxiliary fuel tank installations (refer to paragraph 2-4).

d. Paper Copy. A paper copy of the policy letter may be ordered from the FAA, Transport Airplane Directorate, Transport Standards Staff, Standardization Branch, ANM-113, 1601 Lind Avenue SW., Renton, WA 980057-3356. An electronic copy can be downloaded from the Internet at http://www.fsims.faa.gov or http://rgl.faa.gov/.

1-7. INDUSTRY REFERENCE. The ATA MSG-3, Operator/Manufacturer Scheduled Maintenance Program Development, and later revisions.

1-8. THE EAPAS/FTS RULE. The EAPAS/ FTS rule (72 Federal Register (FR) 63364 effective December 10, 2007) includes revisions to the operational requirements that were originally adopted by the 2001 FTS rule (66 FR 23085, effective June 6, 2001). This AC describes a method of compliance with these revised FTS operational requirements.

a. 2001 FTS Rule. On June 6, 2001, the Transport Airplane Fuel Tank System Design Review, Flammability Reduction and Maintenance and Inspection Requirements rule became effective. It is referred to as the 2001 FTS rule. It amended part 21 and created Special Federal Aviation Regulation (SFAR) 88. SFAR 88 required DAH to conduct a safety review of the applicable airplanes identified in the rule to determine that their design meets the FTS ignition requirements described in §§ 25.901 and 25.981(a) and (d). If their design was determined to not meet those requirements, they were required to develop design changes for those non-compliant designs that were determined to meet the unsafe condition criteria using FAA policy memorandum 2003-112-15, SFAR 88 — Mandatory Action Decision Criteria. The FAA is issuing ADs mandating those design changes.

b. Design Changes. Operators must comply with the DAH, and FAA Oversight Office-approved design changes in accordance with the respective ADs. In some instances, an interim repetitive maintenance or inspection task is required on specific airplanes allowing the operator additional time to accomplish the design change.

c. Compliance Dates. These fuel tank system design change ADs, and any associated repetitive maintenance and inspection tasks, have varying compliance dates. The operator must track these dates using its currently established AD tracking system.

d. ICA for Preventing an Ignition Source. SFAR 88 also requires the DAH to develop specific ICA needed to maintain design features that prevent the existence or development of an ignition source within the fuel tank, which could be accomplished using policy memorandum ANM112-05-001. The operator must incorporate FAA Oversight Office-approved ICA into their maintenance or inspection program by the dates specified in the operational rule or AD. The actions specified in the ICA must be accomplished in accordance with the times specified in the ICA.

CHAPTER 2. FUEL TANK SYSTEM REQUIREMENTS

2-1. REQUIREMENTS.

a. Fuel Tank System Program Requirements. This AC provides information to support operators' compliance with the fuel tank system maintenance and inspection program requirements contained in the EAPAS/FTS rule. The operational rules contained in § 91.1507, § 121.1113, § 125.507; and § 129.113 require operators to incorporate FAA Oversight Office-approved ICA into their maintenance or inspection program.

b. Types of ICA. In accordance with policy memorandum ANM112-05-001, DAH identified two categories of maintenance and inspection instructions. For the purposes of this guidance, we have simplified the descriptions of these types of ICA and have provided two classifications: "unsafe condition" and "no unsafe condition" as defined below:

(1) Unsafe Condition. Those that are directly related to an unsafe condition and require mandatory action.

(2) No Unsafe Condition. Those that do not have a direct adverse affect on operational safety, but for which developing maintenance inspections, certain standard practices, or procedural warnings can reduce the potential for an ignition source.

NOTE: Refer to paragraph 1-6 for reference to ANM112-05-001.

2-2. UNSAFE CONDITION. The DAH are required to develop design changes and ICA to address features of the fuel tank system design that are determined to meet the SFAR-88 unsafe condition criteria, and mandated by AD. These AD-mandated actions could include design changes, operational procedures, or ALIs containing repetitive maintenance and inspection instructions, or all three. FTS airworthiness limitations include CDCCL, inspections, or other procedures that are necessary to prevent development of ignition sources within the fuel tank system. CDCCLs are a type of fuel tank system airworthiness limitation introduced by § 25.981(d) (refer to paragraph 3-4 for a detailed description of CDCCLs).

2-3. NO UNSAFE CONDITION. The DAH were also required to develop ICA for all Safety-related Failure Effect Category (FEC) 5 and 8 tasks developed from analysis of Maintenance Significant Items (MSI) that include those fuel tank system design features. These tasks address those features of the fuel tank system design that are determined to be a no unsafe condition but are necessary to maintain the continued airworthiness of the ignition source prevention features of the fuel tank system. The DAH, through the Maintenance Review Board (MRB) process, subjects these MSIs to maintenance program development logic using the latest version of MSG-3. Inspection tasks, intervals, and task instructions/procedures are developed as a result of this process. They are FAA Oversight Office-approved. They will normally be found in the TC holder's Maintenance Review Board Report (MRBR) or a source document required by part 25 appendix H, § H25.5(b). The current edition of AC 120-102, Incorporation of Electrical Wiring Interconnection Systems Instructions for Continued Airworthiness into an Operator's Maintenance Program, provides information on the "source document." The STC ICA will be contained in the FAA-approved STC document.

NOTE: For administrative purposes, some DAH have put both the "no unsafe condition" and the "unsafe condition" category ICA in their ALS mandated by an AD. An operator's AD tracking system must ensure it does not make a distinction between categories such that one is tracked differently from the other. Both are mandated by an AD and require the same level of visibility and attention. Changes to either category must be approved by the FAA Oversight Office as an alternative method of compliance (AMOC) to the AD.

a. Operators without MSG-3 Programs. The FAA recognizes that some operators may not have MSG-3 maintenance programs. Those operators must still incorporate the FAA-approved fuel tank system ICA into their maintenance or inspection program.

b. Inspection Tasks, Intervals, and Task Instructions/Procedures. The inspection tasks, intervals, and task instructions/procedures are selected to ensure that fuel tank system protective features are properly maintained while still allowing flexibility for the operators to schedule maintenance tasks within their maintenance or inspection programs. The DAH will make these inspection tasks, intervals, and task instructions/procedures available to the operators for incorporation into their maintenance or inspection programs in the following manner.

c. FTS ICA or FTS/EWIS ICA. The fuel tank systems ICA are identified as FTS ICA, or if the FTS ICA is also part of a EWIS ICA it may be identified as FTS/EWIS ICA. Both are FAA Oversight Office-approved. AC 120-102 provides additional information on the FTS/EWIS ICA. The DAH will sometimes identify a separate cross-referencing document where these fuel tank systems ICA are located. While the FAA expects that the DAH fuel tank system ICA tasks will be located in ATA, Chapter 28, Fuel Systems, some may also be located in other ATA chapters such as Chapter 20, Standard Practices.

NOTE: The procedures to carry out the inspections such as access, equipment removal, etc., should be contained in the DAH Aircraft Maintenance Manual (AMM) as well as be included in their applicable job/task cards.

d. FTS ICA. In accordance with the operational rules, operators must include fuel tank system ICA in their maintenance or inspection program. Operators should have a tracking system within their maintenance or inspection program so that they do not lose their identity as an FTS ICA. Operator changes to FTS ICA must be in accordance with the guidance contained in this AC. The operator should submit the data that supports any changes to approved ICA through the principal inspector (PI), who may add comments and then forward them to the FAA Oversight Office for approval.

e. Specific Instructions. The DAH no unsafe condition ICA will typically be in the form of inspection tasks and intervals and task instructions/procedures. They may also be specific instructions that are referenced in a task but are contained in other manuals such as the AMM, the airplane standard wiring practice manual (SWPM), or in the STC holder's manual that contains the ICA for the STC. These DAH ICA are approved by the FAA Oversight Office.

The operator should submit its FTS ICA to their PI who will approve implementation using operations specification (OpSpec) D097.

2-4. FIELD-APPROVED AUXILIARY FUEL TANKS. Per paragraph (b) of the operational rules (refer to § 91.1507, § 121.1113, § 125.507; and § 129.113) if an operator has any of these tanks installed in their airplanes and chooses to continue operation with them installed, the operator must perform a design review and develop ICA in accordance with the design review requirements detailed in SFAR 88. The operator, being the DAH for these tanks, is in the best position to develop ICA for them. The operator should submit proposed field-approved auxiliary tank data through their PI to the FAA Oversight Office responsible for approving their airplane type. After FAA Oversight Office approval, the operator must submit the approved ICA to the PI for review and approval. The PI for parts 121, 125, and 129 operators will approve the operator's fuel tank program on OpSpec D097. In the event the operator chooses to deactivate or remove a field-approved auxiliary tank, such action can only be accomplished using approved data.

2-5. STC AUXILIARY FUEL TANKS. According to the operational rules, if an operator has STC auxiliary fuel tanks installed in their airplanes, they must incorporate ICA meeting SFAR 88, if any, into their maintenance or inspection program. This "if any" provision means that if a DAH fails to develop ICA, the operator of an airplane with an affected tank is not required to incorporate ICA for them. Under these circumstances, if the FAA determines any particular STC auxiliary tank installations pose a safety risk, the FAA will issue ADs mandating such tanks be deactivated or removed in accordance with data submitted by the operators and approved in accordance with the AD. The related ADs will offer operators the opportunity to do their own design review and present ICA to the FAA Oversight Office for approval.

2-6. APPLICABLE FTS STCs. In order for an operator to incorporate all the applicable STC ICA they must first establish what STCs are installed on their airplanes. An FAA engineering-approved list of applicable STCs is provided in Appendix 2 List of Applicable Supplemental Type Certificates. The operators should review this list and determine if any of the applicable STCs are installed on their airplanes. Under normal circumstances a records review by the operators should be sufficient to determine which of their airplanes has any of the applicable STCs. If records are inadequate, it may be necessary to physically inspect airplanes to confirm applicable STC installation; however, this should not entail physically checking the routing of wiring, etc. The operator should provide the PI a list of airplanes that have any of the applicable STCs installed and present their proposed STC ICA for review and approval. (Refer to paragraphs 3-10 through 3-14 for the review and approval process.)

2-7. HISTORY OF FUEL TANK SYSTEM MAINTENANCE PRACTICES. Most fuel tank system maintenance involves zonal inspections to determine the condition of units or systems with regard to continued serviceability. Corrective action is taken only when indicated by the condition of a particular unit or system. The most common type of zonal inspection for certain components of fuel tank systems is a general visual inspection (e.g., an examination of an interior or exterior area, installation, or assembly to detect obvious damage, failure or irregularity). Typically, operators conducted these general visual inspections as part of other zonal inspections of the fuel tanks. A limitation of a general visual inspection of the fuel tank system is that often the inspection does not provide sufficient information to determine continued airworthiness of internal or hidden system components. This is because certain degraded

conditions or failures are difficult, or even impossible, to detect without extensive and detailed inspection or functional checks. Examples of such degraded conditions or failures are worn wiring routed through conduit to fuel pumps, accumulated debris inside fuel pumps, corrosion of bonding wire interfaces, and broken or missing bonding straps. As a result of the FTS review, certain general visual inspections of the fuel tank system under the zonal inspection concept may become detailed inspections, and may include specific pass/fail criteria.

CHAPTER 3. DESIGN MAINTENANCE AND INSPECTION

3-1. AIRPLANE FUEL TANK SYSTEM. The airplane's fuel tank system is defined by the airplane's TC, amended type design changes, and any STC and field-approved auxiliary fuel tank systems. The fuel tank system includes components necessary for the fuel tank system to perform its intended function (e.g., pumps, fuel pump power supplies, fuel valves, fuel quantity indication system probes, wiring, compensators, densitometers, fuel level sensors, etc.). The safety assessment required to address potential fuel tank ignition sources includes both analysis of the fuel tank system and analysis of other airplane systems that could affect the fuel tank system.

3-2. DAH FUEL TANK ALTERATIONS. Generally, DAH-developed ICA do not apply to portions of the airplane fuel tank system modified in accordance with an STC, or those that have field-approved auxiliary fuel tanks. The FAA has defined field-approved auxiliary fuel tank systems as design changes approved by an aviation safety inspector (ASI) on FAA Form 337, Major Repair and Alteration (Airframe, Powerplant, Propeller, or Appliance). DAH of auxiliary fuel tanks are required to develop ICA, approved by the FAA Oversight Office, that meet the requirements of SFAR 88 or § 25.1529 and part 25 appendix H, effective June 6, 2001.

3-3. CHANGES TO OPERATORS' FUEL TANK SYSTEM TASKS, INTERVALS, AND INSTRUCTIONS/PROCEDURES. Fuel tank system MSI tasks (FEC 5 and 8) resulting from SFAR 88 safety reviews are unique to SFAR 88 since the FTS rule (May 7, 2001) requires FAA approval of any changes. These maintenance tasks (inspections intervals and task instructions/procedures) are necessary to prevent the development of ignition sources inside the fuel tanks. The fuel tank system FEC 5 and 8 tasks were derived by engineering judgment based on the anticipated consequences of functional failures assessed under MSG-3 logic and therefore changes to them may have a greater affect on safety than FEC 6, 7, and 9 tasks. The task intervals are selected to ensure proper maintenance of fuel tank system protective features related to ignition prevention. These intervals are also selected to allow flexibility for operators to perform these maintenance tasks within their normal scheduled maintenance checks.

> **NOTE: For certification to § 25.981, Amendment 25-102, all CDCCLs, inspections, or other procedures established to comply with § 25.981 must be included in the ALS) of the ICA required by § 25.1529 in accordance with Amendment 25-125, § 25.981(d) and H25.4, Amendment 25-102.**

a. Deleting or Changing a Task Requirement. A task requirement includes both the task and the interval. Operators wanting to delete or increase a task/interval must first obtain approval from the FAA Oversight Office through the PI if any escalation of the MRBR FEC 5 and 8 task/interval is needed to retain the task(s) in the check package. For example, when an operator wants to escalate a normal scheduled maintenance check (e.g., "C" check package that includes FEC 5 and 8 fuel tank system tasks/intervals) the operator has two options. In either case there should be close coordination between the operator and the FAA.

(1) Option one. Obtain approval from the FAA Oversight Office through the PI to escalate the FEC 5 and 8 task/interval.

(2) Option two. Identify the FEC 5 and 8 tasks/intervals and track them individually or identify the FEC 5 and 8 tasks/intervals and place them in a more frequent package (e.g. a 4A check).

b. Escalation of Fuel Tank System Task Requirement. Any proposed escalation of any fuel tank system MSI tasks must include data and analysis that supports the proposed change. The analysis should include reliability data from the operator's fleet experience including fleet operating hours and cycles for the airplane model, types of task-related failures experienced, and the number of task-related failures. In addition, the operator should review all fuel tank system issues/problems including unscheduled maintenance and feedback from airworthiness limitation compliance.

c. Airplane Modifications and Operating Environment. Airplane modifications incorporated after the airplane manufacture date could affect the data used in the analysis, so data on those changes should be included in the submittal in support of the proposed change. The model fleet operating environment could also affect the data. Any analysis that includes other operator's fleet experience should show that the data being used is from airplanes operated in an environment consistent with the operating environment of the operator's fleet. The operator may want to get inputs from the manufacturer.

d. Fuel Tank System Maintenance Tasks Analysis. Additional information on performing analysis of fuel tank system maintenance tasks and intervals is included in AC 25.981-1, Fuel Tank Ignition Source Prevention Guidelines, current edition, and ANM112-05-001. Operators should submit their request to the PI, who may add comments and then forward it to the FAA Oversight Office for approval. Task intervals for FEC other than 5 and 8 may be escalated through the normal operator and PI approval process.

e. Submitting Proposed Changes. Operators wanting to change FAA Oversight Office-approved FEC 5 and 8 task instructions/procedures such as those contained in the MRBR for the airplane, should submit their proposed changes through the PI, who may add comments and then forward them to the FAA Oversight Office for approval. The PI may also want to simultaneously coordinate the operators' proposed change with the appropriate FAA Aircraft Evaluation Group (AEG) Maintenance Review Board (MRB) Chair person.

3-4. FUEL TANK SYSTEM AIRWORTHINESS LIMITATIONS. Fuel tank system airworthiness limitations are FAA Oversight Office-approved mandatory CDCCLs, inspections, or other procedures determined necessary to ensure that fuel tank ignition sources do not occur and are not introduced into the fuel system as a result of maintenance actions, repairs, or alterations throughout the operational life of the airplane. This requirement is similar to that contained in § 25.571 for airplane structure and fuel tank system airworthiness limitations are intended to be treated the same as airplane structure airworthiness limitations. Therefore, Amendment 25-102 added a new requirement to part 25 Appendix H to require including fuel tank system airworthiness limitations in the ALS of the ICA. The purpose of the FTS airworthiness limitations is to prevent the development of ignition sources in the fuel tank system. Fuel tank system airworthiness limitations are required to ensure that unsafe conditions do not occur or are not introduced into the fuel tank system as a result of configuration changes, repairs, alterations, or deficiencies in the maintenance program throughout the operational life of the airplane.

a. Fuel System ADs. While fuel system airworthiness limitations are developed as part of the type certification process (new designs) in compliance with § 25.981, Amendment 25-102 or later, in-service airplanes did not have this requirement for fuel system airworthiness limitations in their certification basis. Therefore, SFAR 88 required DAH to develop fuel system airworthiness limitations that the FAA then mandated with ADs. These fuel system ADs require the operator incorporate the fuel system airworthiness limitations into their maintenance or inspection program. A fuel tank system airworthiness limitation may be a mandatory replacement time, related inspection, or procedures or a CDCCL.

b. Types of Fuel System Airworthiness Limitations. There are three types of fuel system airworthiness limitations: inspections, procedures and CDCCL. One is an inspection that has a specific task and interval (such as 10 years). A second type is procedures that could have specific intervals. The third type is a CDCCL which has no interval but establishes configuration limitations to maintain and to protect the "critical design feature" identified in the CDCCL. CDCCLs can also include requirements to have placards on the airplane with information about critical features. (Refer to AC 25.981-1 for additional information on CDCCLs.)

(1) The following is an example of a CDCCL critical design feature for a "Legacy Airplane."

(a) For an alternating current fuel pump fault current bonding strap installation, the concern is the potential for fault current path through the pump motor housing to structure inside the tank. Electrical faults internal to the fuel pump motor impeller are by design routed through the motor impeller assembly to the bonding straps on the front face of the motor impeller assembly to structure outside the tank. The bonding straps ensure that fault currents are conducted to structure outside the tank until the circuit breaker and/or Ground Fault Interrupter (GFI) has had time to remove power from the pump.

(b) The following features must be maintained during pump replacement per the manufacturer's AMM:

- Install two bonding straps between the pump motor impeller end-cap and structure, and
- Verify that the motor impeller bonding resistance to structure is 0.0004 ohms (0.4 milliohms) or less.

(2) These CDCCLs must be incorporated and adhered to as written. Any proposed operator changes to the CDCCL must be approved by the DAH Oversight Office.

c. Inspection in a Hangar Environment. Traditionally structural airworthiness limitations have a specific task and interval and are performed as part of a scheduled inspection in a hangar environment. Most fuel system airworthiness limitations will also involve access requirements that are generally only available in a hangar environment during a scheduled maintenance visit.

d. Critical Design Feature Maintenance. For example, there will also be times when a fuel system CDCCL will involve unscheduled maintenance such as a fuel pump change due to

pump failure at a line station overnight. The CDCCL requires that the critical design feature identified in subparagraph 3-4(b)(1) above must be maintained during the fuel pump change.

e. Fuel System Airworthiness Limitations That Include CDCCLs. Accomplishment of fuel system airworthiness limitations that include CDCCLs relates directly to safety of flight similar to the Required Inspection Item (RII) requirement in the part 121 rule. Operators must consider CDCCLs with the same safety consideration and emphasis, whether the work occurs during scheduled or unscheduled maintenance, or it arises at an inconvenient time or location.

(1) Operators must have procedures in their maintenance program that ensure that any airworthiness limitation critical design feature that is affected is maintained whether it's during scheduled or unscheduled maintenance.

(2) CDCCLs are intended to identify only critical features of a design that must be maintained. For example, certain components of a fuel pump (or all components) may include critical features that are identified as CDCCLs. These critical features would be identified in the ALS of the ICA and in the component maintenance manual (CMM) as CDCCLs.

(3) Although not intended by the introduction of CDCCLs and other fuel system airworthiness limitations, there are also DAH that have created certain airworthiness limitations CDCCLs that include both the critical design feature as well as the tasks associated with maintaining the CDCCL. Typically these airworthiness limitations require adhering to a specific CMM at a specific revision level when repairing or overhauling fuel system components. In this case, operators are required to adhere to all elements of the CMM specified in the CDCCL. Any deviations from CMMs specified in the CDCCL, including using later revisions of those CMMs, must be approved by the FAA Oversight Office. The operator should submit its proposed changes through the PI, who may add comments and forward them to the FAA Oversight Office for approval. Deviations from CMMs specified in the CDCCL may also involve an AMOC to an AD. (Refer to the CMM deviation definition in Appendix 3, Definitions.)

3-5. AD REquirements. The AD requires the operator to incorporate fuel tank system airworthiness limitations into their maintenance or inspection program.

a. Fuel Systems Airworthiness Limitations. The information in this paragraph and the following subparagraphs 3-5b and 3-5c is based on a transport airplane Maintenance Planning Data (MPD) ALS. Not all airplane manufacturers use the term MPD. It includes explanatory language, which is also referred to as the program rules/front matter, about what the fuel system airworthiness limitations are, their regulatory basis, and what they contain. It explains the difference between an ALI and a CDCCL. Operators must incorporate this explanatory language into their maintenance or inspection program. This includes appropriate manuals used in the administration of the operator's maintenance or inspection program. Any changes to these program rules must be approved by the FAA Oversight Office and may also involve an AMOC to an AD. The operator should submit any changes through the PI, who may add comments and forward them to the FAA Oversight Office for approval.

b. Format of Airworthiness Limitations. This paragraph includes a format in terms of airworthiness limitation number, task, interval, airplane applicability, and description. This is the

format used by the DAH and included in the ALS of its maintenance manual. The operator can use its own format but it must include the airworthiness limitation number, task, interval, airplane applicability, and description in its maintenance or inspection program. This includes appropriate manuals and documents such as engineering orders (EO) and job/work cards used in the administration of the operator's maintenance or inspection program. It is especially important that this information be included on the operators job/work cards so that the person performing the task knows the safety significance of the task.

c. Types of Airworthiness Limitations. This paragraph includes the airworthiness limitations. Some DAH have separated fuel system airworthiness limitations into two sub-categories: ALIs and CDCCLs. In this case, ALIs include only fuel tank airworthiness limitation inspections and procedures. The description of the CDCCLs in some cases contains references to the DAH AMM and the SWPM or equivalent. Unless otherwise noted, these manuals' references are incorporated by reference (IBR) and therefore are FAA Oversight Office-approved. Any changes to these references in the AMM or the SWPM must be FAA Oversight Office-approved before being used.

d. Work Instructions/Procedures. As stated in subparagraph 3-5c. above, AMM and SWPM references in the airworthiness limitations are FAA Oversight Office-approved. The following paragraphs should be used as guidance when complying with airworthiness limitations that contain references to AMMs or SWPMs:

(1) When the words "in accordance with" or "per" are cited in the airworthiness limitations, the procedures in the AMM or SWPM must be followed to ensure that the critical design feature is maintained. Any changes to these procedures require FAA Oversight Office approval before they are used. Proposed changes must be submitted through the PI, who may add comments and forward them to the FAA Oversight Office for approval.

(2) When the words "refer to" are cited in the airworthiness limitation, the procedures in the AMM or SWPM represent one method of complying with the airworthiness limitation. An accepted alternative procedure may be developed by the operator in accordance with its procedures in its maintenance program/manual. Prior FAA Oversight Office approval is not required for this action. This does not preclude the PI from coordinating with the FAA Oversight Office before concurring with the revision.

(3) Operators must include specific procedures in its maintenance program/manual that identify fuel system airworthiness limitations that have AMM and SWPM procedures that are FAA approved and can only be changed by the FAA Oversight Office, and those that can be changed by the operator without prior FAA Oversight Office approval.

e. Example Airworthiness Limitation Identification Tables. The following tables are examples of how two fuel tank system airworthiness limitations are identified; one as an ALI, and the other a CDCCL. Table 1 identifies a portion of an airworthiness limitation in ATA Chapter 28 for the fuel tank system. The task is identified as an ALI with an assigned interval, airplane applicability, and a description of the airworthiness limitation task to be performed (not shown). Table 2 identifies a portion of an airworthiness limitation with the task being a CDCCL (the task is not shown). There is no assigned interval because a CDCCL is not an inspection or

procedure. It refers to information for maintenance personnel to follow when performing maintenance and alteration to protect the critical design features of the fuel tank system.

TABLE 1

AWL Number	Task	Interval	Applicability	Description
28-AWL 01	ALI	12 Yrs/36000 Hrs	All Models	External wires over center fuel tank. Concern: Potential for chaffing and arcing to center fuel tank upper panel.

TABLE 2

AWL Number	Task	Interval	Applicability	Description
28-AWL 02	CDCCL	N/A	All Models	External wires over center fuel tank. Concern: Potential for chaffing and arcing to center fuel tank upper panel.

(1) An example of a CDCCL for current designs would be maintaining wire separation between FQIS wiring and other high power electrical circuits. The original DAH defined a method to ensure that this essential information will be evident to those who may perform and approve repairs and alterations. The DAH provided visual means to alert maintenance personnel of areas in the airplane where inappropriate actions may degrade the integrity of the design configuration.

(2) The FAA Oversight Office approved the airworthiness limitations and the information is communicated by statements in appropriate manuals such as Wiring Diagram Manuals (WDM), AMMs, SWPMs, or the CMM. The FAA Oversight Office must approve any operator changes to the airworthiness limitations or the manual following the process described in subparagraph 3-5d.

(3) Operators must incorporate these CDCCLs in their maintenance or inspection program; CDCCL instructions should be included in the operator's manual and in the job/work cards. Any changes that require approval by the FAA Oversight Office must be submitted by the operator through the PI, who may add comments and then send them to the appropriate FAA Oversight Office.

3-6. OPERATOR COMPLIANCE WITH AIRWORTHINESS LIMITATIONS.

a. ALS Approved Under § 25.981. Section H25.4 (a)(2), Amendment 25-102, requires "Each mandatory replacement time, inspection interval, related inspection procedure, and all

critical design configuration control limitations approved under §25.981 for the fuel tank system" must be contained in a section of the ICA titled Airworthiness Limitations. The ALS is FAA Oversight Office-approved and specifies maintenance required under §§ 43.16 and 91.403. Simply stated, each operator must incorporate the ALS approved under § 25.981 for the fuel tank system into its maintenance or inspection program. As stated in § H25.4(a)(2), the fuel tank system must include the following under § 25.981 for fuel tank system:

- Mandatory replacement times,
- Inspection intervals,
- Related inspection instruction/procedures, and
- All CDCCLs.

b. Compliance with CDCCLs. All fuel tank system CMMs as specified in the CDCCLs are FAA approved. Any changes must be submitted through the PI, who may add comments and forward them to the FAA Oversight Office for approval. An example is provided as follows: If required by CDCCLs, repair and overhaul of certain fuel system components must be "per" or "in accordance with" the manufacturers' CMM, or later revisions of these CMMs that have been approved by the FAA Oversight Office. The operator must comply with the CMMs if required by CDCCLs.

3-7. OPERATOR-DEVELOPED SHOP INSTRUCTIONS. In the past, CMMs were accepted by the FAA, not approved. The FAA Oversight Office will approve certain CMMs and certain parts of CMMs in accordance with the requirement in § 25.981(d) in establishing certain CDCCLs.

a. CMM Example. An example is the CMM for overhauling or repairing fuel pumps. In certain CDCCLs, the entire manual is FAA Oversight Office-approved and a statement is contained in the manual to that effect. The FAA Oversight Office must approve any operator changes to the CMM.

b. CDCCL Example. Another example is a CDCCL where the entire CMM is not FAA Oversight Office-approved, but the CDCCL requires following specific FAA-approved data such as maintenance instructions, inspections, and procedures in the CMM. This data will be flagged as FAA-approved data in the CDCCL and CMM.

c. Identify FAA-Approved Data. Operators who develop their own shop manuals and instructions need to ensure that the FAA-approved data used in their manuals and instructions are identified as FAA-approved data. The FAA Oversight Office must approve any changes to the FAA-approved data in the operators' shop manuals or instructions.

3-8. EXCEPTIONAL SHORT TERM EXTENSION OF FUEL TANK SYSTEM AIRWORTHINESS LIMITATIONS.

a. Extension without Approval. The FAA has determined that an operator may extend certain fuel system airworthiness limitations by up to the maximum number of days specified in the applicable ALS for a specific airplane without FAA Oversight Office approval. The FAA Oversight Office-approved ALS includes a statement explaining that the exceptional short-term

extensions of fuel tank system airworthiness limitations, subject to the procedures in the document, are FAA Oversight Office-approved. The FAA defines an exceptional short-term extension as an increase in a fuel system ALI interval that may be used by the operator to cover an uncontrollable or unexpected situation where the airworthiness limitation cannot be performed within the ALI timeframe. For example, an operator's airplane is scheduled for an airworthiness limitation inspection but cannot enter the hangar bay because it is still occupied by another airplane. In this case, the operator, in accordance with the procedures in the ALS must request and have advance approval from the PI for the exceptional short-term extension. (For the purposes of the FTS requirements and this AC, short-term escalation procedures authorized by air carrier OpSpecs cannot be used for exceptional short term extension of fuel tank system airworthiness limitations.)

b. Repeated Use Prohibited. After an operator uses an exceptional short-term extension of an FTS airworthiness limitation, that airworthiness limitation interval must revert back to the original interval in the maintenance program. Extensions are only allowed on an individual airplane. Under the procedures in the ALS, repeated use on the same airplane or on similar airplanes in the operator's fleet is not allowed.

c. Airworthiness Limitation Extension Requests. The extension request must be submitted to the PI, who will forward the request along with comments to the FAA Oversight Office for approval. Any such request must include substantiating data. If approved by the FAA Oversight Office, the PI will then approve the change to the maintenance program. (For the purposes of the FTS requirements and this AC, short-term escalation procedures authorized by air carrier OpSpecs cannot be used for exceptional short-term extension of a fuel tank system airworthiness limitation.)

3-9. CHANGES IN ICA RESULTING FROM ALTERATIONS. The EAPAS/FTS final rule requires that after December 16, 2008, before returning an aircraft to service after any alteration for which fuel tank ICA are developed under SFAR 88, or § 25.1529 and part 25 appendix H (effective June 6, 2001), the operator must incorporate the fuel tank ICA into its maintenance or inspection program.

a. Major Alterations. The only alterations for which fuel tank system ICA will be developed are those for which compliance with either SFAR 88 or § 25.1529 must be shown. These are major alterations approved under STCs or amended TCs.

b. Scheduled Maintenance Visit/Check. These alterations would normally be scheduled by an operator to occur during a period of allocated downtime such as a scheduled maintenance visit/check. Operators should include in their maintenance planning for such modification actions necessary to incorporate fuel tank ICA into their maintenance or inspection program.

3-10. FUEL TANK SYSTEM IGNITION PREVENTION TRAINING. The EAPAS/FTS introduced new requirements that affect DAH and operators.

a. New Philosophical Approach. To fully realize the objectives of fuel tank system ignition prevention, the operators need to rethink their current philosophical approach to

maintaining, inspecting, and altering aircraft wiring and systems that could affect the fuel tank system ignition prevention features. This approach has begun at the airplane manufacturers with maintenance program enhancements that address fuel tank system ignition prevention. It is incumbent that the operators include these DAH fuel tank system maintenance program enhancements into their respective programs. Furthermore, they should commit to training their maintenance and inspection work force to understand the new philosophical approach to fuel tank system ignition prevention.

b. New Procedures. In addition to CDCCLs, there will be new maintenance manual and job card procedures, inspection devices, graphical information showing required tasks, or changes in tasks such as wire splicing. Operators should provide training to maintenance, inspection, and engineering personnel, including persons who write and edit job cards and EOs. Heightened awareness of these critical areas is needed. Additionally, operators must have procedures in place that ensure maintenance record entries for complying with a CDCCL are consistent with §§ 43.9 and 43.11, or in accordance with the applicable provisions of part 121 or part 129 and the operators' manual.

c. Operator Training Program. The operator training program should emphasize the importance of accomplishing the fuel tank system airworthiness limitations, CDCCLs, inspections, and other procedures while accomplishing scheduled and unscheduled maintenance. (Refer to subparagraphs 3-4 b, c, d, and e for further guidance on this subject.)

d. Critical Design Features. Maintenance and engineering personnel can ensure that the fuel tank system airworthiness limitations are properly performed throughout the operational life of the airplane by having a thorough understanding of the airplane fuel tank system critical design features.

e. Manufacturer-Developed Training Programs. Operators should take advantage of any airplane manufacturer-developed training programs that address fuel tank ignition prevention.

3-11. OPERATOR'S MAINTENANCE PROGRAM APPROVAL UNDER §§ 121.1113 AND 129.113. Parts 121 and 129 operator will be issued OpSpec D097, Aging Aircraft Programs, to implement FTS requirements. The operators must submit its fuel tank system maintenance program changes that include ICA (inspections, procedures and limitations) to the PI, who will review and approve operator incorporation with OpSpec D097. Operator-proposed changes must be submitted to the PI for review and approval. Any changes to the operators' FAA Oversight Office-approved ICA will be handled as stated in this AC.

3-12. OPERATOR'S INSPECTION PROGRAM APPROVAL UNDER § 125.507. Part 125 operators will be issued Letter of Authorization (LOA) Aging Aircraft Programs to implement FTS requirements. The operator must submit its fuel tank system inspection program changes that include ICA (inspections, procedures and limitations) to the PI, who will review and approve operator incorporation with the LOA. Operator-proposed changes must be submitted to the PI for review and approval. Any changes to the operators' FAA Oversight Office-approved ICA will be handled as stated in this AC.

3-13. OPERATOR INSPECTION PROGRAM APPROVAL UNDER § 91.1507. Part 91 and part 91K operators will be issued LOA/Management Specification (MSpec) MD097, Aging Aircraft Programs, to implement FTS requirements. The operator must submit its fuel tank system inspection program changes that include ICA (inspections, procedures and limitations) to the PI, who will review and approve operator incorporation with LOA/ MSpec MD097. Operator-proposed changes must be submitted to the PI for review and approval. Any changes to the FAA Oversight Office-approved ICA will be handled as stated in this AC.

a. PI Action. The PI will approve incorporation into the maintenance/inspection program by issuing OpSpec/MSpec D097. The free text area of the OpSpec/MSpec D097 is used to:

- Identify and record the document(s)— by document number, revision number, and date—used as the source of the FAA Oversight Office-approved EWIS/FTS ICA, or
- If this information is contained in the operator's manual system, a reference to that location in their manual system can be recorded in the free text area.

b. Operator Action. The operator must have procedures in its manual that track any changes and approvals made to the FAA Oversight Office-approved EWIS/FTS ICA.

APPENDIX 1. ACRONYMS

14 CFR	Title 14 of the Code of Federal Regulations
AC	Advisory Circular
ACO	Aircraft Certification Office
AD	Airworthiness Directive
AEG	Aircraft Evaluation Group
AFS	Flight Standards Service
ALI	Airworthiness Limitation Item
ALS	Airworthiness Limitation Section
AMC	Acceptable Means of Compliance
AMM	Aircraft Maintenance Manual
AMOC	Alternative Method of Compliance
ASI	Aviation Safety Inspector
ATA	Air Transport Association of America
CAMP	Continuous Airworthiness Maintenance Program
CDCCL	Critical Design Configuration Control Limitations
CMM	Component Maintenance Manual
CWT	Center Wing Fuel Tank
DAH	Design Approval Holder
DOT	Department of Transportation
EAPAS	Enhanced Airworthiness Program for Airplane Systems
EWIS	Electrical Wiring Interconnection System
EZAP	Enhanced Zonal Analysis Procedure
ESPM	Electrical Standard Practices Manual
FAA	Federal Aviation Administration
FEC	Failure Effects Category
FQIS	Fuel Quantity Indicating System
FR	Federal Register
FSU	Fuel System Unit
FTS	Fuel Tank Safety
HQ	Headquarters
IBR	Incorporated by Reference
ICA	Instructions for Continued Airworthiness
LOA	Letter of Authorization
LODA	Letter of Deviation Authority
MPD	Maintenance Planning Data
MRB	Maintenance Review Board
MRBR	Maintenance Review Board Report
MSG	Maintenance Steering Group
MSI	Maintenance Significant Items
MWG	Maintenance Working Group
NAA	National Aviation Authority
NTSB	National Transportation Safety Board
OEM	Original Equipment Manufacturer
OpSpec	Operations Specification
PI	Principal Inspector
RGL	Regulatory and Guidance Library

RII	Required Inspection Items
SFAR	Special Federal Aviation Regulation
STC	Supplemental Type Certificate
SWPM	Standard Wring Practice Manual
TC	Type Certificate
TSO	Technical Standard Order
TWA	Trans World Airlines
VTO	Volumeric Top-off
WDM	Wiring Diagram Manual

APPENDIX 2. LIST OF APPLICABLE SUPPLEMENTAL TYPE CERTIFICATES

Supplemental Type Certificate (STC) Number	STC Holder	Airplane Models	Description	Operator Actions
ST00069BO	Goodrich Corporation	DC8-62, -62F, -63F, -72, -72F, -73F	Fuel quantity indicating system (FQIS) (external to tank)	STC amended January 5, 2004. Operators must incorporate instructions for continued airworthiness (ICA) T3068-0005-01, Initial Issue, dated October 23, 2003 (or later version). (At "D" check interval, inspections of flight deck wiring and connectors.)
ST00020BO	Goodrich Corporation	B747-100, -100B, -100B SUD, -200B, -200C, -200F, -300, B747SP & B747SR	Retrofit of entire Fuel Quantity Gauging System	STC amended October 19, 2004. Operators must incorporate ICA T3070-0005-0101, Initial issue, dated July 2, 2004 (or later version). (At D check interval, inspections of wiring separation, shielding, bonding.)
ST00142BO	Goodrich Corporation	B737-300	Isolation fuel quantity transmitter system	STC amended February 10, 2004. Operators must incorporate ICA T3072-0005-0101, Revision A, dated January 22, 2004 (or later version). (Periodic inspections of wiring and bonding)
SA298NE	Goodrich Corporation	B727-100, -200	Computerized FQIS	STC amended April 19, 2004. Operators must incorporate ICA T3066-0005-0101, Revision D, dated March 10, 2004 (or later version). (Inspections to determine the condition of the wiring and connector interfaces every 16,000 flight hours.)
ST00053BO	Goodrich Corporation	B727, -100, -100C, -200, -200F, 727C	FQIS indicators with Volumetric Top-off (VTO) and optional fuel system unit (FSU), In-tank harnesses.	STC amended April 19, 2004. Operators must incorporate ICA T3065-0005-0101, Revision D, dated March 10, 2004 (or later version). (Inspections to determine the condition of the wiring and connector interfaces every 16,000 flight hours)

NOTE: These STCs have mandatory actions associated with them in accordance with Title 14 of the Code of Federal Regulations (14 CFR) part 91, § 91.1507; part 121, § 121.1113; part 125, § 125.507; and part 129, § 129.113. Other STCs may be addressed via Airworthiness Directives (AD).

APPENDIX 3. DEFINITIONS

a. Aircraft Evaluation Group (AEG). AFS representatives who know the operational and maintenance aspects of the certification project and are responsible for determining the operational acceptability and continuing airworthiness requirements of newly certified or modified aircraft, engines, and propellers intended to be operated under the provisions of the 14 CFR. This function includes providing the cognizant ACO support in the review and approval of the initial and subsequent changes to the type design.

b. Aircraft Maintenance Manual (AMM). A manual developed by the manufacturer of a particular airplane that contains information necessary for the continued airworthiness of that airplane.

c. Airworthy. An aircraft, aircraft engine, or component that conforms to its type design and is safe to operate.

d. Fuel System Airworthiness Limitation. An airworthiness limitation that contains "each mandatory replacement time, inspection interval, related inspection procedure, and all CDCCL approved under 14 CFR part 25, § 25.981 for the fuel tank system."

e. Airworthiness Limitation. Mandatory maintenance of the fuel system that includes CDCCL, inspections, or other procedures determined necessary to ensure that fuel tank ignition sources do not occur and are not introduced into the fuel system as a result of maintenance actions, repairs, or alterations throughout the operational life of the airplane.

f. Airworthiness Limitation Item (ALI). A term used by some DAH to group maintenance/inspection type fuel tank airworthiness limitations separately from CDCCL type fuel tank ALs.

g. Airworthiness Limitations Section (ALS). "Airworthiness Limitations" is the title required by part 25 appendix H, § H25.4(a) and (a)(2) for the section of the ICA that contains "each mandatory replacement time, inspection interval, related inspection procedure, and all critical design configuration control limitations approved under Sec. 25.981 for the fuel tank system."

h. Auxiliary Tanks. Fuel tanks installed which make additional fuel available to increase the flight range of that airplane and are secondary to the airplane's main fuel tanks. Auxiliary tanks have been installed in various locations including center wing structure, horizontal stabilizers, wings, and cargo compartments.

i. AMOC. Alternative method of compliance.

j. Component Maintenance Manual (CMM). A manual developed by a manufacturer that contains information necessary for the continued airworthiness of a particular component.

k. CMM Deviation.

(1) Term used for approval of changes to CMMs that are the subject of CDCCLs adopted by a type design change.

(2) Term used for the approval of changes to CMMs referenced in CDCCLs that are mandated by ADs, provided the CDCCL includes wording that allows use of "later approved" CMMs. Otherwise, approval is granted as an AMOC to the AD. As with AMOC approvals, a CMM deviation approval is by a letter from the FAA Oversight Office.

l. Continued Airworthiness. Certified aircraft, engines, propellers, and appliances are safe to operate for the intended purpose; they are maintained safely throughout their service life; the product meets its type design; and is in a condition for safe operation.

m. Critical Design Configuration Control Limitation (CDCCL). A CDCCL is an airworthiness limitation required by §§ 25.981 and H25.4 that defines those parameters of the design that must be maintained to ensure that ignition sources will not develop within the fuel tank. CDCCLs include any information necessary to maintain those design features that have been determined by analysis of the fuel tank system as needed to preclude development of ignition sources. This information is essential to ensure that maintenance, repairs, or alterations do not unintentionally violate the integrity of the original type design of the fuel tank system.

n. Design Approval Holder (DAH). The holder of any design approval, including TC, amended TC, STC, amended STC, parts manufacturer approval, TSO authorization, letter of TSO design approval, and field approvals (refer to FAA Form 337).

o. Exceptional Short-Term Extension. An increase in a fuel system ALI interval that may be used by the operator to cover an uncontrollable or unexpected situation where the ALI cannot be performed within the ALI timeframe.

p. Electrical Arc or Spark. The transfer of electrons across a gap.

q. Enhanced Zonal Analysis Procedure (EZAP). An analytical process for developing maintenance and inspection instructions for the EWIS.

r. Electrical Wiring Interconnection System (EWIS). Any wire, wiring device, or combination of these, including termination devices, installed in the airplane for transmitting electrical energy between two or more termination points.

s. FAA Oversight Office. The ACO or the office of the Transport Airplane Directorate having oversight responsibility for the relevant TC or STC as determined by the Administrator. (Refer to Appendix 4 FAA Oversight Offices by Airplane Manufacturer, for a list of FAA Oversight Offices for certain transport airplane TC holders.)

t. Flammable. With respect to a fluid or gas, flammable means susceptible to igniting readily or to exploding (refer to 14 CFR part 1, Definitions and Abbreviations).

u. Failure Effect Category (FEC).

(1) Category 5. Functional failures that have evident safety effects.

(2) Category 6. Functional failures that have evident operational effects.

(3) Category 7. Functional failures that have evident economic effects.

(4) Category 8. Functional failures that have hidden function safety effects.

(5) Category 9. Functional failures that have hidden function non-safety effects.

v. Field Approval. A method for obtaining FAA approval of a design change to the airplane. An FAA Flight Standards inspector can approve the design change using FAA Form 337.

w. Flammable Fluid Leakage Zones. Any area where flammable liquids or vapors are not intended to be present, but where they might exist due to leakage from flammable fluid carrying components (e.g., leakage from tanks, lines). Examples of these areas include:

- The wing leading (including any adjacent compartment such as the strut) and trailing edges;
- Fairings located below the fuel tanks;
- Wheel wells;
- Fuel pump enclosures;
- Unpressurized areas of the fuselage surrounding fuel tanks; and
- Areas containing flammable fluid lines or tanks.

x. Flight Standards Service (AFS). Offices located in FAA headquarters (HQ) responsible for developing guidance and policy applicable to transport category airplanes for AEG personnel and AFS field personnel (maintenance, avionics, and Operations ASI in the conduct of their responsibilities.

y. Functional Failures. The failure of a component or subsystem to perform its intended function within specified limits.

z. Hidden Failure. A failure whose presence may not be readily apparent to the flightcrew or maintenance personnel.

aa. Hidden Functional Failure Safety Effect. A combination of a hidden (or latent) functional failure and one additional failure of a system-related or backup function that will have an adverse effect on operational safety.

bb. Hot Short. Electrical energy introduced into equipment or systems as a result of unintended contact with a power source, such as bent pins in a connector or damaged insulation on adjacent wires.

cc. Instructions for Continued Airworthiness (ICA). The information developed in accordance with applicable airworthiness requirements that include the applicable inspection tasks, intervals, methods, processes, procedures, and airworthiness limitations to keep the product airworthy throughout its operational life.

dd. Maintenance and Inspection Instructions. Information that provides, for each part of the airplane and its engine auxiliary power units, propellers, accessories, instruments, and equipment, the recommended periods at which they should be cleaned, inspected, adjusted, tested, lubricated, and the degree of inspection, the applicable wear tolerances, and work recommended at these periods needed to provide for the continued airworthiness of the airplane. The recommended overhaul periods and necessary cross-reference to the airworthiness ALS of the manual are also included.

ee. Maintenance Planning Data (MPD). Data developed by the manufacturer of a particular airplane that contain the information each operator of that airplane needs to develop a customized, scheduled maintenance program.

ff. Maintenance Review Board (MRB). An FAA group that supports industry development of the Maintenance Review Board Report (MRBR) and approves the final MRBR.

gg. Maintenance Review Board Report (MRBR). A report which contains the initial minimum scheduled maintenance and inspection requirements for a particular transport category airplane and on-wing engine program. Air carriers may use those provisions, along with other maintenance information contained in the ICA, in the development of their maintenance programs.

hh. Maintenance Significant Item (MSI).

(1) Under MSG – 3rd Task Force (MSG-3), items other than ALI that are identified by the DAH whose failure could cause one of the following effects:

- It could affect safety on the ground or in flight,
- It could be undetectable during operations,
- It could have a significant impact on operations, or
- It could have a significant economic impact.

(2) In terms of development of maintenance and inspection instructions, MSIs include systems, subsystems, modules, components, accessories, units, or parts.

ii. Maintenance Steering Group-3 (MSG-3). A voluntary structured process developed by the industry and maintained by the ATA to make decisions used to develop maintenance and inspection tasks and intervals for an airplane.

jj. Maintenance Working Group (MWG). A working group of maintenance specialists from participating operators, the prime manufacturer, and the regulatory authority whose function is to develop airplane maintenance programs. The MWG should have representatives knowledgeable about the fuel tank system under analysis and about the requirements of SFAR 88.

kk. Mandatory Action Advisory Board. A committee composed of representatives from the cognizant FAA Oversight Office and the Transport Airplane Directorate whose function was to review the findings from the SFAR 88 safety review for determination of an unsafe condition using the criteria in FAA policy memorandum 2003-112-15, SFAR 88—Mandatory Action Decision Criteria.

ll. National Aviation Authority (NAA). The aviation authority responsible for the certification and continued airworthiness of those airplanes having a U.S. TC within its state of design as established in accordance with agreements with the United States.

mm. Products. Products are certified aircraft, engines, propellers, and appliances.

nn. Supplemental Type Certificate ICA. The STC holder ICA consists of the inspection tasks, intervals, methods, processes, and procedures to keep an alteration affecting the fuel tank system approved under an STC airworthy throughout its operational life. The STC holder ICA must meet the requirements of SFAR 88, or § 25.981 and part 25 appendix H, and be approved by the FAA Oversight Office.

oo. Type Certificate Holder ICA. The TC holder ICA consists of the inspection tasks, intervals, methods, processes, procedures to keep the product's fuel tank system airworthy throughout its operational life. It is typically the result of the MRB process. During this process the TC holder develops MSIs and subjects them to maintenance program development logic, such as in MSG-3 or later revisions. The TC holder ICA must comply with the requirements of SFAR 88, or § 25.981 and part 25 appendix H, and be approved by the FAA Oversight Office.

APPENDIX 4. FAA OVERSIGHT OFFICES BY AIRPLANE MANUFACTURER

Airplane Manufacturer	FAA Oversight Office
ATR – GIE Avions de Transport Régional	Transport Standards Staff, International Branch (ANM-116)
Airbus	Transport Standards Staff, International Branch (ANM-116)
BAE Systems	Transport Standards Staff, International Branch (ANM-116)
Boeing—Seattle Area	Seattle Aircraft Certification Office (ACO) (ANM-100S) and/or Boeing Aviation Safety Oversight Office (ANM-100B)
Boeing—Long Beach (McDonnell-Douglas)	Los Angeles ACO (ANM-100L) and/or Boeing Aviation Safety Oversight Office (ANM-100B) Certification Office
Bombardier	New York ACO
EADS CASA	Transport Standards Staff, International Branch (ANM-116)
de Havilland	New York ACO
Dornier	Transport Standards Staff, International Branch (ANM-116)
Embraer	Transport Standards Staff, International Branch (ANM-116)
Fokker	Transport Standards Staff, International Branch (ANM-116)
Lockheed Martin	Atlanta ACO
SAAB	Transport Standards Staff, International Branch (ANM-116)