VOLUME 4 AIRCRAFT EQUIPMENT AND OPERATIONAL AUTHORIZATIONS

CHAPTER 9 SELECTED FIELD APPROVALS

Section 1 Perform Field Approval of Major Repairs and Major Alterations

4-1176 PROGRAM TRACKING AND REPORTING SUBSYSTEM (PTRS) ACTIVITY CODES.

A. Maintenance: 3414, 3416, and 3446.

B. Avionics: 5414, 5416, and 5446.

4-1177 OBJECTIVE. This section provides guidance in determining the category of a repair or alteration and ensuring that the aircraft, engine, or accessory can be returned to service in accordance with the field approval process, regardless of the rules under which the aircraft operates.

4-1178 GENERAL.

A. Factors to Consider. There are essentially three factors to consider in the performance of alterations or repairs. These definitions are provided in Title 14 of the Code of Federal Regulations (14 CFR) part 1, § 1.1.

1) Is the alteration or repair major or minor, per 14 CFR part 43 appendix A? If determined to be a major repair or alteration, a field approval may be granted.

2) If the alteration or repair is determined to be a major change to type design, a field approval will not be granted.

3) Minor alterations or repairs do not require Federal Aviation Administration (FAA) approval.

B. Data. Data may be presented in various forms, but all data will fall into one of two categories: acceptable to the FAA, or approved by the FAA. The FAA has determined that technical data contained in the manufacturer's maintenance manuals or service instructions was developed utilizing the technical data previously approved during the 14 CFR part 21 certification process of the product or article. The FAA has further determined that there is no need to obtain re-approval of that technical data when performing a major repair in accordance with that data as required by 14 CFR part 65, § 65.95(a)(1); part 121, § 121.379(b); part 135, § 135.437(b); and part 145, § 145.201(c). Inspectors should be aware that deviations to the manufacturer's maintenance manuals may constitute a major repair in itself and would require additional approval.

1) Acceptable Data. Acceptable data is data that you can reasonably expect the FAA to find acceptable for the purpose it was created. Examples of acceptable data may include the drawings and specifications that include information on weight, balance, operating limitations, flight characteristics, dimensions, materials, and processes that are necessary to

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define the repair or alteration. The following are examples of acceptable data that one can use as a basis for developing approved data to substantiate major repairs or major alterations:

a) Manufacturers' manuals, including manufacturers' service documents (unless approved by the Administrator), equipment and systems installation instructions, and component repair manuals.

b) FAA Form 337, Major Repair and Alteration (Airframe, Powerplant, Propeller, or Appliance), is acceptable data that may be used for developing approved data for subsequent alterations when the specified data has been previously approved as a one-time alteration or repair.

c) Data contained in a Structural Repair Manual (SRM) unless FAA-approved; the current editions of Advisory Circular (AC) 43.13-1, Acceptable Methods, Techniques, and Practices—Aircraft Inspection and Repair; and AC 43.13-2, Acceptable Methods, Techniques, and Practices—Aircraft Alterations. (The Original Equipment Manufacturer (OEM) SRM is a preferred manual even though the SRM may not be FAA-approved.)

d) Data describing installation eligibility for subsequent installation or reinstallation of a part or appliance into a product, provided the part or appliance meets the environmental and functional performance requirements of the regulations, as well as is operationally suitable for the intended installation. The operator/applicant must provide evidence of previously approved installation by field approval on FAA Form 337 for follow-on field approval.

e) Data based on inspection or testing, such as approval of technical data by physical inspection.

2) Approved Technical Data. The drawings and specifications, including a listing of the drawings and specifications needed to define the configuration and design features of a particular article, repair, or alteration. These substantiating and descriptive technical data are used to make an Administrator-approved major repair or alteration. The following list, although not all-inclusive, contains sources of approved data:

a) Type Certificate Data Sheets (TCDS), when used in conjunction with the current edition of FAA Order 8620.2, Applicability and Enforcement of Manufacturer's Data.

b) AC 43.13-1, for FAA-approved major repairs on non-pressurized areas of aircraft only when the user determines that it is:

- Appropriate to the product that receives repairs;
- Directly applicable to the repair being made; and
- Not contrary to the airframe, engine, propeller, or appliance manufacturer's repair data or instructions.

c) AC 43.13-2, for FAA-approved major alterations on non-pressurized areas of aircraft only when the user determines that it is:

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- Appropriate to the product being altered;
- Directly applicable to the alteration being made; and
- Not contrary to the airframe, engine, propeller, product, or appliance manufacturer's data.

d) Airworthiness Directives (AD).

e) Appliance manufacturer's manuals or instructions, unless specifically not approved by the Administrator, are approved for major repairs only.

f) Data describing a part or appliance used in an alteration that is FAA-approved under a Parts Manufacturer Approval (PMA). A Supplemental Type Certificate (STC) may be required as a means of assessing airworthiness and/or performance of the part.

NOTE: Installation eligibility for subsequent installation or reinstallation of such part or appliance in a type-certificated (TC) aircraft, other than the aircraft that originally had its airworthiness demonstrated, is acceptable, provided the part or appliance meets its performance requirements and is environmentally and operationally compatible for installation. The operator/applicant must provide evidence of previously approved installation by a TC, STC, or field approval on FAA Form 337 that will serve as a basis for follow-on field approval.

g) Data describing an article or appliance used in an alteration that is FAA-authorized for production under a Technical Standard Order (TSO). The installer must show that the TSO-approved data is applicable to the specific installation to ensure that the article continues to perform its intended function and the installation of the article. The installation of the article must comply with part 43 or the applicable airworthiness requirements.

h) Data in the form of an Appliance Type Approval (TCA) issued by the Minister of Transport Canada for those parts or appliances for which there is no current TSO available. The installation manual provided with the appliance includes the Transport Canada certificate as well as the date of issuance and an environmental performance qualification statement.

i) Designated Engineering Representative (DER)-approved data, only when authorized under his or her specific delegation.

j) FAA-approved portions of SRMs.

k) FAA Form 337, used by the original modifier for approval of multiple identical aircraft.

l) Foreign bulletins, for use on U.S.-certificated foreign aircraft, when approved by the foreign authority within the provisions of a Bilateral Agreement (BA) with the United States.

m) Original airplane manufacturer's service and repair data in accordance with current regulations, for major repairs on non-pressurized elements of airplanes that are

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12,500 pounds or less maximum certificated takeoff weight, provided the person intending to perform such repairs determines that:

- Data is appropriate for the specific make and model airplane being repaired,
- Data is directly applicable to the make and model being repaired, and
- The repair does not deviate from the manufacturer's methods, techniques, and practices.

n) FAA-approved Service Bulletins (SB) and Service Letters (SL) or similar documents.

o) Type design data approved by a STC, including Approved Model List (AML) STC, provided it specifically applies to the product that receives a repair/alteration. One may use such design data in whole or in part as identified within the STC.

p) United States Civil Aviation Authority (CAA) Form 337, dated prior to October 1, 1955, provided the data is appropriate, directly applicable, and not contrary to regulatory requirements.

q) Organization Designation Authorization (ODA)-approved data when the major repair or major alteration is performed specific to the authorization granted.

C. Definitions.

1) Alter. To change or modify.

2) Appliance. Any instrument, mechanism, equipment, part, apparatus, appurtenance, or accessory (including communications equipment) that one uses or intends to use in operating or controlling an aircraft in flight and that is installed in, or attached to, the aircraft and which is not part of an airframe, engine, or propeller.

3) Approval for Return to Service (RTS). The approval given by an appropriately rated person that enables an aircraft to be returned to service.

4) Field Approval. Field approvals are a method by which the FAA approves technical data used to accomplish a major repair or a major alteration on a single aircraft, provided the repair or alteration is not classified as a major change in type design. An FAA inspector's signature in block 3 of FAA Form 337 approves the data provided on the form.

5) Coordinated Field Approval. A procedure initiated by an aviation safety inspector (ASI) when he or she determines that a proposed alteration or repair (project) may exceed the scope and complexity or be beyond the knowledge of an ASI to approve. The ASI should coordinate the applicant's request with the appropriate Aircraft Certification Office (ACO).

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6) Follow-On Field Approval. Approval of equipment of the same make and model on an aircraft using data from the initial field approval. The make and model of the aircraft may be different for generic applications such as avionics installations, if the installation is similar.

7) Initial Approval. The first field approval of equipment installed on a given make and model.

8) Major/Minor Repairs/Alterations. See part 1 and part 43 appendix A.

9) Major/Minor Type Design Changes. See part 21, §§ 21.93, 21.95, 21.97, and 21.113.

10) Meet Minimum TSO-Established Standards. Means that the equipment need not have TSO approval, but only meet requirements set by the TSO.

11) Product. Aircraft, aircraft engine, or propeller.

12) Return to Service (RTS). The action of making an aircraft operational after an appropriately rated person grants approval.

13) Substantiating. To support and verify with proof or evidence.

D. ASI Qualifications and Responsibilities. The ASI must be authorized, experienced, and/or trained in the methods, techniques, and materials involved in the major repair/major alteration.

1) The ASI must determine if, by granting a field approval, the affected product or appliance can be expected to result in safe operation and conform to regulatory requirements.

2) If the ASI is not thoroughly familiar with all aspects of the alteration or repair, or has any doubt about the expected airworthiness, an airworthiness determination must not be given. He or she will seek assistance to the extent necessary to enable him or her to reach a clear decision before approval or denial is given.

3) Flight Standards District Offices (FSDO) must ensure that an ASI's lack of experience or qualifications does not necessarily stop the approval process. The ASI's lack of qualifications does not mean the FSDO should deny a field approval and tell the applicant that they need to seek an STC. The ASI can seek assistance from another ASI or FSDO, as appropriate.

4) ASIs occasionally receive requests to approve alterations or repairs that do not require a field approval. Deny these requests. Typically, these requests fall into one of two categories: minor alterations or repairs, or alterations or repairs that can be accomplished using previously approved data. Minor alterations and repairs do not need approved data and, therefore, should not receive a field approval. Alterations and repairs that are supported by sufficient DER-approved data may not require further approval. ASIs should review the data packages for each requested approval to ensure that a field approval is necessary and is appropriate. ASIs who deny field approval requests to operators for alterations or repairs that do

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not need or qualify for field approvals should explain to the operator the reason for the denial and, if requested, provide the reason(s) in writing or via email. The applicant or operator can then retain the reason(s) within the aircraft records for future reference.

E. DER. If the applicant employs a DER to provide approved technical data to support a major alteration or major repair, then the applicant is responsible to ensure that the DER(s) is authorized to approve such technical data, as applicable to the alteration. If the data, as approved, addresses the entire alteration or repair, and all of the requirements of parts 21 and 43 are met, there is no requirement for any further approval by the ASI.

1) If the repair or alteration data is approved solely by the DER(s) but necessitates instructions for continued airworthiness (ICA) in addition to the maintenance recording requirements of part 43, § 43.9, the ICA should be prepared by the applicant and recorded in block 8 of FAA Form 337. The Instructions for Continued Airworthiness Checklist (Figure 4-66) should be used as a guide for the applicant who creates the ICA. The ICA developed in accordance with this guidance constitutes methods, techniques, and practices acceptable to the Administrator and therefore is not required to be reviewed by the FAA. The ICA provides the aircraft owner/operator with the advantages contained in paragraph 4-1189.

2) The DER may be limited to technical areas that do not fully cover all aspects of the entire project. DER authorizations and limitations are referenced in the current edition of FAA Order 8110.37, Designated Engineering Representative (DER) Guidance Handbook. The FAA must evaluate any area not covered by this approval. The ASI may need to approve the lacking technical data on the FAA Form 337 or elevate that data to the ACO for approval. The ASI approves and is responsible only for the data not listed on FAA Form 8110-3, Statement of Compliance with Airworthiness Standards. A list of eligible consultant DERs and their appointed functions and authorizations is available at http://www.faa.gov/other_visit/aviation_industry/designees_delegations/designee_types/media/DERDirectory.pdf.

F. Eligibility of DER to Approve Technical Data. FAA Order 8110.37, paragraph 4-12, subparagraphs a and c addresses approval of technical data by DERs holding specific authority. For other than that, as is applicable to the STC, the DER will provide performance support of major repairs and major alterations as appropriately identified on FAA Form 337. DERs do not have authorization to approve data that is otherwise approved by foreign authorities or their designees when such technical data is identified in an Engineering Order (EO) or other assignable document. DERs also do not have authorization to approve repairs or alterations using FAA Form 337, which is limited to a qualified ASI authorized to perform a field approval. DERs are not held accountable, nor can they be held accountable for, configuration control.

G. Description of DER Approval of Technical Data.

1) FAA Order 8110.37 requires inclusion of a note in the “List of Data” area of FAA Form 8110-3, stating, “This approval is for engineering design data only.” It indicates that the data (listed above) demonstrates compliance only with the regulations specified by paragraph and subparagraph described on FAA Form 8110-3 as “Applicable Requirements.” The DER

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must also indicate if there is a requirement to comply with additional regulations (not described in FAA Form 8110-3). An FAA Form 8110-3 marked "Approve these Data" constitutes FAA approval of applicable data listed on the 8110-3; other approvals may be necessary to substantiate compliance to requirements for the entire repair or alteration. Alterations and repairs that are fully supported by previously approved "DER-approved" data do not require further FAA approval, so long as such data is applicable. The data package submitted to support a field approval must contain DER-approved data and the applicable FAA Form(s) 8110-3. An FAA Form 8110-3 specifying "Recommend for Approval" does not constitute an approval but is usually eligible to support a field approval by the ASI.

2) The FAA must evaluate any area not covered by this approval.

H. ODA Data.

1) ODA-approved data could be documented by either FAA Form 8100-9, Statement of Compliance with Airworthiness Standards, or FAA Form 8100-11, Organization Designation Authorization Statement of Completion, or both. If the data is only documented by FAA Form 8100-9, the form should note which aspects are covered by the data, and might be included in the data package to support a field approval request. If the data is also documented by FAA Form 8100-11, the approval addresses all aspects of the repair or alteration and field approval is not necessary.

2) For ODA authorizations and limitations, see the current editions of:

- FAA Order 8100.15, Organization Designation Authorization Procedures, and
- The list of authorized ODA holders available at: http://www.faa.gov/other_visit/aviation_industry/designees_delegations/designee_types/media/DARDirectory.pdf.

4-1179 AIRPLANES TC'D UNDER 14 CFR PART 23 OR 25 AND OPERATED UNDER PART 121.

A. Field Approval Eligibility. These aircraft, although not specifically prohibited from receiving field approvals, are not generally eligible for them. Field approvals may be performed on these aircraft in rare instances for extenuating circumstances, and each request must be evaluated on a case-by-case basis. Field approvals are not to be performed for installation of auxiliary fuel tanks or any other fuel system alterations to which §§ 121.1117, 125.509, and 129.117 apply. In addition, field approvals are not to be performed for installation of auxiliary fuel tanks or any other fuel system alterations to which 14 CFR part 91, § 91.1507, §§ 121.1113, 125.507, and 129.113 apply. If an ASI from a FSDO/certificate management office (CMO)/International Field Office (IFO) believes that a field approval request is appropriate, the FSDO/CMO/IFO will obtain concurrence from the Flight Standards Service (AFS) division Regional Office (RO) prior to performing the approval.

B. Field Approval Database. The AFS division RO will maintain a database of field approvals accomplished on part 121 aircraft that it either concurred or nonconcurred with. This database will contain:

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- A unique control number for each instance,
- The date of concurrence or nonconcurrence,
- The name of the ASI assigned to field approve the alteration/repair,
- The FSDO's/CMO's/IFO's routing symbol,
- An indication of concurrence or nonconcurrence,
- The air carrier identifier,
- The make/model of the aircraft, and
- A brief description of the requested approval.

4-1180 COMMERCIAL DERIVATIVE AIRCRAFT (MILITARY). TC'd aircraft operated by or for the U.S. military require special consideration for field approvals due to the complexity of the aircraft and systems. Coordinate any request for field approvals through the FAA Military Certification Office (MCO) and AFS-340. The MCO should provide a concurrence that the proposed field approval is compatible with previously installed systems or design criteria.

4-1181 INCOMPLETE AND/OR INCREMENTAL INSTALLATIONS.

A. Conditions and Limitations. If it is intended that the aircraft operate for an unspecified period of time per § 91.213 and/or without complete equipment or system functionality, then installations of such equipment or components are considered to be incomplete or incremental. AC 43-210, Standardized Procedures for Requesting Field Approval of Data, Major Alterations, and Repairs, refers to approval of such installations as "piecemeal installation approval process." Installation of equipment or components such as racks, wiring, circuit breakers, hard-points, etc., may be accomplished and may be eligible for field approval if one determines such installation is a major alteration to an aircraft. Such aircraft having been altered may receive approval for RTS only if the following have been accomplished:

1) All applicable technical data was FAA-approved prior to performance of the installation;

2) The determination that the incomplete or incremental installation does not adversely affect safe operation of the aircraft;

3) The equipment or components as installed remain deactivated and appropriate placards have been affixed to prohibit use of such equipment or components;

4) Aircraft Weight and Balance (W&B) data reflects the incomplete installation; and

5) The signing and completion of the required aircraft maintenance records, including the logbooks and FAA Form 337 as appropriate, for the work that was actually accomplished.

NOTE: In order to maintain a current airworthiness certificate, the approval for RTS must be accomplished by an authorized person identified in § 43.7.

B. Conformity Inspection. The applicant must conduct a conformity inspection on the completed alteration. FAA approval of the incremental installation may provide for use of

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installed equipment if the FAA can determine that such equipment can be used safely (i.e., may require placards, flight manual supplements, crew training).

4-1182 DESIGN APPROVAL OF REPAIRS TO AERONAUTICAL PRODUCTS (CANADIAN EQUIVALENT TO A UNITED STATES DER). The FAA and Transport Canada Civil Aviation (TCCA) have agreed in a Memorandum of Understanding (MOU) that certain TCCA and TCCA-delegated repair design approvals are considered to be FAA-approved data. The following information is provided for reference, but the MOU should be reviewed if additional guidance is required. The MOU is available at http://www.tc.gc.ca/CivilAviation/certification/Int/Memoranda/usa.pdf.

A. United States-Held TCs. For United States-held TCs, only repair design approvals issued by TCCA are considered to be approved data. Repair design approvals issued solely by a TCCA delegate are not approved data and, to be used as such, require TCCA approval or direct approval by the FAA or FAA designee.

B. Canadian-Held TCs. For Canadian-held TCs, repair design approvals issued by either TCCA or a TCCA delegate are considered to be approved data.

C. All Other Countries. For TCs held by all other countries, do not consider TCCA or TCCA-delegated repair design approvals to be approved data.

D. TCCA Repair Design Certificate. A TCCA Repair Design Certificate (equivalent to FAA Form 8110-3) can accompany data and can be signed by either a TCCA-approved Design Approval Representative or TCCA airworthiness authority.

E. Additional Instructions. For additional instructions on reciprocal acceptance of repair design data approvals between FAA and TCCA see FAA Order 8110.53, Reciprocal Acceptance of Repair Design Data Approvals Between FAA and TCCA.

4-1183 DESIGNATED AIRWORTHINESS REPRESENTATIVE (DAR).

A. Representatives of the Administrator. DARs with function code 50 serve as representatives of the Administrator. They review the data package or Standard Data Package (SDP) developed to substantiate an alteration to determine or ensure that:

1) The intended alteration can be accomplished as a minor change to the type design and that an STC is not required for the alteration intended to be performed.

2) All regulatory requirements including all pertinent airworthiness standards are addressed to ensure that the alteration(s) intended to be performed can be accomplished.

3) Data approved by FAA-authorized designees are within the scope and limitations of the DER’s or other designee’s authority.

4) Appropriate approvals exist for technical data that encompasses and is applicable to the entire alteration.

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5) ICA applicable to the alteration have been developed and substantiated against the checklists contained in AC 43-210 and Figure 4-66.

B. Task Accomplishment. To accomplish this task, the management DAR must:

1) Determine the data package is complete with all FAA-approved data.

2) If the data package is not complete, recommend completion of data approval by a DER(s), the ACO, or FSDO, as appropriate.

3) Coordinate with the applicant and FAA FSDO when the alteration does not meet airworthiness requirements.

4) If the data package meets all FAA requirements, complete FAA Form 337, block 3, for certification of completeness.

5) Return the package to the applicant for alteration completion.

6) Maintain records of the work completed for review by the designee managing office.

C. Entries. Make the following entry in FAA Form 337, block 3, for certification of completeness: "The alteration identified herein has been reviewed, and found to be complete, inclusive of appropriate designee approvals. All aspects of the alteration(s) are compatible and eligible for use on the above described aircraft, subject to conformity inspection by a person authorized in § 43.7." DARs are currently not authorized to perform field approval.

4-1184 COORDINATED FIELD APPROVAL. Coordinated field approval includes a request by an ASI for FAA Aircraft Certification personnel to provide an evaluation of the field approval application and accompanying data and possibly to provide assistance in approving such data to be used in support of a major repair or major alteration. The engineering evaluation may result in concurrence that issuing a field approval is feasible and appropriate. The engineering evaluation also includes an assessment of the submitted data and an approval or a denial of the submitted data. Such denial may be for reasons that the data is inadequate or that it insufficiently describes the basis for approval. An ACO may also determine that the proposed alteration to the product constitutes a major change to the type design, which will result in approval for the alteration to be made through the STC process. The FAA recommends that ASIs coordinate with their regional specialist when contacting the ACO to coordinate a field approval and report to their applicant accordingly.

A. ACO Engineering Assistance Request. You can transmit a request for FAA engineering assistance by one of several means, including use of a record of communications, an email request to the ACO technical branch manager through the FSDO manager or designated person, or with coordination of the Regional Specialist for the specific technical area or specialty on the matter of interest. The ASI should identify what elements, based upon the applicant's intended repair or alteration, require ACO participation.

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B. Contact the ACO. If the ACO should discover that the intended alteration warrants application for an STC, etc., then instruct the person intending to perform the work to contact the ACO directly and officially notify them that the field approval request is no longer actionable.

4-1185 ALTERATIONS THAT MAY REQUIRE ENGINEERING EVALUATION, ACO ASSISTANCE, OR STCs.

A. Major Alterations. The list in Figure 4-68, Eligibility Considerations For Field Approval, describes methods of approval for typical major alterations. This list is not all-inclusive; examine each project on a case-by-case basis. If an alteration is not on the list, it may be eligible for a field approval; however, each alteration must be evaluated on a case-by-case basis. Items not listed should be treated as Evaluation (designated by the letters "EVL"). Alterations on transport category aircraft with 30 or more passenger seats or operating under part 121 should be considered Engineering (designated by the letters "ENG") and must be coordinated with the RO.

B. Alternative. An alternative to the field approval process is the use of a properly authorized FAA ODA on Form 8100-9 and/or individual DER-approved data on FAA Form 8110-3 (with data). If all the data supporting compliance with applicable airworthiness regulations is DER-approved, then the product can be altered in accordance with that data. An ODA or DER may not approve data where Figure 4-68 indicates "STC" unless the STC project number is listed on the Form 8110-3. The person(s) signing blocks 6 and 7 of FAA Form 337, not the DER, is then responsible for conforming and certifying that the work was accomplished in accordance with the description of work accomplished in block 8 of the Form 337 for the repair or the installation.

C. Aircraft Flight Manual Supplements (AFMS). An AFMS approval may be necessary from the ACO when an ASI is not specifically authorized to review and approve as described by Information for Operators (InFO) 08047. The ASI should confirm through the applicant that the configuration of the equipment and systems, as installed, are described or properly characterized. The detail contained in the proposed AFMS must conform to the requirements described in subparagraph 4-1186D below, before requesting ACO review and approval.

4-1186 OPERATIONAL FLIGHTCHECK REQUIREMENTS, FLIGHT TESTING, AFMS, AND LIMITATIONS PLACARDS.

A. Change to the Aircraft Flight Characteristics. Any repair or alteration that has been determined to be major or that may substantially affect the aircraft's operation may require the applicant or designee to conduct an operational flight check in accordance with § 91.407(a) and (b). Following successful completion, the results are recorded in the aircraft records.

B. Alteration Requiring a § 21.191(b) Flight Test. An alteration that requires a flight test to show compliance with the regulations in accordance with requirements of § 21.191(b) must be coordinated with the appropriate ACO or authorized flight test DER. A Manufacturing Inspection District Office (MIDO) or authorized DAR must issue an experimental airworthiness certificate for the purpose of showing compliance in accordance with the current FAA

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Order 8130.2, Airworthiness Certification of Aircraft and Related Products. If the flight test is unsatisfactory, the applicant must develop additional data or alter the test plan and conduct such tests to ensure compliance can be substantiated.

C. ACO Flight Testing Assistance.

1) Section 21.33, requires applicants to allow the FAA to make any inspection or testing necessary to determine compliance with applicable requirements of the regulations. As a function of seeking a coordinated field approval, an ASI, through his or her manager, may request flight testing assistance from an ACO by applying to the manager of the ACO. Letters of authorization (LOA) must be used in lieu of a Type Inspection Authorization (TIA) in cases where FAA flight test pilots conduct flights other than dedicated certification flights. Examples of such flights are flight tests in support of field approvals, foreign type validations, proof of concept flights, avionics systems demonstrations, or early FAA participation in developmental flight tests. When there is a requirement for an LOA, the appropriate level of authority commensurate with the level of risk must sign it and following the current edition of FAA Order 4040.26, Aircraft Certification Service Flight Test Risk Management Program.

2) As described in FAA Order 4040.26, the ACO manager will issue an LOA, which will be the vehicle by which ACO management ensures that the "AIR Risk Management Process" has been satisfactorily accomplished for each LOA that occurs. The ACO or flight test managers, or their designees, will sign the respective LOA. These managers must understand that by signing an LOA, they are stating that they have assessed and accepted the flight test risks involved with the project. Therefore, it is necessary for the manager, or his or her designee, to ensure that the proper risk assessment be completed before signing the LOA. The ACO manager or designee will determine and is responsible for the degree and depth of the risk assessment process to be used for each test project. Factors to be considered when making such a determination include, but are not limited to, type of tests (avionics or airframe), knowledge base of particular tests (first time vs. done many times in the past), level of sophistication demonstrated by the applicant (experienced aircraft manufacturer vs. limited flight test experience), and flightcrew currency in both the test method(s) and aircraft type.

D. Limited Authority of ASIs to Review and Approve AFMS. Qualified ASIs with field approval authorization may be specifically authorized by AFS policy to review and approve certain AFMS. Qualified ASIs may grant such approval after establishing that the installed equipment or systems, as well as equipment to which such equipment is interfaced, meets the appropriate airworthiness requirements for compatibility and operational performance. The proposed AFMS must contain the elements of operating limitations placed on the aircraft in accordance with 14 CFR parts 23, 25, 27 and part 29, §§ 29.1525 and 29.1583(h). It should also include abnormal/emergency procedures, normal operating procedures, aircraft performance, and aircraft W&B section. The AFMS must contain the same pertinent details as the Aircraft Flight Manual (AFM) approved under the original TC or STC. ASIs are to ensure when reviewing an AFMS that all limitations include those required in the original FAA-approved AFM by reference and by form and function.

1) The ASI must also ensure that elements such as switches, annunciators, displays and/or flight director/autopilot and instruments, etc., are compatible with the equipment or

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systems, of the aircraft being modified. The AFMS should also contain a "General" or "Systems Description" section that does not require approval at the discretion of the ASI. The ASI must be familiar with the airworthiness standards in part 23, 25, 27, or § 29.1525, and §§ 29.1581 through 29.1589 when approving the AFMS. The AFMS must denote the aircraft manufacturer's name, model number, serial number, and registration number, which limits the FAA-approved AFMS to one aircraft only for configuration control purposes.

2) This authorization is for "Follow-On Installations" that have prior TC or STC approval. In the event the equipment or system does not have prior TC or STC approval, referral to and coordination with FAA engineering is required. Coordinate with the ACO alterations that require the imposing of limitations that may affect the type certification basis of the aircraft, aircraft engine, or propeller.

E. Authority to Review and Approve Placards. A qualified ASI with field approval authorization may review the language and approve an FAA Form 337 granting field approval of an appropriately affixed placard that specifically characterizes operating limitations or information such as that stipulating the use of certain equipment and systems. An example of such placard (e.g., "GPS Not Approved for IFR" in the instance of Global Positioning System (GPS) performance limitations under instrument flight rules (IFR)) is one that must be denoted on the FAA Form 337 and affixed adjacent to the related equipment, or in plain view of the flying pilot. Section 91.9(b)(2) requires the installation of such a placard for which an Airplane or Rotorcraft Flight Manual (RFM) is not required by § 21.5.

4-1187 USE OF FAA FORM 337 FOR RECORDING AND REPORTING MAJOR REPAIRS AND MAJOR ALTERATIONS.

A. Previously Approved Data for an Alteration to a Specific Aircraft. Data that is approved by the FAA to substantiate an alteration for one aircraft is applicable only to that aircraft described in block 1 of FAA Form 337. Such data developed for the altered product is considered acceptable data and may be applied as a basis for developing approved data applicable to alterations on another aircraft involving equipment of the same make and model. The make and model of the aircraft may be different if the installation is similar.

NOTE: ASIs must not approve data for use on multiple aircraft.

B. Evaluating, Recording, and Reporting Deviations to Previously Approved Data. Data that is developed and approved may not be directly applicable to certain products or appliances that receive an alteration. For example, such data may identify a location to which an appliance or component part cannot be installed due to a mounting conflict or configuration differences. In this example, relocation may be considered a deviation to the previously approved data accomplished by TC or STC (including AML STC), designee-approved, or previously field-approved data identified on a FAA Form 337. In instances of such deviations, the ASI must consult with the cognizant ACO responsible for issuance of the TC or STC. Consideration for field approval can occur provided the applicant can show that the alteration meets the certification basis for the aircraft being altered and that the characteristics with regard to aerodynamic function, structural strength, resistance to vibration and deterioration, and other qualities affecting airworthiness are not adversely affected. The aircraft records must identify

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and include such deviations. Conversely, an alteration (which is accomplished using previously approved data that, when implemented, results in a deviation that adversely affects characteristics of aerodynamic function, structural strength, resistance to vibration and deterioration, and other qualities affecting airworthiness and is deemed to be significant) must be reported on an FAA Form 337. Such alteration requires additional FAA approval and may require amending the TC or STC through the cognizant ACO.

C. Disposition of FAA Form 337 (Other Than Additional Fuel Tank Installations). There is no requirement for an ASI to review a completed FAA Form 337. The person completing the FAA Form 337 must do so in duplicate, sending one copy to the owner/operator and send one copy to the Aircraft Registration Branch, AFS-750, P.O. Box 25504, Oklahoma City, OK 73125 within 48 hours. Form 337s that are incorrectly sent to the FSDO for processing may be forwarded to AFS-750; however, the submitter should be counseled on the correct procedure. AFS-750 receives these electronic versions automatically through an interactive Web-based system.

1) Persons requesting access to the electronic FAA Form 337 are required to visit their local FSDO for application and certificate validation. Personnel authorized to perform the certificate validation and complete the application process function are established by local office policy. Obtain more information on electronic FAA Form 337 online at http://eformservice.faa.gov/eForm337.aspx.

2) ASIs are encouraged to inform the users of FAA Form 337 of their responsibility to provide complete and accurate data to avoid noncompliance.

3) Additionally, ASIs and the users of FAA Form 337 should be aware of the aircraft registration document size requirement. Attachments larger than standard 8.5 x 11 inches cannot be processed and will be returned.

4) FAA Form 337 dated (10-06) incorporates revised regulatory text verbiage and minor reformatting to accommodate implementation of the electronic version Form 337. The changes are identified in the current edition of AC 43.9-1, Instructions for Completion of FAA Form 337, and can be used for both paper and electronic submittals.

NOTE: Military aircraft without a U.S. registration, foreign-registered aircraft, and component parts not installed on an aircraft cannot have FAA Form 337 submitted to AFS-750 because they cannot be identified by aircraft make, model, serial number, and U. S. registration number.

D. Disposition of FAA Form 337 for Extended-Range Fuel Tank Installations.

1) In addition to the requirements of paragraph 4-1187 and FAA Form 337 (for extended-range fuel tank installation in the passenger or cargo compartments) within 48 hours, the person completing FAA Form 337 must do so in triplicate, giving one copy to the owner/operator, placing one copy onboard the aircraft, and sending one copy to the Aircraft Registration Branch, AFS-751, P.O. Box 25724, Oklahoma City, OK 73125. Electronic versions are submitted automatically to AFS-751 through an interactive Web-based system.

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2) Although disposition of the completed form is the responsibility of the applicant, inspectors should be aware of the owner/operator's requirements to make these records available for inspection by the Administrator, authorized representatives of the National Transportation Safety Board (NTSB), or upon request of any law enforcement officer (LEO).

4-1188 MODE S TRANSPONDER INSTALLATION. Mode S aircraft identification code is listed on AC Form 8050-3, Certificate of Aircraft Registration, as the International Civil Aviation Organization (ICAO) Aircraft Address Code. If the aircraft registration does not contain this information, aircraft owners and operators with an installed Mode S transponder must obtain an aircraft identification code from the FAA Aircraft Registry in Oklahoma City. This can be accomplished by writing to the FAA at: Federal Aviation Administration, Aircraft Registration Branch, AFS-750, P.O. Box 25504, Oklahoma City, OK 73125-0504, or by calling: 405-954-3116, or toll free: 866-762-9434.

4-1189 ICA.

A. Field Approval Data Package. The Administrator has determined that the field approval data package must include ICAs. The purpose of the ICA is to provide instructions on how to maintain aircraft that are altered and appliances that are installed in accordance with a field-approved major alteration.

1) The Instructions for Continued Airworthiness Checklist (Figure 4-66) is a guide for the applicant who creates the ICA in accordance with methods, techniques, and practices acceptable to the Administrator.

2) If the ICA for the submitted field approval major alteration is not acceptable to the FAA, the inspector should not sign block 3 of the applicant's FAA Form 337.

B. ICA Advantages.

1) The ICA provides the aircraft owner/operator with the following advantages when it is included in block 8 of Form 337:

- The major alteration and reference to ICA is contained in one document;
- The ICA becomes a permanent aircraft record as required by § 91.417(a)(2)(vi); and
- The owner/operator can contact the FAA registry for a replacement FAA Form 337 if the ICA is lost or destroyed.

2) The additional reference to the presence of ICA as part of the major alteration in the aircraft's maintenance entry will ensure that maintenance personnel appropriately address ICAs during future inspections.

C. Field-Approved Major Alterations under the Civil Air Regulations (CAR). For field-approved major alterations to aircraft, engines, and propellers certificated under the CAR, the ICA must meet the original type design requirements. In cases where the major alteration is a totally new design, or a substantially complete redesign that the CAR did not address, the major alteration must meet the applicable 14 CFR requirements. The checklist in Figure 4-66 provides

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acceptable guidance for these types of installations that require additional maintenance, or inspections not covered by the OEM's instructions.

D. ICA Requirements. The ICA requirements are the same for a field approval or STC. Changes that affect the Airworthiness Limitation Section (ALS) should be coordinated with the cognizant ACO. Changes that affect the certificated life limit of a part should not be field approved. The vast majority of field-approved major alterations are simplistic in design and execution. Therefore, the applicant's ICA may not need as much detail as when accomplishing an ICA required for a complicated STC. If the manufacturers' instructions are not available, the applicant may use FAA publications such as part 43 appendix D, ACs 43.13-1, and 43.13-2, or other applicable aviation standards to aid in developing the ICA.

E. Major Alterations. Major alterations approved before October 7, 1998, do not require ICAs. However, if an owner/operator wishes to formally incorporate an ICA for existing field-approved major alterations, they may do so using the revision process in checklist item number 16 in Figure 4-66.

F. ICA Procedures. ASIs will ensure that each major alteration that requires additional maintenance, or inspections resulting from performance of a major alteration when not covered by the OEM's instructions accepted under the field approval process, will have ICAs prepared in accordance with parts 23, 25, 27 and § 29.1529, 14 CFR part 31, § 31.82, 14 CFR part 33, § 33.4, and 14 CFR part 35, § 35.4, as applicable. The description of the ICA will be documented on an FAA Form 337. The ASI will advise the applicant that the entry for the major alteration in the aircraft's maintenance records required by § 43.9 will also include a reference to the ICA and identify the FAA Form 337 by the approval date on which the instructions are documented. The form will be kept in the aircraft's permanent records in accordance with § 91.417(a)(2)(vi).

G. Retroactive ICA. Holders of design approval for products manufactured or altered after January 28, 1981, including either by TC or STC, must furnish at least one set of complete ICAs to the owner of the product, as appropriate, upon delivery.

H. Develop the ICA.

1) The applicant is to develop the ICA and present it in conjunction with the field approval request. Additional guidance is provided in AC 43-210.

2) The checklist in Figure 4-66 is a guide the applicant can use to assure all the applicable requirements are met.

3) The ICA should include specific instructions that describe how to maintain the affected area to ensure continued airworthiness. For example, the ICA might include a new requirement for a special inspection to be accomplished during each 100-hour or annual inspection. Such ICA must also include installed appliances that may impact maintainability of the product or require periodic maintenance to assure their continued performance. When appropriate, the ICA should also include specific instructions for determining excessive wear or deterioration, troubleshooting information, installation and removal procedures, and functional checks. Servicing requirements, such as recommended fluid change intervals or lubrication schedules, should also be included.

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4) The FAA inspector accepts the ICA if it meets the applicable requirements:

a) In the instances that a repair or alteration invokes 14 CFR part 26 to address fuel tank safety (FTS) and electrical wiring interconnection systems (EWIS), the FAA's Oversight Office of the Aircraft Certification Service (AIR) will specifically approve such ICA developed as instructions for inspections to satisfy the regulations.

b) These ICAs contain:

- Inspection tasks and task intervals.
- Instructions/procedures to accomplish the tasks, which are contained in the Aircraft Maintenance Manual (AMM).
- Protection and caution instructions/information, which are contained in the standard wiring practices manual.

4-1190 PREREQUISITES AND COORDINATION REQUIREMENTS.

A. Prerequisites. Identification and authorization to perform field approvals by the FSDO office manager and the regional AFS manager in the form of a signed statement of authorization placed in the ASI's file or in the office manual (the authorization will state that the ASI has authorization to perform field approvals and may also include limitations to this authority).

B. Coordination. This task may require coordination or assistance from FAA engineering, other technical personnel, and the operator. Direct communication between field personnel is recommended to permit a rapid exchange of technical information.

C. Electronic Form 337. Inspectors with field approval authority are authorized to perform approvals via the electronic Form 337 process. Inspectors should establish and maintain a user account with digital signature. Offices should also identify individuals to initiate external user account requests as the point of contact (POC). AFS implementation of a commercial off-the-shelf (COTS) product End-User Product (EUP) system will automate accounts authorized by the AVS POC. Information is available at http://eformservice.faa.gov/eForm337.aspx.

4-1191 REFERENCES, FORMS, AND JOB AIDS.

A. References (current editions):

- Advisory Circular (AC) 20-114, Manufacturers' Service Documents.
- AC 21-40, Guide for Obtaining a Supplemental Type Certificate.
- AC 23-17, Systems and Equipment Guide for Certification of Part 23 Airplanes and Airships.
- AC 23-27, Parts and Materials Substitution for Vintage Aircraft.
- AC 33.4-1, Instructions for Continued Airworthiness.
- AC 43-9, Maintenance Records.
- AC 43.9-1, Instructions for Completion of FAA Form 337.

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- AC 43.13-1, Acceptable Methods, Techniques, and Practices—Aircraft Inspection and Repair.
- AC 43.13-2, Acceptable Methods, Techniques, and Practices—Aircraft Alterations.
- AC 43-210, Standardized Procedures for Requesting Field Approval of Data, Major Alterations, and Repairs.
- Aeronautics Bulletins 7A, 7H, and 8.
- Air Transportation Oversight System (ATOS) Element: Safety Attribute Inspection (SAI)/Element Performance Inspection (EPI) 1.3.9, Major Repairs and Alterations Records.
- Civil Air Regulations (CAR) 3, 4a, 4b, 6, 7, and 8.
- FAA Order 8100.8, Designee Management Handbook.
- FAA Order 8100.15 Organization Designation Authorization Procedures (ODA).
- FAA Order 8110.37, Designated Engineering Representative (DER) Guidance Handbook.
- FAA Order 8110.54, Instructions for Continued Airworthiness Responsibilities, Requirements, and Contents.
- FAA Order 8130.2, Airworthiness Certification of Aircraft and Related Products.
- FAA Order 8310.6, Airworthiness Compliance Check Sheet Handbook.
- Title 14 of the Code of Federal Regulations (14 CFR) parts 1, 21, 23, 25, 27, 29, 31, 33, 34, 35, 36, 39, 43, and 91.
- Type Certificate Data Sheet (TCDS) applicable to the product.

B. Forms:

- FAA Form 337, Major Repair and Alteration (Airframe, Powerplant, Propeller, or Appliance).
- FAA Form 8100-9, Statement of Compliance with Airworthiness Standards.
- FAA Form 8110-3, Statement of Compliance with Airworthiness Standards.
- FAA Form 8110-12, Application for Type Certificate, Production Certificate, or Supplemental Type Certificate.

C. Job Aids:

- Figure 4-66, Instructions for Continued Airworthiness Checklist.
- Figure 4-67, Decision Flow Chart for Field Approval Process.
- Figure 4-68, Eligibility Considerations for Field Approval.
- Job Task Analyses (JTA): 3.2.4, 4.8.11.

4-1192 PROCEDURES.

A. Review the Applicant's Request for a Field Approval. Ensure that the information supplied is complete and appropriate to proceed with the field approval process for the proposed alteration or repair. The applicant should specify the certification rule used as a basis for the field approval (see § 21.101).

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1) Review and evaluate the following before the operator starts the actual work, and to identify any flight test or evaluations that may be required, as applicable:

a) A formal request submitted on one of the following:

- FAA Form 337 completed in duplicate (in triplicate for extended-range fuel tanks).
- Other administrative forms used by a manufacturer or operator that are acceptable to the Administrator, such as EOs.

b) Proposed flight manual supplements or supplemental flight manuals.

c) FAA Form 8110-3 or Form 8110-9, as applicable.

d) The description of the proposed alteration or repair to ensure that it correctly and accurately describes the alteration or repair.

e) Methods, sketches, drawings, stress analyses, photographs, electrical load analyses, etc., to ensure that the operator has considered all applicable design standards and has analyses to substantiate the findings in this regard. The inspector must consider at least the following:

- The certification basis, including special conditions (fail safe, damage tolerance, etc.).
- The structural requirements that may be affected by the alteration or repair.
- Any hazards that may affect the aircraft or its occupants.
- W&B computations.
- Operating limitations.
- Any other factors affecting safety or airworthiness.

f) Ensure that all ground and flight tests and operational checks meet applicable certification requirements to substantiate the alteration or repair.

2) ICAs, as required, are prepared in accordance with Figure 4-66 and guidance in AC 43-210, for each product or component receiving alterations.

B. Evaluate the Proposal. Determine if the applicant has conducted a conformity evaluation to ensure that the proposed alteration will not impact the airworthiness of the aircraft. The applicant will provide verification that he or she has inspected the aircraft and reviewed the aircraft records to ensure compatibility of this alteration or repair with previously approved modifications.

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C. Evaluate Data Package.

1) If a determination is made that the proposed alteration is beyond the scope of a field approval, advise the applicant that an STC is necessary. Assistance to the applicant will include the following:

- Furnish the FAA Form 8110-12 application for an STC.
- Advise that supporting data must be attached.
- Assist in providing AC 21-40.
- Refer the applicant to the current edition of FAA Order 8110.4, Type Certification.

2) If assistance from an ACO is necessary for approving a major alteration or major repair, the ASI, not the applicant, should make the request for engineering evaluation/assistance and/or approval of non-approved engineering data for the field approval. The FAA recommends that ASIs notify their regional specialists when requesting ACO assistance with a coordinating field approval. A memorandum from the ASI's office to the ACO should accompany the file. The memorandum should provide pertinent and detailed information, such as the ASI's recommendations and specific requests for advice. After the ACO has completed its evaluation, the ACO should return the file to the ASI. Coordination with the applicant will include the following:

a) Request that the applicant provide all supporting data.

b) Caution against proceeding with the alteration/repair before receiving engineering approval.

c) Provide the applicant with a proposed schedule for completion of the project that is consistent with available resources.

d) Specific authorization:

- ACs, notices, or other written documentation may authorize AFMS or aircraft supplemental flight manual signature authority.
- ACO-authorized interior compliance inspections.
- Other written authorizations as requested by the ACO and MIDO during the coordination process.

D. Data Package Accepted for Field Approval.

1) ACO Concurrence. If the ASI requests engineering assistance, written ACO concurrence (e.g., memo or email) becomes an attachment to FAA Form 337.

2) Approval for Data Only. If the repair or alteration data complies with regulations, record data approval by entering the appropriate statement and signing block 3 of FAA Form 337; return both copies to the applicant. When recording FAA approval in block 3, use the following statement: "The data identified herein complies with the applicable

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airworthiness requirements and is approved for the above described aircraft, subject to conformity inspection by a person authorized in § 43.7."

3) Approval of Technical Data by Physical Inspection. Schedule a physical inspection with the applicant to verify workmanship and compliance of the data submitted. If the repair or alteration complies with regulations, record alteration approval by entering the following statement, signing block 3 of FAA Form 337, and return copies to the applicant: "Approval by Physical Inspection, Demonstration, Testing, etc. One Aircraft: The alteration or repair identified herein complies with the applicable airworthiness requirements and is approved for the above described aircraft, subject to conformity inspection by a person authorized in § 43.7."

NOTE: ASIs must not approve data that is intended for use on more than one product.

4) Denial of Proposed Alteration/Repair Approval. If the applicant is unwilling or unable to comply with the requirements to obtain the requested field approval, terminate the process by notification in writing to the applicant. This notification should include the reason for denial. The applicant should be given the opportunity to make necessary corrections within a reasonable amount of time from receipt of notification.

4-1193 TASK OUTCOMES.

A. Complete the PTRS Record.

B. Final Outcome. Completion of this task can result in the approval of the data, alteration, or repair; reference to the ACO for an STC; or denial of a request for a field approval.

4-1194 FUTURE ACTIVITIES. None.

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Figure 4-66. Instructions for Continued Airworthiness Checklist

A/C Make_____ Model_____ S/N_____ Reg. #N_____

Revision:_____ Date:_____ System:_____

Item	Subject
1.	Introduction: This section briefly describes the aircraft, engine, propeller, or component that has been altered. Include any other information on the content, scope, purpose, arrangement, applicability, definitions, abbreviations, precautions, units of measurement, referenced publications, and distribution of the instructions for continued airworthiness (ICA) as applicable.
2.	Description: Describe the major alteration and its functions, including an explanation of its interface with other systems, if any.
3.	Control, operation information: Or special procedures, if any.
4.	Servicing information: Such as types of fluids used, servicing points, and location of access panels, as appropriate.
5.	Maintenance instructions: Such as recommended inspection/maintenance periods in which each of the major alteration components are inspected, cleaned, lubricated, adjusted, and tested, including applicable wear tolerances and work recommended at each scheduled maintenance period. This section can refer to the manufacturer's instructions for the equipment installed where appropriate (e.g., functional checks, repairs, and inspections). It should also include any special notes, cautions, or warnings, as applicable.
6.	Troubleshooting information: Information describing probable malfunctions, how to recognize those malfunctions, and the remedial actions to be taken.
7.	Removal and replacement information: This section describes the order and method of removing and replacing products, parts, and any necessary precautions. This section should also describe or refer to manufacturer's instructions to make required tests, trim checks, alignment, calibrations, center of gravity (CG) changes, lifting or shoring, etc., if any.
8.	Diagrams: Of access plates and information, if needed, to gain access for inspection.
9.	Special inspection requirements: Such as X-ray, ultrasonic testing, or magnetic particle inspection, if required.
10.	Application of protective treatments: To the affected area after inspection and/or maintenance, if any.
11.	Data: Relative to structural fasteners such as type, torque, and installation requirements, if any.
12.	List of special tools: Special tools that are required, if any.

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Figure 4-66 Instructions for Continued Airworthiness Checklist (continued)

13.	For commuter category aircraft: The following additional information must be furnished, as applicable: A. Electrical loads. B. Methods of balancing flight controls. C. Identification of primary and secondary structures. D. Special repair methods applicable to the aircraft.
14.	Recommended overhaul periods: Are required to be noted on the ICA when an overhaul period has been set by the manufacturer of a component or equipment. If there is no overhaul period, the ICA for item 14 should state: "No additional overhaul time limitations."
15.	Airworthiness Limitation Section (ALS): Include any approved airworthiness limitations (AL) identified by the manufacturer or Federal Aviation Administration (FAA) type certificate (TC)-holding office (e.g., a Supplemental Type Certificate (STC) incorporated in a larger field-approved major alteration may have an AL). The FAA inspector will not establish, alter, or cancel ALs without coordinating with the appropriate FAA TC-holding office. If there are no changes to the ALs, the ICA should state for item 15: "No additional Airworthiness Limitations" or "Not Applicable."
16.	ICAs are required to be acceptable to the FAA. As such, changes should be documented by submitting the revised ICA along with the original Form 337 to the Aircraft Registration Branch in Oklahoma City. An entry in the aircraft records should indicate the current revision.

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Figure 4-67. Decision Flow Chart for Field Approval Process

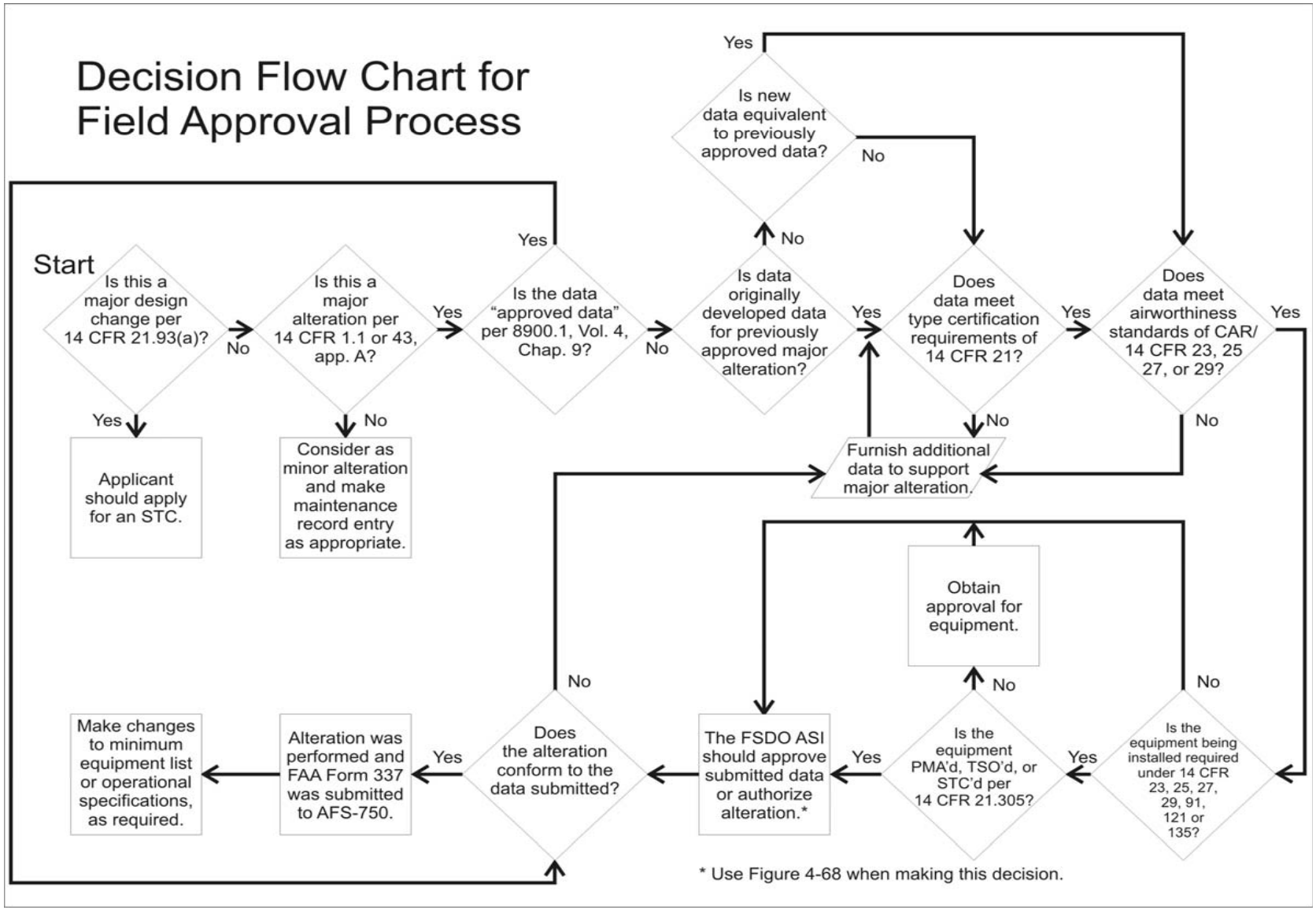

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Figure 4-68. Eligibility Considerations for Field Approval

The following lists indicate which method(s) may be used for approving major alterations to type-certificated (TC) and Supplemental Type-Certificated (STC) products. These lists are not all-inclusive, and each alteration should be evaluated on a case-by-case basis. Consult each section that concerns your product. Additionally, aviation safety inspectors (ASI) should review current notices, advisory circulars (AC), etc., for specific types of installations that have been identified as candidates for field approval. The legend is as follows:

1. Items with the letters “STC” require an STC. With the complexity of broad applications concerning major alterations, inspectors occasionally encounter a situation in which the guidance material requires application for an STC, but the applicant feels the change doesn't warrant approval as a major change to the product's type design. In those instances, the applicant may request assistance from the Flight Standards District Office (FSDO) to obtain a reclassification for the specific alteration. The FSDO should coordinate the request with the appropriate Aircraft Certification Office (ACO) either by phone or email if the FSDO feels further consideration is warranted. If the ACO determines that the reclassification request should be considered, the ACO should obtain concurrence from the appropriate product directorate and Aircraft Engineering Division (AIR-100) for the reclassification. The ACO will provide the Aircraft Certification Service (AIR) position on the reclassification request and document the directorate and AIR-100 concurrence in writing to the FSDO (email preferred). This concurrence must be referenced on the FAA Form 337 prior to issuing the field approval or documenting the alteration with approved data. Reclassification decisions will be monitored and the data used to improve the descriptions and criteria in the job aid.

2. Items designated ‘Evaluation” by the letters “EVL” may be eligible for approval by means other than a STC, depending on the scope and complexity of the alteration. These items will not automatically qualify for a field approval; they require evaluation and review of guidance to determine if the field approval process may be applied and is appropriate. The ASI may seek assistance from the ACO if necessary in making determinations of items listed as “EVL”.

3. Items designated “Engineering" by the letters “ENG” may be eligible for approval by means other than a STC, but require either supporting Designated Engineering Representative (DER) or Organization Designation Authorization (ODA) approved engineering data or concurrence from the ACO for issuance of field approval.

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

1. NORMAL, UTILITY, ACROBATIC, AND COMMUTER CATEGORY AIRPLANES.	
NOTE: The following list applies to aircraft certificated under Title 14 of the Code of Federal Regulations (14 CFR) parts 23 and 31 (or earlier regulations).	
A. Weight and Balance (W&B).	
1) Changes that increase the certificated maximum weight limits (increases in the maximum gross weight, maximum takeoff, or landing weights).	STC
2) Changes in the certificated center of gravity (CG) range limits (for example, decreasing the forward limit or increasing the aft limit).	STC
3) Changes that increase the operational limits (maximum speed limits such as maneuvering speed (V_A), maximum flap-extended speed (V_{FE}), never-exceed speed (V_{NE}); minimum speed limitations, such as stall speed; increases or reductions in certificated service ceiling; and other performance parameters, as affected).	STC
B. Structural Strength.	
1) Changing primary structures (structures that carry flight, ground, or pressure loads as defined in the current edition of AC 23-13, Fatigue, Fail-Safe, and Damage Tolerance Evaluation of Metallic Structure for Normal, Utility, Acrobatic, and Commuter Category Airplanes).	ENG
2) Changes to significant structure to accommodate appliances installed on the exterior of the aircraft (i.e., Forward Looking Infrared (FLIR) equipment or system, cameras, firefighting, agricultural dispensing equipment, etc.). (See the current edition of AC 23-17, Systems and Equipment Guide for Certification of Part 23 Airplanes and Airships, for guidance for the substantiation of modifications involving installation of external equipment.)	STC
3) Substituting airframe primary structural materials.	STC
4) Substituting an engine or propeller (such as replacing a reciprocating engine with a turbine engine).	STC
5) Substituting or altering a reciprocating engine such that the net result is an increase of more than 10 percent greater horsepower.	STC

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

6) Effects from changes above that affect flutter and vibration for any of the aforementioned changes.	STC
7) Substituting blind fasteners in primary load structures.	ENG
8) Altering passenger-carrying aircraft to an all-cargo or combination configuration.	STC
NOTE: All field approvals for blind fasteners (Cherry Max, or equivalent) in primary load structures must be coordinated with the ACO or supported by DER- or ODA-approved data.	
C. Reliability.	
1) Changes to manifolding, air induction systems or air intake doors, engine cowling, or baffle that affect the flow of engine cooling air and carburetor/fire ignition heat rises.	STC
2) Changes to the basic engine or propeller design, controls, and operating limitations.	STC
3) Changes that include engine/propeller adjustments and settings limitations that affect power output.	STC
4) Modifications to approved avionics equipment that affect functionality, reliability and/or airworthiness, such as:	
a) Deviating from the design environment, qualification, or minimum performance standards as specified under a TC or air traffic control (ATC).	STC
b) Changes to appliances that affects performance, functionality, or configuration that are determined to be major alterations other than those specified and approved by an Airworthiness Directive (AD) or performed by the design approval holder (DAH), which are completed using approved data, that must be documented in the aircraft records.	ENG
c) Deviating from the component manufacturer's specific operating limitations.	STC
d) Changes to operating system or imbedded software applications. This does not include navigation, terrain, synthetic vision system, and surface navigation/guidance databases.	STC

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

e) Changes to airplane structural, physical, electrical properties, or equipment that could adversely affect Reduced Vertical Separation Minimum (RVSM) systems and airplane performance.	ENG
f) Altering wiring, shielding, or bonding that may adversely affect protection against High Intensity Radiated Fields (HIRF) and electromagnetic interference (EMI) or lighting diversion or suppression.	ENG
D. Operational Characteristics.	
1) Changes or relocation of systems (including hydraulic, oil, and fuel systems) and equipment that affect structural integrity, flight, ground handling characteristics, or noise/acoustics of the aircraft.	STC
2) Changes that alter the movable control surfaces that affect the dynamic and/or static balance, alter the aerodynamic contour of movable control surfaces, or change the weight distribution.	STC
3) Changes in control surface travel, control system mechanical advantage, location of control system component parts, or direction of motion.	STC
4) Changes in basic dimensions or external aerodynamic contour/configuration of the aircraft such as wing and tail planform or incidence angles, canopy, contour or radii, the location of wing and tail fairings, winglets, wing lift struts, tiptanks, windows, and doors.	STC
5) Changes in canopies, windows, and doors on unpressurized aircraft.	ENG
6) Changes in engine cowlings.	ENG
7) Changes to flight-critical electrical/electronic equipment and systems such as electronic flight controls or the engine control system, full-authority digital electronic control (FADEC), electronic engine control (EEC), or fly-by-wire.	STC
8) Changes that affect aircraft performance, drag, engine power, revolutions per minute (rpm), or exhaust muffler.	ENG
9) Changes that increase the differential pressure limits of an atmospheric or climatic control system of aircraft interior compartments.	ENG
10) Changes in engine and propeller combination (vibration approval).	ENG

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

11) Changes affecting noise.	ENG
12) Changes affecting flight characteristics.	ENG
13) Installation of:	
a) Avionics systems that perform critical functions, other than installation of basic attitude, altitude, and airspeed instruments, or are highly integrated with complex switching interfaces with other equipment and systems.	STC
b) Avionics systems installed under an approved model list (AML) STC that do not conform to the type design established at the time of certification or which require assessment caused by a deviation in location of ancillary components or equipment.	ENG
c) Systems that extract power from drive systems, such as air conditioning power drawn from the tail rotor driveshaft.	STC
d) Health Usage Monitoring Systems (HUMS) or Data Transfer Units (DTU).	STC
e) Head-up display (HUD), enhanced flight vision systems (EFVS), or Synthetic Vision Systems (SVS) used for primary navigation.	STC
f) Traffic alert and collision avoidance device (TCAD), traffic advisory systems (TAS), and Traffic Alert and Collision Avoidance Systems (TCAS) I (see Information for Operators (InFO) 08047).	EVL
g) TCAS II.	STC
h) Autopilots (AP), flight guidance systems, and automatic flight control systems (AFCS) or flight directors (FD).	STC
i) Cockpit voice recorders (CVR) and associated interfaces.	EVL
j) Flight data recorders (FDR) and associated sensors or digital flight data acquisition units (DFDAU).	STC
k) Electronic flight instrument systems (EFIS).	STC
l) Electronic horizontal-situation indicators (EHSI). (See the current edition of AC 23.1311-1, Installation of Electronic Display in Part 23 Airplanes, and InFO 08047.)	EVL
m) Ground proximity warning systems (GPWS).	STC

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

n) Terrain Awareness and Warning Systems Class A (TAWS-A). (See the current edition of AC 23-18, Installation of Terrain Awareness and Warning System (TAWS) Approved for Part 23 Airplanes, and InFO 08047.)	ENG
o) Terrain Awareness and Warning Systems Class B (TAWS-B). (See AC 23-18 and InFO 08047.)	EVL
p) Emergency Vision Assurance System (EVAS).	STC
q) Mounting fixtures or brackets for portable devices such as Global Positioning System (GPS) or Electronic Flight Bag (EFB) must be flame-resistant in compliance with the requirements of part 23, § 23.853(a) and wiring as installed meets the requirements of §§ 23.1359(c) and 23.1365(a), (b), and (d) and has passed the flammability tests of part 23 appendix F, paragraph (g). Also see the current edition of AC 23-2, Flammability Tests.	ENG
r) GPS or Global Navigation Satellite System (GNSS). (See AC 20-138, Airworthiness Approval of Positioning and Navigation Systems, and InFO 08047.) NOTE: Field approval of coupled lateral approach procedures with vertical guidance (LPV) may be issued for compatible autopilots/flight guidance systems identified by the initial STC holder or the equipment and system manufacturer.	EVL
s) Multi-sensor Navigation System (including Navigation Management Systems (NMS) and flight management systems (FMS)). (See the current edition of AC 20-138 and InFO 08047.) NOTE: Field approval of coupled LPV may be issued for compatible autopilots/flight guidance systems identified by the initial STC holder or the equipment and system manufacturer.	EVL
t) Multifunction displays (MFD) or Electronic Map Displays (EMD) (see AC 23.1311-1). NOTE: MFDs, EMDs, or similar electronic displays are systems that are capable of depicting graphic information (e.g., engine instrumentation, TAS, TCAS, TAWS, terrain, moving map, weather detection, weather radar, windshear, etc.) from multiple sensors that have been demonstrated to meet applicable minimum performance standards or that are produced under Technical Standard Order Authorization (TSOA). When used to display primary flight information to meet regulatory operating requirements, the manufacturer or installer must ensure that such information, as it is scheduled to be depicted, is prioritized as to its	ENG

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

importance in critical flight phases so that, for example, TAWS or terrain contours and/or alerts are depicted near terrain or obstructions, windshear alerts are depicted on approach or departures to airports below 900 feet above ground level (AGL), or weather radar is displayed, unless overridden by TAS or TCAS, in environments with threatening proximate traffic, etc.	
u) EFB Class 1 and Class 2 mounting devices, data connectivity and aircraft power connections. See the current edition of AC 120-76, Guidelines for the Certification, Airworthiness, and Operational Approval of Electronic Flight Bag Computing Devices. NOTE: Class 1 and Class 2 EFB units themselves are considered to be portable electronic devices (PED) and do not require installation approval.	ENG
v) EFB Class 3 employing Type A, B and/or C software applications. (See AC 120-76 and FAA Order 8900.1 for instructions.)	STC
w) EVAS.	STC
x) Night vision goggles (NVG) environments, including existing lighting and Night Vision Imaging System (NVIS) arrays.	STC
y) FLIR, Light Detection and Ranging (LIDAR), or airborne surveillance systems incorporating visible and non-visible laser pointer, range finder, and laser illumination devices (Class IIIb and Class IV, as rated by the Food and Drug Administration (FDA)).	STC
z) High-Intensity Discharge (HID) lamps and power supplies must have been issued STC for a particular make and model airplane and Parts Manufacturer Approval (PMA) supplement lists' specific eligibility for installation of HID as supplemental lighting only. aa) HID lighting installed and intended for use as primary lighting required to meet performance under the airworthiness standards requires approval by STC.	ENG or STC
bb) Anti-terrorism countermeasures, including flares and dispensing systems.	STC
cc) Automatic Dependent Surveillance-Broadcast (ADS-B).	STC
14) Any alteration that requires flight testing to show compliance with the regulations (not applicable to operational flights following maintenance and alterations conducted under 14 CFR part 91, § 91.407(b)).	ENG

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

E. Changes to Systems that Affect Aircraft Airworthiness, Such as:	
1) Changes to landing gear and related components, such as internal parts of shock struts, length, geometry of members, brake and brake systems, or additions.	STC
2) Changes to an existing or installation of a new icing protection system.	STC
3) Changes to or relocation of exterior fuel vents, fuel drains, or battery vents. (Applicable to components not attached to the basic engine.)	ENG
4) Changes to crew or passenger liquid oxygen (LOX) or onboard generating systems.	ENG
5) Changes to external, critical access doors, auxiliary power unit (APU) ram air, nacelle blowout doors, fuel drain.	ENG
6) Changes to oil, hydraulic, pneumatic, and fuel lines, or systems that affect their operation or installation and flammability requirements, such as:	
a) New types of hoses and/or hose fittings that may not meet installation requirements, such as flow rate and flammability requirements.	ENG
b) New type fuel dump valves.	ENG
c) New oil/fuel/hydraulic line materials beyond the scope of the current edition of AC 43.13-1, Acceptable Methods, Techniques, and Practices—Aircraft Inspection and Repair.	ENG
d) Change to, or addition of, permanent fuel tanks or fuel system components, including sealants.	ENG
7) Changes in fixed fire extinguisher or detector systems that affect the system's effectiveness or reliability, such as:	
a) Relocating discharge nozzles, detector units, or fixed fire extinguisher bottles.	ENG
b) Using new or different detector components.	ENG
c) Decreasing the amount or changing the type of extinguishing agents.	ENG
8) Alterations or repairs that include:	

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

a) Changes that include substituting airframe materials that affect structural integrity, lightning protection, HIRF protection, flight characteristics, or performance.	ENG
b) Use of synthetic covering materials.	ENG
c) Use of new titanium or magnesium applications.	ENG
d) Use of ceramic coatings.	ENG
e) Use of synthetic coatings.	ENG
f) Use of new plated coatings.	ENG
F. Crashworthiness.	
1) Changes to the aircraft structure, cabin interiors, seating configuration, or equipment relocation that affect crashworthiness and/or emergency evacuation. This includes initial installation, replacement (one for one with different seats), or relocation of seats or litter systems.	ENG
2) Changes that affect access and use of emergency exits and passenger door configuration (i.e., emergency medical services, sport parachute jumping).	ENG
NOTE: Alterations to an approved aircraft configuration may in themselves not constitute a major design change that would require application for an STC (see 14 CFR part 21, § 21.113). An engineering evaluation of any proposed alteration that will affect the crashworthiness of an aircraft must be conducted prior to determining if a STC is necessary, or if a field approval would be acceptable. NOTE: Some seemingly minor changes, such as relocating an existing seat one inch, could have the affect of making an interior non-compliant with the airworthiness requirements. An engineering evaluation must be accomplished that considers all the effects of the proposed alteration. In this example, if the relocation reduced the passageway to an emergency exit to less than the required minimum dimension the change would not be allowed. NOTE: Complete initial interior installations require application for an STC or amended TC.	

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

2. NORMAL AND TRANSPORT CATEGORY ROTORCRAFT.	
NOTE: The following section applies to aircraft with a certification basis of 14 CFR parts 27, 29, or the earlier regulations.	
A. W&B.	
1) Changes that increase the certificated maximum weight limits affecting structural, performance, handling qualities, and so forth (for example, increases in the maximum gross weight, maximum takeoff weight, or landing weight).	STC
2) Changes in the certificated CG range limits (for example, decreasing the forward limit or increasing the aft limit).	STC
3) Changes that increase the operational limits (maximum speed limits such as V_A, V_{FE}, V_{NE}; minimum speed limitations such as stall speed, increases or reductions in certificated service ceiling; and other performance parameters, as affected).	STC
B. Structural Strength.	
1) Changing primary structural elements (PSE) (principal elements that carry flight, ground, or pressure loads) defined by the current edition of AC 25.571-1, Damage Tolerance and Fatigue Evaluation of Structure.	STC
a) Changing the structural panels and load-bearing components that could affect service life.	STC
b) Changing internal frame, longeron, or structural members.	STC
c) Changes to significant structure to accommodate appliances installed on the exterior of the aircraft (i.e., FLIR equipment or system, cameras, firefighting, agricultural dispensing equipment, etc.). (See the current editions of AC 27-1, Certification of Normal Category Rotorcraft, and AC 29-2, Certification of Transport Category Rotocraft, for guidance for the substantiation of modifications involving installation of dispensing and other external equipment.)	STC
d) Changes to landing gear and related system and structural components, including wheels, brakes, and tires.	EVL
e) Substituting engine, rotor, or airframe primary structure materials.	STC

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

2) Effects from changes above that affect flutter and vibration for any of the aforementioned changes.	STC
3) Substituting blind fasteners in primary load structures.	ENG
NOTE: All field approvals for blind fasteners (Cherry Max, or equivalent) in primary load structures must be coordinated with the ACO or supported by DER- or ODA-approved data.	
C. Reliability.	
1) Changes to manifolding, air induction systems or air intake doors, engine cowling, or baffle that affect the flow of engine cooling air and carburetor/fire ignition heat rises.	STC
2) Change to the basic engine, or rotor design, controls, or operating limitations.	STC
3) Changes that include engine/rotor adjustments and setting limitations that affect power output.	STC
4) Modifications to approved avionics equipment that affect functionality, reliability and/or airworthiness, such as:	
a) Deviating from the design environment qualifications, or minimum performance standards as specified under TC or ATC.	STC
b) Changes to appliances, which affects performance, functionality, or configuration that are determined to be major alterations other than those specified and approved by the AD, or performed by the DAH, which are completed using approved data, that must be documented in the aircraft records.	ENG
c) Deviating from the component manufacturer's specified operating limitations.	STC
d) Changes to operating system or imbedded software applications. This does not include navigation, terrain, and synthetic vision systems and surface navigation/guidance databases.	STC
e) Altering wiring, shielding, or bonding that may adversely affect protection against HIRF and EMI or lighting diversion or suppression.	ENG
D. Operational Characteristics.	

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

1) Changes or relocation of systems (including hydraulic, oil, and fuel systems) and equipment that affect structural integrity, flight, ground handling characteristics, or noise/acoustics of the aircraft.	STC
2) Changes that alter the movable control surfaces that affect the dynamic and/or static balance, alter the aerodynamic contour of movable control surfaces, or change the weight distribution.	STC
3) Changes in control surface travel, control system mechanical advantage, location of control system component parts, or direction of motion.	STC
4) Changes in basic dimensions or external aerodynamic contour/configuration of the aircraft such as wing and tail planform or incidence angles, canopy, cowlings, contour or radii, the location of wing and tail fairings, winglets, wing lift struts, and tiptanks.	STC
5) Changes in canopies, windows, and doors, including installation of bubble or extended observation windows.	ENG
6) Changes in engine cowlings or housings.	STC
7) Changes to flight-critical electrical/electronic equipment and systems such as electronic flight controls or the engine control system, FADEC, EEC, or fly-by-wire.	STC
8) Changes that affect aircraft performance, drag, engine power, rpm, or exhaust muffler.	ENG
9) Changes that alter the aerodynamic contour that affect noise or flight characteristics.	ENG
10) Installation of:	
a) Avionics systems that perform critical functions, other than installation of basic attitude, altitude, and airspeed instruments, or are highly integrated with complex switching interfaces with other equipment and systems.	STC
b) Avionics systems installed under an AML STC that do not conform to the type design established at the time of certification or which require assessment caused by a deviation in location of ancillary components or equipment.	ENG
c) Systems that extract power from drive systems, such as air conditioning power drawn from the tail rotor driveshaft.	STC

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

d) HUMS or DTU.	STC
e) HUD, EFVS, or SVS used for primary navigation.	STC
f) TCAD, TAS, traffic alert, and TCAS I. (See InFO 08047.)	EVL
g) TCAS II.	STC
h) AP, flight guidance systems, and AFCS or FDs.	STC
i) CVR and associated interfaces.	EVL
j) FDR and associated sensors or DFDAU.	STC
k) EFIS.	STC
l) EHSI. (See the current editions of AC 23.1311-1 and AC 25-11, Electronic Flight Deck Displays, and InFO 08047).	EVL
m) GPWS.	STC
n) TAWS-A.	ENG
o) TAWS-B. (See the current editions of AC 23-18 and AC 25-23, Airworthiness Criteria for the Installation Approval of a Terrain Awareness and Warning System (TAWS) for Part 25 Airplanes, and InFO 08047.)	EVL
p) Mounting fixtures or brackets for portable devices such as GPS or EFB must be flame-resistant in compliance with the requirements of part 27, § 27.853(a) or the requirements of part 29, § 29.853 and wiring as installed meets the requirements of § 27.1365 or § 29.1359 and has passed the flammability tests of 14 CFR part 25 appendix F, part I(a)(3).	ENG
q) GPS or GNSS. (See AC 20-138 and InFO 08047.) NOTE: Field approval of coupled LPV may be issued for compatible autopilots/flight guidance systems identified by the initial STC holder or the equipment and system manufacturer.	EVL
r) Multi-sensor Navigation System (including NMS and FMS). (See the current edition of AC 20-138 and InFO 08047.) NOTE: Field approval of coupled LPV may be issued for compatible autopilots/flight guidance systems identified by the initial STC holder or the equipment and system manufacturer.	EVL

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

s) MFD or EMDs (see AC 23.1311-1 and AC 25-11.) NOTE: MFD, EMDs, or similar electronic displays asre systems that are capable of depicting graphic information (e.g., engine instrumentation, TAS, TCAS, TAWS, terrain, moving map, weather detection, weather radar, windshear, etc.) from multiple sensors that have been demonstrated to meet applicable minimum performance standards or are produced under TSOA. When used to display primary flight information to meet regulatory operating requirements, the manufacturer or installer must ensure that such information, as it is scheduled to be depicted, is prioritized as to its importance in critical flight phases so that, for example, TAWS or terrain contours and/or alerts are depicted near terrain or obstructions, windshear alerts are depicted on approach or departures to airports below 900 feet AGL, or weather radar is displayed (unless overridden by TAS or TCAS) in environments with threatening proximate traffic, etc.	ENG
t) EFB Class 1 and Class 2 mounting devices, data connectivity and aircraft power connections. See AC 120-76. NOTE: Class 1 and Class 2 EFB units themselves are considered to be PEDs and do not require installation approval.	ENG
u) EFB Class 3 employing Type A, B, and/or C software applications. (See the current edition of AC 120-76 and FAA Order 8900.1 for instructions.)	STC
v) EVAS.	STC
w) NVG environments including existing lighting and NVIS arrays.	STC
x) FLIR or airborne surveillance systems incorporating visible and non-visible laser pointer, range finder, and laser illumination devices (Class IIIb and Class VI as rated by the FDA).	STC
y) HID lamps and power supplies must have been issued STC for a particular make and model airplane and PMA supplement lists specific eligibility for installation of HID as supplemental lighting only. z) HID lighting installed and intended for use as primary lighting required to meet performance under the airworthiness standards requires approval by an STC.	ENG or STC
aa) Anti-terrorism countermeasures, including flares and	STC

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

dispensing systems.	
bb) ADS-B.	STC
11) Any alteration that requires flight testing to show compliance with the regulations (not applicable to operational flights following maintenance and alterations conducted under § 91.407(b)).	ENG
E. Changes to Systems that Affect Aircraft Airworthiness, Such As:	
1) Changes to landing gear and related components, such as internal parts of shock struts, length, geometry of members, brake and brake systems, or additions.	STC
2) Changes to an existing or installation of a new icing protection system.	STC
3) Changes to or relocation of exterior fuel vents, fuel drains, or battery vents. (Applicable to components not attached to the basic engine.)	ENG
4) Changes to crew or passenger LOX or onboard generating systems.	ENG
5) Changes to external, critical access doors, APU ram air, nacelle blowout doors, fuel drain.	ENG
6) Changes that include substituting rotor/airframe materials that affect structural integrity, lightning protection, or flight characteristics.	ENG
7) Changes that alter dynamic components of rotorcraft, such as loads, vibration, fatigue, damage tolerance, flaw tolerance, characteristics of main or tail rotor system, transmission system, gearbox, driveshafts, driveshaft support bearings, and main and tail rotor blades.	STC
8) Changes to a critical or life-limited part, including engine/APU rotating parts.	STC
9) Changes of passenger-carrying aircraft to an all-cargo or combination configuration.	STC
10) Changes that may require a human factors compliance finding (for example, in-flight deck instrumentation and controls).	STC
11) Changing or substituting engine/aircraft instrumentation required by a unique characteristic of the particular type design.	STC

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

12) Changes to rpm of main and tail rotor may affect handling performance characteristics and/or noise or acoustics.	STC
F. Changes to Oil, Hydraulic, Pneumatic, and Fuel Lines, or Systems or their Components that Affect Their Operation or Installation and Flammability Requirements, Such as:	
1) New types of hoses and/or hose fittings that may not meet installation requirements, such as those of flow rate and flammability.	ENG
2) New type of fuel dump valves.	ENG
3) New oil/fuel/hydraulic line materials.	ENG
4) New fuel tanks or fuel system components, including sealants.	STC
G. Changes in Fixed Fire Extinguisher or Detector Systems that Affect the System's Effectiveness or Reliability, Such as:	
1) Relocating discharge nozzle, detector units, or fixed fire extinguisher bottles.	ENG
2) Using new or different detectors.	ENG
3) Decreasing the amount or changing the type of extinguishing agents.	ENG
H. Alterations or Repairs that Include:	
1) Changes that include substituting airframe materials that affect structural integrity, lightning protection, HIRF protection, flight characteristics, or performance.	ENG
2) Use of synthetic covering materials.	ENG
3) Use of new titanium or magnesium applications.	ENG
4) Use of ceramic coatings.	ENG
5) Use of synthetic coatings.	ENG
6) Use of new plated coatings.	ENG
I. Crashworthiness.	

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

1) Changes to the aircraft structure, cabin interiors, seating configurations, or equipment relocation that affect crashworthiness and/or emergency evacuation. This includes initial installation, replacement (one for one with different seats), or relocation of seats or litter systems.	ENG
2) Changes that affect access and use of emergency exits and passenger door configurations (e.g., emergency medical services, sport parachute jumping).	ENG
NOTE: Alterations to an approved aircraft configuration may in themselves not constitute a major design change that would require application for an STC (see § 21.113). An engineering evaluation of any proposed alteration that will affect the crashworthiness of an aircraft must be conducted prior to determining if a STC is necessary, or if a field approval would be acceptable. NOTE: Some seemingly minor changes, such as relocating an existing seat one inch, could have the affect of making an interior non-compliant with the airworthiness requirements. An engineering evaluation must be accomplished that considers all the effects of the proposed alteration. In this example, if the relocation reduced the passageway to an emergency exit to less than the required minimum dimension the change would not be allowed. NOTE: Complete initial interior installations require application for an STC or amended TC.	
3. TRANSPORT CATEGORY AIRPLANES.	
NOTE: The following list applies to airplanes certificated under part 25 (or the earlier regulations).	
A. W&B.	
1) Changes in the certificated CG range limits (for example, decreasing the forward limit or increasing the aft limit).	STC
2) Changes that increase the operational limits (maximum speed limits such as V_A, V_{FE}, $V_{NE,}$ $V_{MO,}$ maximum operating limit speed ($V_{MO/}$ M_{MO}); minimum speed limitations such as stall speed, increases or reductions in certificated service ceiling; and other performance parameters, as affected).	STC
3) Changes that increase the certificated maximum weight limits affecting structural, performance, handling qualities, and so forth (for example, increases in the maximum gross weight, maximum takeoff weight, or landing	STC

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

weight).	
B. Structural Strength.	
1) Changing PSEs (principal elements that carry flight, ground, or pressure loads) defined by AC 25.571-1, as well as the following additional modifications or changes to structural members:	STC
2) The *following three exceptions* are permitted to use data approved by an ACO, DER, or ODA for alterations that affect a PSE provided that a damage tolerance evaluation is performed and the data is approved to § 25.571 (amendment 25-45 or later) for the alteration and affected PSE. A PSE is affected when it is physically altered, it is subject to increased loading, or its inspectablility is decreased. NOTE: All the following exceptions require damage tolerance approval. DER/ODA approvals for static strength alone are not permissible. a) *Exception 1*: Alterations that install "small" equipment mounted externally on the fuselage skin. Structural changes to the fuselage skin such as cutouts with reinforcing-doublers installed to accommodate externally mounted equipment (e.g., small antennas), provided that: *1.* Compliance with the damage tolerance requirements of amendment 25-45 or later amendments is demonstrated and approved for the alteration and the affected PSE (e.g., skin, stringers, frames, etc.). *2.* The modification is contained within one frame-stringer bay (area between adjacent frames and adjacent stringers).	ENG
b) *Exception 2*: Alterations that install mechanisms (e.g., brackets, clips etc.) to support system/wiring installations. Structural changes to bulkheads, floor beams, frames, etc., such as those made to install brackets, clips, or other mechanism to accommodate systems/wiring installations, provided that the compliance with the damage tolerance requirements of § 25.571 (amendment 25-45 or later), is demonstrated and approved for the alteration and the affected PSE (e.g., bulkheads, floor beams, frames, etc.).	ENG
c) *Exception 3*: Alterations that install mechanisms (intercostals, tie rods, links, brackets, clevis lugs, fittings, etc.) to support interior component installations. Structural changes to skin, frames, stringers, floor beams, etc., such as those made to install intercostals, tie rods, links, brackets, clevis lugs, fittings etc., to accommodate the installation of interior components (i.e., galleys, closets, lavatories, stowage bins, etc.), provided that compliance with the damage tolerance requirements of § 25.571 (amendment 25-45 or later), is demonstrated and approved for the alteration and the affected PSE (e.g., skin, frames, stringers,	ENG

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

floor beams, etc.).	
3) Changing the structural panels and load-bearing components that could affect service life.	STC
4) Changing internal frame, longeron, or structural members.	STC
5) Changes to significant structure to accommodate appliances installed on the exterior of the aircraft (i.e., FLIR equipment or system, cameras, firefighting, agricultural dispensing equipment, etc.). See the current edition of AC 25-7, Flight Test Guide for Certification for Transport Category Airplanes, for guidance for the substantiation of modifications involving installation of external equipment.	STC
6) Changes to landing gear and related system and structural components, including wheels, brakes, and tires.	STC
7) Substitution of engine, propeller, or airframe primary structure materials.	STC
8) Effects from changes above that affect flutter and vibration for any of the aforementioned changes.	STC
9) Substitution of blind fasteners in primary load structures.	ENG
NOTE: All field approvals for blind fasteners (Cherry Max, or equivalent) in primary load structures must be coordinated with the ACO or supported by DER- or ODA-approved data.	
10) Alteration of passenger-carrying aircraft to an all-cargo or combination configuration.	STC
C. Reliability.	
1) Changes to manifolding, air induction systems or air intake doors, engine cowling, or baffle that affect the flow of engine cooling air.	STC
2) Changes to the basic engine or propeller design, controls, and operating limitations.	STC
3) Changes that include engine/propeller adjustments and setting limitations that affect power output.	STC
4) Modifications to approved avionics equipment that affect functionality, reliability, and/or airworthiness, such as:	

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

a) Deviating from the design environment qualifications, or minimum performance standards as specified under TC or ATC.	STC
b) Changes to appliances that affect performance, functionality, or configuration that are determined to be major alterations other than those specified and approved by AD, or performed by the DAH, which are completed using approved data, that must be documented in the aircraft records.	ENG
c) Deviating from the component manufacturer's specified operating limitations.	STC
d) Changes to airplane structural, physical, electrical properties, or equipment that could adversely affect RVSM systems and airplane performance.	ENG
e) Changes to operating system or imbedded software applications. This does not include navigation, terrain, synthetic vision system, and surface navigation/guidance databases.	STC
f) Altering wiring, shielding, or bonding that may adversely affect protection against HIRF and EMI or lighting diversion or suppression.	EVL
D. Operational Characteristics.	
1) Changes or relocation of systems (including hydraulic, oil, and fuel systems) and equipment that affect structural integrity, flight, ground handling characteristics, or noise/acoustics of the aircraft.	STC
2) Significant changes to the movable control surfaces that affect the dynamic and/or static balance, alter the aerodynamic contour of movable control surfaces, or change the weight distribution.	STC
3) Changes to control surface travel, method of control system mechanical advantage, or direction of motion.	STC
4) Changes in basic dimensions or external aerodynamic contour/configuration of the aircraft, such as wing and tail planform or incidence angles, canopy, cowlings, contour or radii, the location of wing and tail fairings, winglets, wing lift struts, tiptanks, windows, and doors.	STC
5) Changes in engine cowlings or housings.	STC
6) Changes to flight-critical electrical/electronic equipment and systems such as electronic flight controls or the engine control system, FADEC, EEC, or fly-by-wire.	STC

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

7) Changes that affect aircraft performance, drag, engine power, rpm, or exhaust muffler.	STC
8) Changes that alter the aerodynamic contour that affect noise or flight characteristics.	ENG
9) Installation of:	
a) Avionics systems that perform critical functions, other than installation of basic attitude, altitude, and airspeed instruments, or are highly integrated with complex switching interfaces with other equipment and systems.	STC
b) Systems that extract power from drive systems, such as air conditioning, etc.	STC
c) HUMS or DTU.	STC
d) HUD, EFVS, or SVS used for primary navigation.	STC
e) TCAD, TAS, and TCAS I. (See InFO 08047.)	EVL
f) TCAS II.	STC
g) AP, flight guidance systems, and AFCS or FDs.	STC
h) CVR and associated interfaces.	EVL
i) FDR and associated sensors or DFDAU.	STC
j) EFIS.	STC
k) EHSI. (See AC 25-11 and InFO 08047.)	EVL
l) GPWS.	STC
m) TAWS-A.	ENG
n) TAWS-B. (See AC 25-23 and InFO 08047.)	EVL
o) Mounting fixtures or brackets and wiring must meet the flammability requirements of §§ 25.853(a) and 25.1713(c).	ENG
p) GPS or GNSS. (See AC 20-138 and InFO 08047.) NOTE: Field approval of coupled LPV may be issued for compatible autopilots/flight guidance systems identified by the	EVL

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

initial STC holder or the equipment and system manufacturer.	
q) Multi-sensor navigation system (including NMS and FMS). (See AC 20-138 and InFO 08047.) NOTE: Field approval of coupled LPV may be issued for compatible autopilots/flight guidance systems identified by the initial STC holder or the equipment and system manufacturer.	EVL
r) MFD or EMDs. (See the current edition of AC 25-11.) NOTE: MFD, EMDs, or similar electronic displays are systems that are capable of depicting graphic information (e.g., engine instrumentation, TAS, TCAS, TAWS, terrain, moving map, weather detection, weather radar, windshear, etc.) from multiple sensors that have been demonstrated to meet applicable minimum performance standards or that are produced under a TSOA. When used to display primary flight information to meet regulatory operating requirements, the manufacturer or installer also must ensure that such information, as it is scheduled to be depicted, is prioritized as to its importance in critical flight phases so that, for example, TAWS or terrain contours and/or alerts are depicted near terrain or obstructions; windshear alerts are depicted on approach or departures to airports below 900 feet AGL; or weather radar is displayed, unless overridden by TAS or TCAS, in environments with threatening proximate traffic, etc.	ENG
s) EFB Class 1 and Class 2 Mounting devices, data connectivity, and aircraft power connections. See AC 120-76. NOTE: Class 1 and Class 2 EFB units themselves are considered to be PEDs and do not require installation approval.	ENG
t) EFB Class 3 employing Type A, B, and/or C software applications. (See AC 120-76 and FAA Order 8900.1 for instructions.)	STC
u) EVAS.	STC
v) NVG environments including existing lighting and NVIS arrays.	STC
w) FLIR or airborne surveillance systems incorporating visible and non-visible laser pointer, range finder, and laser illumination devices (Class IIIb and Class VI, as rated by the FDA).	STC
x) HID lamps and power supplies must have been issued an STC for a particular make and model airplane and PMA supplement lists specific	ENG

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

eligibility for installation of HID as supplemental lighting only. y) HID lighting installed and intended for use as primary lighting required to meet performance under the airworthiness standards requires approval by STC.	or STC
z) Anti-terrorism countermeasures, including flares and dispensing systems.	STC
aa) ADS-B.	STC
10) Any alteration that requires flight testing to show compliance with the regulations (not applicable to operational flights following maintenance and alterations conducted under § 91.407(b)).	ENG
E. Changes to Systems that Affect Aircraft Airworthiness, Such as:	
1) Changes to landing gear and related components, such as internal parts of shock struts, length, geometry of members, brake and brake systems, or additions.	STC
2) Changes to an existing or installation of a new icing protection system.	STC
3) Changes to or relocation of exterior fuel vents, fuel drains, or battery vents. (Applicable to components not attached to the basic engine.)	ENG
4) Changes to crew or passenger LOX or onboard generating systems.	ENG
5) Changes to external, critical access doors, APU ram air, nacelle blowout doors, fuel drain.	ENG
6) Changes that include substituting engine/propeller/airframe materials that affect structural integrity, lightning protection, or flight characteristics.	ENG
7) Changes to a critical or life-limited part, including engine/APU rotating parts.	STC
8) Changes of passenger-carrying aircraft to an all-cargo or combination configuration.	STC
9) Changes that may require a human factors compliance finding (for example, in-flight deck instrumentation and controls).	STC

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

10) Changing or substituting engine/aircraft instrumentation required by a unique characteristic of the particular type design.	STC
F. Changes to Oil, Hydraulic, Pneumatic, and Fuel Lines, or Systems or Their Components that Affect Their Operation or Installation and Flammability Requirements, Such as:	
1) New types of hoses and/or hose fittings that may not meet installation requirements, such as those of flow rate and flammability.	ENG
2) New type of fuel dump valves.	ENG
3) New oil/fuel/hydraulic line materials.	ENG
4) New fuel tanks or fuel system components, including sealants.	STC
G. Changes in Fixed Fire Extinguisher or Detector Systems that Affect the System's Effectiveness or Reliability, Such as:	
1) Relocating discharge nozzle, detector units, or fixed fire extinguisher bottles.	ENG
2) Using new or different detectors.	ENG
3) Decreasing the amount or changing the type of extinguishing agents.	ENG
H. Alterations or Repairs That Include:	
1) Changes that include substituting airframe materials that affect structural integrity, lightning protection, HIRF protection, flight characteristics, or performance.	ENG
2) Use of synthetic covering materials.	ENG
3) Use of new titanium or magnesium applications.	ENG
4) Use of ceramic coatings.	ENG
5) Use of synthetic coatings.	ENG
6) Use of new plated coatings.	ENG

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

I. Crashworthiness.	
1) Changes to the aircraft structure, cabin interiors, seating configurations, or equipment relocation that affect crashworthiness and/or emergency evacuation. This includes initial installation, replacement (one for one with different seats), or relocation of seats or litter systems.	ENG
2) Changes that affect access and use of emergency exits and passenger door configurations (e.g., emergency medical services, sport parachute jumping).	ENG
NOTE: Alterations to an approved aircraft configuration may in themselves not constitute a major design change that would require application for an STC (see § 21.113). An engineering evaluation of any proposed alteration that will affect the crashworthiness of an aircraft must be conducted prior to determining if a STC is necessary, or if a field approval would be acceptable. NOTE: Some seemingly minor changes, such as relocating an existing seat one inch, could have the affect of making an interior non-compliant with the airworthiness requirements. An engineering evaluation must be accomplished that considers all the effects of the proposed alteration. In this example, if the relocation reduced the passageway to an emergency exit to less than the required minimum dimension the change would not be allowed. NOTE: Complete initial interior installations require application for an STC or amended TC.	
4. ENGINES, PROPELLERS, AND APU.	
NOTE: The following list applies to engines certificated under 14 CFR parts 33, 34, and 36 or JAR E, propellers certificated under 14 CFR part 35 or JAR P, or APUs approved under TSO-C77a or TSO-C77b.	
A. W&B.	
1) Changes that increase or decrease the certificated weight or CG.	STC
B. Structural Strength.	
1) Changes to an engine, APU, or propeller's primary or critical structure.	STC
C. Reliability and Airworthiness.	

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

1) Changes to the approved ratings or operational or installation limits.	STC
2) Changes to the engine, propeller, or APU control system.	STC
3) Changes to engine, propeller, or APU adjustments and setting limitations that have an affect on power output or control functions or operability.	STC
4) Changes that alter the aerodynamic contour of any blades, vanes, or internal or external aerodynamic surfaces.	STC
5) Changes affecting engine or propeller performance, power, or rpm.	ENG
6) Changes to inlet induction or exhaust components.	STC
D. Changes to Components, Assemblies, or Systems, Such as:	
1) Relocation of fuel vents or drains.	ENG
2) Using new or different alternators, generators, starters, vacuum pumps, or magnetos.	EVL
3) Using new or different hydraulic components, pumps, or turbo or superchargers.	STC
4) Pressure fuel lines and oil lines.	ENG
5) External critical access doors, APU ram air, nacelle blowout doors, bleed ports and doors, and so forth.	STC
6) Installing new or modifying existing icing protection systems.	STC
7) Changes that include substituting engine/APU/propeller materials that affect structural integrity, lightning protection, operating characteristics, fire protection, or noise/acoustics.	STC
8) Major alterations to propellers.	STC
9) Changes to critical or life-limited parts.	STC
10) New propeller and engine combinations (vibration approval).	STC
E. Modification to Approved Electrical Equipment, Such as:	
1) To design environmental performance standards.	STC

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Figure 4-68. Eligibility Considerations for Field Approval (Continued)

2) To the component manufacturer's specified operating limitations.	ENG
3) Altering wiring, shielding, or bonding that may adversely affect protection against HIRF, EMI, lightning diversion, or suppression.	STC
4) Changing flight-critical electrical/electronic systems, such as electronic controls or engine, propeller, or APU control systems such as FADEC or EEC.	STC
5) Changing or substituting engine, propeller, or APU instrumentation.	STC
6) Changes that do not conform to the minimum standards in a TSO under which a particular component or appliance is manufactured (see InFO 08047).	ENG
7) Changes to or relocation of any systems (including hydraulic, oil, and fuel systems) and equipment that affect structural integrity, operating characteristics, noise/acoustics, fire protection, or emissions and fuel venting.	STC
8) Changes affecting the ALS (i.e., Chapter 4 or 5) of the ICAs.	STC
F. Other Considerations.	
1) Changes affecting exhaust emissions (part 34).	STC
2) Changes affecting engine noise (part 36).	STC

RESERVED. Paragraphs 4-1195 through 4-1210.

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