U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: GUIDE FOR OBTAINING A SUPPLEMENTAL TYPE CERTIFICATE

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Initiated by: AIR-110

This advisory circular (AC) is intended as a certification guide for obtaining a supplemental type certificate (STC). This AC both consolidates existing policy documents, and certain ACs that cover specific paragraphs of the regulations, into a single document and adds new guidance.

This AC is not mandatory and does not constitute a regulation. It is issued for guidance purposes and to outline a method of compliance with the rules. A person may elect to follow an alternative method, provided the FAA finds it to be an acceptable means of complying with the applicable requirements of Title 14 CFR.

/s/
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CHAPTER 1. INTRODUCTION

1-1. Purpose.

a. This advisory circular (AC) is a certification guide for obtaining a supplemental type certificate (STC). It is intended for civilian applicants only. We have written it to help designers, manufacturers and installers applying for STCs to better understand the STC process. The guidance in this AC is general in nature and intended to help an applicant gain a basic understanding of the STC process and our respective roles and responsibilities.

b. This AC is not mandatory and does not constitute a regulation. This AC describes an acceptable means, but is not the only means, to gain certification. The primary source of information for certification contained in this AC is derived from Order 8110.4, *Type Certification.* You'll find the most current version of this order on the internet at http://rgl.faa.gov.

1-2. References. Title 14 of the Code of Federal Regulations (14 CFR) parts 21, 23, 25, 27, 29, 31, 33, 34, 35, 36, 39, 43, 45, 91, 121, 135, 183, and predecessor regulations.

1-3. Cancellation. AC 21-40, *Application Guide for Obtaining a Supplemental Type Certificate,* dated May 6, 1998 is canceled.

1-4. Request for Information. If you have questions, or need more information about this AC, contact the FAA Certification Procedures Branch, (AIR-110) at 800 Independence Avenue SW, Washington DC 20591. Telephone (202) 267-1575**.**

1-5. Regulatory Foundation.

a. Title 49 of the United States Code (49 U.S.C.), section 44701, requires the Federal Aviation Administration (FAA) to promote safe flight of civil aircraft in air commerce. We do this by prescribing minimum standards for the design, material, construction, quality of work, and performance of aircraft, aircraft engines, propellers, and appliances. Title 14 of the Code of Federal Regulations (14 CFR) prescribes airworthiness standards which are FAA minimum safety standards.

b. When we find that a product (an aircraft, aircraft engine, or propeller), is properly designed and manufactured, performs properly, and meets the prescribed airworthiness standards, we issue a design approval in the form of a type certificate. When a type-certificated product is altered, we must evaluate the changed product. After finding that the changed product complies with the prescribed airworthiness standards, we will issue an STC or, in the case of type certificate holders, either an amended type certificate (ATC) or an STC (at type certificate holders' discretion). Refer to 14 CFR § 21.113.

c. Any individual or company may apply to change a type-certificated aircraft, aircraft engine, or propeller.

d. A type design change is classified as *minor* or *major* (see 14 CFR § 21.93). A minor change has no appreciable effect on the weight, balance, structural strength, reliability, operational characteristics, or other characteristics affecting the airworthiness of the product. Minor changes to type design may be approved under a method acceptable to the Administrator before the type certificate (TC) or the STC holder submits any substantiating or descriptive data (14 CFR § 21.95). All other changes are major changes. In addition to being classified as minor or major change, and to comply with 14 CFR part 36, a type design change may be classified as an acoustical change.

e. A major change to type design normally requires us to issue a STC or, in the case of the type certificate holder, an ATC. But, the holder of the TC for the product may elect to apply for an STC instead of an ATC (14 CFR § 21.113). However, if we find that the proposed change is so extensive that it will require a substantially complete investigation of compliance with the applicable regulations, then the applicant will have to apply for a new type certificate.

f. Applicants make the initial determination of major versus minor change in type design based on 14 CFR § 21.93. However, minor design changes may be considered major alterations and can be approved through your local flight standards district office (FSDO). Your aircraft certification office (ACO) or FSDO will help you by referencing FAA Order 8300.10, *Airworthiness Inspector's Handbook, Vol. 2, Chapter 1, Perform Field Approval of Major Repairs and Major Alterations.* The Handbook offers a decision flow chart for the field approval process, plus a major alteration job aid showing specific examples of when we will require a proposed modification to be approved as an STC.

1-6. Key Facts about Supplemental Type Certificates (STC).

a. An STC is the FAA's approval of a major change in the type design of a previously type certificated product. An FAA ACO issues an STC. An STC may also be issued by an organization representative of the FAA; as an example, a designated alteration station (DAS) or an organization designation authorization (ODA) with STC privileges (STC - ODA). A DAS or STC - ODA follows the procedures in their FAA approved procedures manual when accomplishing STC projects.

b. An STC is classified as either "one-only" or "multiple."

(1) We issue "one-only" STCs for modification of a specific serial numbered aircraft, aircraft engine, or propeller. (The design and substantiating data may be of a quality that prevents parts from being reproduced, or the applicant only wants one.) This type of STC cannot be amended.

(2) We issue "multiple" STCs when the applicant intends to modify two or more aircraft, aircraft engines, or propellers. The design and substantiating data must be of a quality that enables parts and the installation to be reproduced.

(3) A list of all "multiple" STCs for each product model is available on the internet in the FAA Regulatory and Guidance Library at http://rgl.faa.gov. You can search this on-line database to determine if another STC has been issued that would satisfy your intended requirement.

c. We award certain privileges when issuing an STC. The STC holder may:

(1) (In the case of aircraft) obtain airworthiness certificates for specified aircraft modified in accordance with the STC; and

(2) Obtain a production approval for the change in type design approved by that STC. (This privilege applies only to an STC classified as a "multiple" STC.)

(3) Install, or sell for installation, the modification defined by the STC.

d. You are responsible for the design and quality of all parts associated with the STC approval.

1-7. Key Steps in the STC Process.

a. Applicants should discuss the design (preferably during early design) with your local FAA certification office so that both the FAA and you can establish that the proposed modification is feasible for approval. If possible, have this discussion before modifying the product.

b. If you apply for an STC, submit FAA Form 8110-12, *Application for Type Certificate, Production Certificate, or Supplemental Type Certificate*, to the FAA certification office serving your geographic area. The website, http://www.faa.gov/aircraft/air_cert/locate_office/aco/**,** lists the addresses, telephone numbers, and geographic areas of service for all FAA certification offices. Be advised that your STC application may be subjected to a project sequencing process which may result in a delay of the initiation of your project or it may be assigned to another ACO. For further information regarding the sequencing process contact your local ACO.

c. You will find the complete set of certification requirements in 14 CFR or the predecessor, Civil Air Regulations (CAR). The type certificate data sheet (TCDS) for the unmodified product lists specific certification requirements, including regulatory airworthiness requirements, special conditions, findings of equivalent level of safety, and exemptions to the regulatory requirements. The certification requirements for your STC project will include those requirements in the TCDS for the unmodified product, and may include later regulatory requirements for areas affected by the proposed design change. FAA

AC 21.101-1, *Establishing the Certification Basis of Changed Aeronautical Products*, covers how to establish a certification basis for changed products in detail. You'll find the most current version of this AC on the internet at http://rgl.faa.gov.

d. You are responsible for showing that the changed product complies with the applicable regulations. You do this by submitting substantiating data, such as computations and analyses, and results of tests, including flight tests, that demonstrate the modified aircraft, aircraft engine, or propeller complies with the applicable regulations.

e. Your data submittals must contain enough detail and substantiating data to completely describe the design of the modification or installation, and to demonstrate that the design complies with the applicable airworthiness standards.

f. You must conduct all of the conformity inspections and determine whether the modification conforms to the descriptive data. The FAA manufacturing inspector verifies that your conformity is accurate and complete and that you comply with 14 CFR § 21.33(b). Our compliance inspection verifies that the modification meets the applicable airworthiness standards.

g. Testing is required to demonstrate compliance with the applicable regulations. Test results from, but not limited to, component, ground, and flight testing, may be required. Component testing demonstrates that detail parts, components, or subassemblies function as required to meet the applicable airworthiness standards. Ground and flight testing demonstrate that the completed modification or installation complies with the applicable airworthiness standards.

h. How long it takes to obtain FAA approval of a proposed change in type design varies with the complexity of your project. Plan, coordinate and schedule inspections, meetings, tests, and other events well in advance to ensure appropriate FAA personnel are available. Schedule and coordinate inspections, meetings, tests and other events during the planning phase of your project to the greatest extent possible. Present each schedule change, along with its impact on the overall project, to us as soon as possible for discussion and concurrence.

i. We encourage your use of designees authorized by us to approve data, conduct inspections, and witness tests. Chapter 4 describes the use of designees in detail.

j. Issuance of an STC is the primary goal of the STC certification process. However, it's not the end of the process. There are post-issuance activities, such as:

(1) Changing or updating the design data,

(2) Maintaining the production approval,

(3) Maintaining the certification data, the method of approving minor changes, and

(4) Implementing the plan for continued airworthiness.

k. Discuss a post-STC plan with us. It's particularly important that you have a plan for evaluating service data, notifying us of safety critical service problems, and expediting development of corrective actions for unsafe conditions. Another important element of the plan is the process by which you modify the changed product and we amend the STC.

l. Major changes to the original STC must be FAA-approved before you operate the changed product. Minor changes may be accomplished in a manner found acceptable to the FAA. Submit both types of changes to the original STC design and any substantiating data for approval and inclusion in FAA data files.

1-8. Operation and Maintenance of a Product Modified by an STC.

a. In addition to approving the data for the STC, we also review how the alteration will affect aircraft operation and maintenance after the STC is complete. As required, include an aircraft flight manual supplement (AFMS), placards, instructions for continued airworthiness (ICA), installation and removal instructions, and other necessary information in the STC installation package. You must give the owner or operator the information needed to keep the aircraft safe and airworthy.

b. Develop ICA and present it in conjunction with the STC process. The ICA contains an airworthiness and maintenance portion. We do *approve* the airworthiness limitation section of the ICA. On the other hand we don't *approve* the maintenance portion of the ICA, but we *accept* it, per the requirements in 14 CFR §§ 23.1529, 25.1529, 27.1529, 29.1529, 31.82, 33.4, and 35.4. ICA instructs how to maintain products that are altered, and appliances that are installed, in accordance with an STC. If there is a need for you to obtain a design approval without a complete ICA, we will do so if we approve a plan submitted by you that ensures all ICA requirements will be complete and accepted before the first affected aircraft is operated with a standard airworthiness certificate. This means an aircraft can be modified, but cannot return to service until we accept the complete ICA. In this case we must include a statement saying, "Instructions for Continued Airworthiness are Incomplete". The aircraft will be eligible to return to service with a standard certificate of airworthiness when the ICA are complete and accepted in the Limitations section of the STC. FAA Order 8110.54, *Instructions for Continued Airworthiness Responsibilities, Requirements, and Contents*, tells ACOs how to help applicants write ICA.

c. ICA must include all necessary functions to keep the aircraft airworthy. Include information such as troubleshooting, servicing, inspections, and functional checks.

d. An aircraft alteration that changes the operating characteristics or procedures for safe operation should include an aircraft flight manual supplement (AFMS). See chapter 2 of this AC for more details about AFMS.

1-9 . Undue Burden on the FAA. Title 14 CFR §§ 21.43, 21.137, 21.303(g), and 21.601(c), state that the Administrator does not issue type certificates and production

approvals when the manufacturing facilities are located outside the United States, unless the Administrator finds that the location of the manufacturer's facilities places no undue burden on the FAA**.**

1-10. STC Project Management. Effective management by both you and us is essential to successful completion of an STC certification project. In addition to this AC, we and the aviation industry jointly developed the *FAA and Industry Guide to Product Certification* ("the CPI Guide") to help you lay a foundation from which to build mutual trust, leadership, teamwork, and efficient business practices. The processes and products described in the CPI Guide enable both you and us to fulfill our respective roles and expedite the certification process while still focusing on significant safety issues. The Guide is available on the internet at: http://www.faa.gov/aircraft/air_cert/design_approvals/media/CPI_guide_II.pdf.

a. The CPI Guide describes how to plan, manage and document an effective, efficient product certification process. It describes the working relationship between us and the applicant. Although focused on large or complex projects, the Guide's principles of up-front planning, project management, and documenting the certification process and working relationship are applicable to all applicants and all projects, large or small.

b. Use of the Guide's principles enables planning and mutual commitment between the FAA and an applicant. Both parties should agree on what certification activities each will accomplish and how the activities will be conducted. Both parties establish a certification plan. Employing the guidance provided in this Advisory Circular will help to efficiently plan the certification project. It will enable both the FAA and the applicant to agree upon the expectations and certification activities for which each will be responsible. Chapter 2 will discuss each phase of managing a certification project in more detail. See the Guide for a complete description of the six-phase approach to managing a certification project.

1-11. FAA Project Team.

a. The FAA certification project team is the working level group at the ACO that works with you, conducts the certification project, and makes the findings of compliance. We will assign a project manager and establish a certification project team for each STC project. A generic project team normally consists of the following:

(1) A project manager,

(2) Engineers or technical specialists in each required discipline based on the project,

(3) Flight test pilots and flight test engineers,

(4) Manufacturing inspectors,

(5) Operations inspectors and airworthiness inspectors from the aircraft evaluation group (AEG), and

(6) A project officer and other persons at the discretion of the accountable directorate.

b. We establish a team for a specific project based on the project's complexity and the number of technical disciplines involved. The team may include some or all of the staff listed above. Once the project team is established, we transmit the team's composition, by name and discipline, to you.

c. The project manager is the ACO representative responsible for planning, reviewing, evaluating, and coordinating all aspects of a certification project. The project manager organizes the project team and is our official point of contact with you. The project manager will notify the ACO manager (or the ACO manager's issuing representative) to issue the STC once they are satisfied that all applicable airworthiness standards and other requirements (such as noise standards and fuel venting requirements) have been met and that you have established a satisfactory post certification activity plan. While you should send all formal correspondence to the FAA project manager, you can discuss technical issues directly with the applicable technical specialists and inspectors on the project team.

d. The project officer is the person in the accountable directorate designated to monitor the project. The project officer will provide project-specific rules and policy to the project team and is the focal point with the directorate for policy. The project officer is also responsible for standardization of similar projects across the ACOs. For a well-planned and executed project, it's important to involve the project officer early to identify issues, rules and policy documents of critical concern to the directorate.

e. We draw engineers or technical specialists from three basic disciplines: airframe, systems and equipment, and propulsion. Airframe engineers cover the structural aspects of certification. Propulsion engineers cover engines, engine installations, fuel systems, auxiliary powerplant systems, and aircraft noise. Systems and equipment engineers normally cover electrical, avionics, and mechanical systems.

f. FAA flight test pilots and flight test engineers cover aircraft flight characteristics and performance issues. Flight test pilots are primarily responsible for aircraft flying qualities and human factor evaluations, while flight test engineers are primarily responsible for aircraft performance and aircraft flight manuals.

g. FAA manufacturing inspectors conduct conformity inspections of detail parts during fabrication, test instrumentation and test setups. They also conduct installation conformity inspections on flight test aircraft to determine aircraft airworthiness before official flight testing. For multiple STCs, our installation conformity inspection includes evaluating process controls to ensure that after we issue the STC, production of uniform and consistent installations or modifications continues.

h. AEG inspectors represent the FAA Flight Standards Division. AEG *operations inspectors* evaluate flight crew operating manuals, manufacturers' flight training programs, and aircraft designs for operational suitability. *Airworthiness inspectors* examine the maintenance aspects of the project, and determine the acceptability of the ICA. The AEG maintains the master minimum equipment list (MMEL) for each type of aircraft. If the AEG determines that your STC modification affects the MMEL, you must revise the MMEL.

1-12. FAA Project Classification and Oversight.

a. In addition to the regulatory classifications of a project, we further classify a project to determine the level of FAA oversight and participation. We determine whether projects are "significant" or "non-significant" as defined in agency directives. Although this is an internal classification, you should know that such classifications do occur. The classification helps the ACO identify related issues so that those issues can be included in the early stages of project planning.

b. Significant projects tend to demand increased involvement of FAA personnel, and at a higher level. The directorate may retain signature authority to issue the STC rather than delegate it to the project ACO. Directorate technical staff may also take an active role in reviewing the design, evaluating data, and providing policy guidance to the ACO.

1-13. U.S. STCs Using Foreign-Registered Test Aircraft. If you intend to use a foreign-registered test aircraft in the STC certification program, notify us. See chapter 10 for special considerations.

CHAPTER 2. THE STC PROCESS

2-1. General. While this chapter describes the STC certification process for an aircraft, the process is similar for an engine or propeller. Only major changes in type design require approval through issuance of an STC by the ACO. The STC process is divided into five phases:

- Phase I - Conceptual Design (paragraph 2- 2)
- Phase II - Requirements Definition (paragraph 2- 7)
- Phase III - Compliance Planning (paragraph 2- 12)
- Phase IV - Implementation (paragraph 2- 17)
- Phase V - Post Certification Activities (paragraph 2- 34)

2-2. Phase I, Conceptual Design. This phase includes:

- Process orientation.
- Pre-project guidance.
- Familiarization briefing.
- Certification plan requirement**.**

2-3. Process Orientation. We encourage applicants seeking an STC approval to contact the ACO in their geographic area (see website for ACO locations http://www.faa.gov/aircraft/air_cert/locate_office/aco/) before submitting an STC application. During this initial contact, an ACO project manager will discuss the type of approval you're requesting, and assess your knowledge of certification procedures. The project manager will conduct a process orientation for applicants unfamiliar with certification. The process orientation establishes our partnership with you and helps you understand the type certification process as it applies to your design. The orientation will explain the need for certification, the certification process, our role, your responsibilities, and the advantages of maximizing the use of designees.

2-4. Pre-Project Guidance. We require an STC application with a certification plan before providing full access to FAA resources necessary to complete a project. However, before this application, we respond to your questions as a potential applicant about FAA procedural and technical requirements that may arise after your process orientation. The ACO will first direct

you to appropriate regulatory, policy, and guidance material, and then perhaps get involved directly. We might do this to determine how unique or novel your proposed design is, or to research past policy applications.

2-5. Familiarization Briefing. Familiarization briefings give potential applicants the opportunity to describe their project to the ACO before application. The main purpose is to familiarize us with your proposed design as you currently know it. Learning about projects before submission of the application also allows the ACO to consider FAA involvement and begin planning resources. In your briefing to us, emphasize any technical issues and unique or novel features. Beyond the design features, tell us about the intended operation, major suppliers and unusual vendor relationships, reliance on approved equipment, project schedule, reliance on designees or delegated organizations, and any other planned alterations on the prototype product.

2-6. Certification Plan Requirement. We will ask you to submit a certification plan for the STC project. The certification plan is a "road map" that both of us will agree on and follow. In general, the certification plan should contain detailed descriptions of the type design change, methods of compliance, how much and type of testing is necessary, when and where you will use designees, and schedule information. The certification plan should be considered a "living document," and be revised as necessary when project circumstances change. When revised, the certification plan will need the concurrence of the project manager. Figure 2-4 shows a sample certification plan outline. See further discussion on certification plan contents in paragraph
2-8.

2-7. Phase II. Requirements Definition. This phase includes:

- Applying for STC and submitting the certification plan.
- FAA establishing a project.
- When applicable, submit a project specific certification plan (PSCP).
- Establishing the certification basis.

2-8. Applying for STC and Submitting the Certification Plan.

a. The formal STC certification process begins when you submit the application form, FAA Form 8110-12, *Application for Type Certificate, Production Certificate or Supplemental Type Certificate*. You submit the application to the FAA ACO responsible for your geographic location. See appendix 1 of this AC for instructions to complete Form 8110-12, and a sample of a completed form.

b. Transmit the application to the ACO with a cover letter and the certification plan,

including:

(1) Project description.

(2) Type of product.

(3) Schedule for project completion.

(4) Locations where design, parts manufacturing, and installation work as well as ground and flight tests will be conducted.

(5) Request to schedule a project initiation meeting (at your discretion).

(6) Foreign aviation authority's agreement if you intend to use foreign-registered aircraft for the STC project.

> **Note:** If the foreign aviation authority plans to validate our STC, then application for that authority's certification should be made as soon as possible.

(7) Your phone number and e-mail address.

c. We should have evidence of authorization if you intend to authorize one or more agents to represent you during the STC certification program. A letter of authorization is acceptable. Attach it to the letter that transmits the application.

d. We require each applicant to submit a copy of the program's certification plan with the application package. We expect that you have developed a reasonably detailed program plan before submitting an application for STC. The certification plan should be comprehensive and sufficiently detailed to allow a good understanding of how you plan to accomplish the requirements for certification. One of the first milestones in the STC process is our acceptance of your certification plan. We use the standards in current FAA directives to review your plan. Your certification plan should include the following elements:

(1) General Information. (Corresponds to sections I through VII in Figure 2-4.) Applicant identification, along with the application date, and model designation of the unchanged product. Briefly but completely describe the modification. Present the certification basis, including any applicable exemptions, equivalent level of safety findings, and special conditions. Describe your methods of compliance, including tests, component, ground, and flight, analysis, and similarity. Include a list of data that you'll submit to show compliance. See chapter 3 for more information about identifying the applicable regulations.

(2) Certification Project Schedule. (Corresponds to section VIII in Figure 2-4.) Identify dates of major milestones, dates for submittal of data and test plans, dates and locations for parts conformity inspections and installation conformity inspections, dates and locations for testing, and the planned project completion date.

(3) Use of Designees. (Corresponds to section IX in Figure 2-4.) Identify all FAA designees you expect to participate in the project. The list may include designated manufacturing inspection representatives (DMIR), designated airworthiness representatives (DAR), and designated engineering representatives (DER). List each designee by name and include the designee's number, specialty, point of contact (if necessary), FAA home office, and level of authority. Identify the function or specific compliance determination that each designee will perform as part of the certification plan.

(4) Continued Airworthiness Requirements. (Corresponds to section X in Figure 2-4.) As an STC holder, you must provide ICA to those persons or agencies required to comply with the methods, techniques, and practices in them. The ICA need only address continued airworthiness with respect to the design change for which application was made, and parts or areas affected by the design change. An aircraft may not be approved for return to service until we have accepted the ICA.

e. In addition to the certification plan, you must complete a conformity plan. The conformity plan can be submitted at a later date, but prior to any actual conformity taking place. This conformity plan is a general overview of the project: a list of focal points, description of inspection systems in place and inspection procedures used for conformity inspections, identification and tracking of conformity inspections, description of the conformity inspections, and the plan for airworthiness certification and aircraft return to service at project completion.

f. You are responsible for meeting the milestones set in the certification plan schedule. Any slippage in the milestone dates may result in a program delay. For the project to proceed as efficiently as possible, we strongly encourage you to coordinate schedule changes with us as soon as possible.

2-9. FAA Establishes a Project.

a. When we accept an STC application, we will establish a project and assign a project manager. After receiving the application and certification plan, the project manager will send you an acknowledgment. The acknowledgment and response will identify the project number, project manager and other members of the FAA certification team, including engineers, flight test personnel, AEG personnel, manufacturing inspection personnel, directorate project officer, and any other team members. The response will also indicate a date for a project initiation meeting as appropriate.

b. We will review your certification plan and concur if it's satisfactory. If it's not, we will comment on it or suggest modifications. We will accept the certification plan when the information sufficiently outlines a program to demonstrating compliance with the certification basis by analysis and, if required, by testing (see par. 2-11.). The plan will present your certification procedures and schedule for accomplishing the project.

c. For systems that contain software, prepare a plan for software aspects of the

certification (PSAC) and submit it to us after we accept the certification plan, unless it is a previously approved software based on Technical Standard Order (TSO) authorization or other approval process. Detailed guidance for preparation of the PSAC is in RTCA, Inc. document RTCA/ DO-178, *Software Considerations in Airborne Systems and Equipment Certification*.

d. For systems that contain complex hardware, prepare a plan for hardware aspects of certification (PHAC) and submit it to us after we accept the certification plan. Detailed guidance for preparation of the PHAC is in RTCA, Inc. document RTCA/ DO-254, *Complex Electronic Hardware.*

2-10. The Project Specific Certification Plan (PSCP). The PSCP is the primary project management tool for coordinating activities between us and applicants *who choose* to implement the techniques and guidance described in *The FAA and Industry Guide to Product Certification* (the CPI Guide). You can find this guide at: http://www.faa.gov/aircraft/air_cert/design_approvals/media/CPI_guide_II.pdf.

2-11. Establish Certification Basis.

a. One of the first tasks in an STC project is defining a certification basis. The certification basis is the set of regulations, special conditions, equivalent safety findings, and exemptions to the rules that identify the airworthiness standards and other standards for which you must show compliance. You must demonstrate compliance with all elements of the certification basis to our satisfaction before we issue an STC.

b. For some significant STC projects we may develop an issue paper to define the project's certification basis. We designate this as the G-1 issue paper. See chapter 3 of this AC for more details on developing the certification basis. The G-1 issue paper states the FAA's position and your (applicant's) position. When we reach an agreement with you, we prepare a conclusion, which becomes the STC project's official certification basis.

c. The compliance checklist is a valuable aid for you and us to document which regulations apply to the project and how compliance is shown with each regulation. See figure 2-5 for a sample checklist.

2-12. Phase III. Compliance Planning. In this phase the FAA project team makes determinations on:

- FAA involvement.
- Using parts produced by technical standard order (TSO) authorization or parts manufacturer approval (PMA) in certification testing.
- Completed (project specific) certification plan.

- Interim TCB meeting for [project specific] certification plan agreement.

2-13. FAA Involvement. For planning purposes, the FAA and applicant certification teams will determine which aspects of the project the FAA will maintain involvement and the extent of FAA involvement. Due to resource constraints, FAA involvement in certification activities may be limited. FAA certification team members will review your design descriptions and project plans, determine where their attention will yield the most benefit, and coordinate their intentions with you.

a. When a particular decision or event is critical to product safety or compliance determination, we stay directly involved (as opposed to indirect involvement by, for example, DERs). Some key issues that will always require our direct involvement include rulemaking (such as for special conditions), equivalent level of safety (ELOS) determinations, developing issue papers, and compliance findings that we consider unusual or typically reserve for ourselves. While these items set the minimum direct FAA involvement, we may also identify additional critical safety findings, based on the safety impact, complexity of the requirement, or the method of compliance. We will determine our level of involvement based on your experience, your internal processes, and the experience of your designees.

b. When we focus FAA resources to oversee the most critical areas, we make the best use of the ACO's limited resources.

c. Once the project team has determined the findings requiring our involvement, we consider all other compliance requirements acceptable for delegation. Once we delegate a finding, we'll determine any increase in direct involvement based on its level of criticality.

d. You can write an agreement with your ACO describing the process where you, under the supervision of the management DER, can do the project with maximum independence from us, except for establishing the certification basis, accepting ICA, noise and emissions findings, signing the STC, and approving and signing the flight manual supplement. See chapter 4 for more information on using designees.

e. We use conformity inspections for both quality assurance and engineering purposes. As part of the type certification process, the ACO should identify the affected areas of the product to be conformed for certification. During the inspection, FAA manufacturing inspectors base the extent of their assessment on factors such as quality of your conformity paperwork, comparison of inspection results, and size and complexity of the inspection.

f. You are responsible for identifying the test articles used to generate compliance data, and for conducting 100 percent applicant conformity of those test articles as required by 14 CFR § 21.33(b). The ACO identifies features, attributes, and components critical to the test results and requests FAA conformity on these test articles with special instructions as necessary. FAA conformity is a validation of your conformity. The manufacturing inspection district office (MIDO) determines what conformity inspections will be necessary for processing production approvals.

g. To expedite agreement on the approval of a completed certification plan or PSCP, develop your test article and schedule data into a conformity plan that the ACO and MIDO can accept with minimal further development. While we encourage your involvement in the conformity plan, we retain the right to make the necessary inspections to determine compliance with the applicable 14 CFR requirements. Therefore, we are responsible for the final content of the plan.

2-14. Using Parts Produced by Technical Standard Order (TSO) Authorization or Parts Manufacturer Approval (PMA) in Certification Testing. Either a Technical Standard Order Authorization (TSOA) or PMA indicates that the FAA has determined that the part produced thereunder conforms to a specifically defined FAA-approved design, and that any deviations from that approved design have been found to have no effect on form, fit, or function of the article. According to 14 CFR § 21.601(b)(4), an article manufactured under a TSOA is an FAA-approved article or appliance for the purpose of meeting the regulations of this chapter that require the article to be approved. For parts produced under a PMA, the corresponding regulatory definition for the fabrication inspection system is 14 CFR § 21.303(h). Marking the part according to 14 CFR § 45.15 also indicates that a part meets the FAA-approved design. For parts approved by TSOA or PMA, part conformity will not be necessary for its use in a certification project.

Note: TSO articles must have separate approval for installation in an aircraft. The article may be installed only if performed under 14 CFR part 43 or the applicable airworthiness requirements. It is the responsibility of those installing the article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. As part of the STC process certain functionality aspects will need to be tested/evaluated, particularly since we have new advanced avionics with extra features and functions not specified in the TSO that will require evaluation as part of the STC process.

2-15. COMPLETED (PROJECT SPECIFIC) CERTIFICATION PLAN. By now, the details of your plan for showing compliance, including the remaining elements outlined in paragraph 2-6 above should be captured by you in the certification plan. From this information, our certification team will determine that, if the plan was successfully executed, its results would show compliance. The amount of detail necessary will vary from finding to finding, but, in general, it decreases when you choose common means of compliance, such as those described in ACs. The certification team should find the plan agreeable before processing conformity requests, approving test plans, witnessing or observing certification tests, or performing any other certification project activities, to ensure that they and you are working with the same fundamental understanding of the certification data.

2-16. Interim Type Certification Board (TCB) Meeting for (Project Specific) Certification Plan Agreement. The TCB meeting establishes consensus on all integrated certification planning. During this meeting, the applicant and the FAA use the PSCP or the certification plan to assess the certification risks of proceeding toward showing and finding compliance. We obtain mutual agreement to the adequacy of the plan and acceptance of the risks before implementation. Our certification team may hold one main interim TCB meeting

to agree on how to conduct the project, followed by splinter meetings among our specialized staff to address the certification activities required for the various systems, disciplines, or components of the product design. The TCB meeting for certification plan agreement concludes with the completion of the splinter meetings. Your ACO uses an interim TCB meeting to establish agreement with the certification plan when the following happens:

a. The project requires significant coordination of resources,

b. A face-to-face meeting will help all involved parties understand how compliance will be shown,

c. You or the ACO may ask for one,

d. Certification plan issues need FAA management visibility,

e. The project manager wants to encourage teamwork within the FAA and with you,

f. Many of your comments and questions could be more efficiently addressed in person, and

g. We need to resolve plan deficiencies with you.

> **Note:** For those projects using the techniques and guidance from, *The FAA and Industry Guide to Product Certification,* the expected level of detail in a PSCP allows our project manager/engineer to identify your deliverables and hold the appropriate parties responsible for fulfilling their commitments. It similarly binds us to the commitments we made.

2-17. Phase IV. Implementation. This phase includes:

- Data Submittal for Approval.
- FAA design evaluation.
- Conformity inspections.
- Applicant test plan and FAA approval.
- (Before witnessing) engineering and flight tests.
- Engineering certification tests.
- Engineering compliance inspection.
- Analysis.
- Experimental airworthiness certificate.
- Ground inspections, ground tests, and flight tests.

- Review of applicant's flight test results.
- Type inspection authorization (TIA).
- Flight test conformity inspections and certification flight tests.
- Aircraft evaluation group (AEG) activities.
- Aircraft flight manual supplement.
- Supplemental type certificate issued.

2-18. Data Submittal for Approval.

a. Submit all data to the ACO project manager for review and approval. If you modify or update the data during the project, immediately contact the ACO project manager and set up a schedule for submitting changed or modified data to us.

b. In many cases we may need more than one copy of your data submittal package. Contact the ACO project manager before submitting any data to determine if you should send more than one copy.

c. You are responsible for showing compliance with all the applicable regulations. Type design and substantiating data should show that the proposed design complies with all requirements in the established certification basis.

- *Type design data* are drawings, specifications, information on dimensions, materials and processes, airworthiness limitations, and any other data necessary to describe the design of the product.

- *Substantiating data* is data necessary to show compliance with the certification basis, such as test and analysis reports, and ground and flight test reports.

d. We don't prescribe a specific format for submitting technical data. But, if you submit it in any form other than original paper copy, we must decide if it's acceptable. We may have to agree with you, using a memorandum of agreement, on the way you submit data to us.

2-19. FAA Design Evaluation.

a. We examine the design data you submit, conduct inspections and witness tests as necessary, and determine if the data shows that the proposed design complies with the certification basis. We also review and accept or approve substantiating data. We are only responsible for reviewing the submitted data, not for developing the analytical methods.

b. We (or our DER) must approve your test plans before you start a test. Test plans should include all necessary details, such as description of test fixtures and test articles (parts, components, subassemblies, or a complete product), as well as comprehensive descriptions of

all testing. Identify components and assemblies requiring conformity, including the test fixture and equipment.

c. We will coordinate project related work only with you or your authorized agent identified on the STC application, FAA Form 8110-12, unless otherwise indicated in a specific authorization. You are responsible for coordinating any FAA requests with your vendors and subcontractors.

d. After we review the data and determine that it shows compliance with the certification basis, the project manager will notify you that we accepted the data.

2-20. Conformity Inspections. Conformity inspections verify and provide objective documentation that the test articles, parts, assemblies, installations, functions, and test setups conform to the design data. 14 CFR § 21.33(a) requires you to allow us to conduct any conformity inspections we choose during the type certification process. FAA engineering personnel are responsible for determining the need to conduct conformity inspections, and then for requesting that the project MIDO do the required inspections. Because the conformity process is so complex and parts conformity inspections need to be made early in the certification project, consult your project MIDO early about inspections. This ensures the necessary inspections are scheduled at appropriate times. Our manufacturing inspector, or authorized designee(s) will conduct all necessary conformity inspections, verifying that the product conforms to the drawings, specifications, and special processes. The FAA conformity inspection must be successfully accomplished before any certification ground or flight tests are conducted (all completed and signed FAA forms 8100-1, *Conformity Inspection Record,* must be submitted to the ACO project manager prior to any official certification ground or flight testing).

a. 14 CFR § 21.33(b) says, "Each applicant must make all inspections and tests necessary to determine:

(1) Compliance with the applicable airworthiness, aircraft noise, fuel venting, and exhaust emission requirements,

(2) Materials and products conform to the specifications in the type design,

(3) Parts of the products conform to the drawings in the type design, and

(4) The manufacturing processes, construction, and assembly conform to those specified in the type design."

b. Submit FAA Form 8130-9, *Statement of Conformity,* attesting that the articles conform to the proposed design. We should receive these forms from you before doing any FAA conformity inspections. This is the way that the applicant attests that the test articles conform to the proposed type design (see 14 CFR § 21.53(b)).

2-21. Applicant Test Plan and FAA Approval. Prepare a test plan when testing is necessary to show compliance to the regulations. Submit the test plan early enough for us to review and approve the plan before you start the test. In the plan, describe the items you'll test and a list of all equipment necessary for the test. Describe how to calibrate the equipment (when calibration is required) and have it approved before the test, the required conformities of the test article and setup, and list the specific applicable airworthiness standards. Describe how you expect compliance to be shown, and write a test procedure in step-by-step format with defined pass/fail criteria. After we or the DER approve the test plan, we request an FAA conformity inspection of the test article and test setup to ensure conformance to the engineering drawings and test plan.

2-22. (Before Witnessing) Engineering and Flight Tests. When witnessing official tests, the witness we authorize will verify that the procedures in your approved test plan are followed and that any data captured by test instrumentation is valid data for the test in question. If the ACO engineer or pilot cannot witness the test, they will authorize another qualified ACO engineer, FAA pilot, or DER; or ask a manufacturing inspector to witness the test.

a. Minimum participants for witnessing the test are our authorized witness and your knowledgeable representative who is able to perform the test. After the test, the FAA-authorized witness signs a record showing the results were obtained by properly following the approved test plan. This record should identify the test and include the results obtained, the decisions reached, and any recommendations the witness made to you. This record is not a substitute for your test report showing completion of the test plan.

b. If a MIDO inspector or DER is the witness**,** the ACO will coordinate specific instructions, if any, prior to the test.

2-23. Engineering Certification Tests.

a. These tests are used by applicants to demonstrate compliance with a requirement, or to collect *quantifiable* product or component data necessary for showing compliance. In contrast, certification flight tests rely on, or supplement quantifiable data with, the pilot's *qualitative* evaluation. They're conducted on a test article of the product. A certification flight test may provide both a compliance demonstration for the engineer, as well as a qualitative assessment for the pilot. Examples of engineering certification tests include part qualification, system function, iron bird, fatigue, flammability, landing gear drop test, ground vibration, and electro-magnetic interference tests. Most of these tests satisfy 14 CFR§ 21.35(a)(2).

b. We have established that a reliable way to determine an aircraft's safety is to show its compliance with minimum standards established by the applicable airworthiness requirements. Therefore, you must adequately evaluate the aircraft by performing engineering tests, analysis, and flight tests. Accomplish each of your tests successfully before conducting any FAA certification flight test. To show compliance with a type certification requirement, the conformity of the test article, test setup, and test procedures used, and the validity of the test results must be established for each certification test conducted. In other words, you should submit test reports and substantiating data for all certification testing, plus any other

data necessary to demonstrate compliance with the certification basis. In turn, we evaluate the test reports and substantiating data for compliance with applicable airworthiness standards. We approve these submittals when we determine that these reports and data demonstrate compliance.

2-24. Engineering Compliance Inspection. An engineering compliance inspection lets the observer review an installation and its relationship to other installations on a product. This inspection ensures that the systems and components are compatible and meet the requirements of the airworthiness and operational standards. Don't confuse FAA engineering compliance inspections with a conformity inspection done by manufacturing inspectors. A conformity inspection determines conformity to engineering data, while an engineering compliance inspection determines compliance with the regulations.

a. Sample Inspections. The product should conform to the type design before we conduct the engineering compliance inspection. Findings are included in the type design data. We may delegate engineering compliance inspections to DERs, but we are obligated to give them proper guidance to make the findings on our behalf.

(1) Interior Inspections. Engineering compliance inspections for aircraft interiors are generally more complex than other compliance inspections. This is because there are many regulations involved--for emergency lighting, emergency exit arrangement, ordinance signs, aisle widths, cockpit controls, waste containers, placards, and occupant protection.

(2) Control System Inspections. Control system compliance inspections determine the ease of control operation, strength of components, the detection of interference, or deflection of control system linkages.

(3) Fire Protection Inspections. The regulations require separation and isolation of flammable fluid carrying lines from ignition sources. We physically inspect the installations.

(4) System Routing Inspections. Hydraulic and electrical system routing require inspections to ensure that they are maintaining proper support and separation.

(5) Acceptability. AEG compliance inspectors determine if your operational and maintenance capability is acceptable to the regulations. They might do those inspections concurrently with engineering compliance inspections.

b. Notification of Non-compliance. An ACO will notify you in writing when they find non-compliance during ground or flight inspections. This may not necessitate discontinuing the type certification tests. The ACOs' notification will include reference to the specific regulation(s). You must resolve all non-compliance items to our satisfaction before we issue the STC.

c. Discontinuance Letter. An ACO will notify you by letter when we must

discontinue official FAA type certification tests for any reason. The letter will cite the applicable regulation(s) and advise you to respond to the ACO when you have corrected the cause of our discontinuance and you want to resume the type certification tests.

2-25. Analysis. Engineering analysis is an integral part of showing compliance. It encompasses the full range of analytical techniques such as textbook formulas, computer algorithms, computer modeling/simulation, or structured assessments (see the processes in SAE International's Aerospace Recommended Practice (ARP) 4761, *Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and Equipment*, dated December 1, 1996. We approve the data, not the analytical technique, so we hold no list of acceptable analyses, approved computer codes, or standard formulas. Your use of a well-established analysis technique is not enough to guarantee the validity of the result. You must show the data are valid. The ACO and their representatives are responsible for finding the data accurate, and applicable, and that the analysis does not violate the assumptions of the problem.

2-26. Experimental Airworthiness Certificate. To conduct flight, and any other developmental testing as required by 14 CFR § 21.35(a), you must ensure that the aircraft is in the experimental category and receives an experimental airworthiness certificate for research and development for company testing. You will also need to obtain an experimental airworthiness certificate for show compliance for FAA flight testing.
14 CFR § 21.191 describes the purposes for which we issue experimental airworthiness certificates.

2-27. Ground Inspections, Ground Tests, and Flight Tests.

a. Conduct a ground inspection to physically determine that the aircraft you will submit for FAA flight tests meets the minimum requirements for quality, conforms to the technical data, and is safe for the flight tests intended. Record the inspection results and, together with any other data requested, submit it to FAA engineering and flight test personnel. Then conduct the ground and flight tests. Provide written reports to us to show compliance with the applicable regulations (certification basis is discussed in paragraph 2-11).

b. An added requirement for type certification testing of prototypes is that you provide first pilot checkout flight time for the FAA flight test pilot(s) and AEG pilot(s) assigned to the project. Accomplish the aforementioned FAA pilot qualification requirement before conducting the FAA compliance flight test.

c. Complete your company's certification flight tests in compliance with 14 CFR § 21.35(a) before any official FAA flight testing. This testing should assure you that the design change complies with all applicable regulations.

2-28. Review of Applicant's Flight Test Results.

a. Submit a flight test report to us for review after successfully completing the flight testing required by 14 CFR § 21.35(a). Submittal of the flight test report complies with 14 CFR § 21.35(a)(4).

b. We will evaluate your flight test report for compliance with the requirements of the certification basis. After our acceptance of your flight test reports, if verification of certain flight tests is required, official FAA certification testing, as called for in the TIA, may start.

2-29. Type Inspection Authorization (TIA).

a. When examination of technical data required for the STC is complete, or where it appears the aircraft will meet the certification basis and the modification or installation is complete, we will prepare and issue a TIA, FAA Form 8110-1. The TIA is an internal FAA document prepared by our engineering staff. We issue it to FAA manufacturing inspection and FAA flight test personnel. The TIA authorizes FAA manufacturing inspection to conduct conformity and airworthiness inspections, and authorizes FAA flight test to conduct flight inspections. Plus if there are operational and airworthiness requirements to be addressed, we include AEG operational evaluations. When we issue the TIA we send a courtesy copy to you, to help you plan for the inspections and tests. You must complete all inspections and tests called for by the TIA satisfactorily before we issue the STC.

b. Before we issue the TIA, a flight test risk management assessment must be performed by FAA flight test personnel. The signed TIA reflects our adherence to ACO/directorate flight test risk management processes in accordance with FAA orders to ensure that the associated flight test risks are acceptable. Our risk management process accomplishes risk assessment through a safety review process. Project and non-project personnel review a flight test plan to expose potential hazards, and recommend procedures to lessen them. In the process, we:

(1) Identify hazards,

(2) Assess the risks involved,

(3) Set up mitigating procedures to reduce or eliminate the risks, and

(4) Decide, at the appropriate level, whether to accept residual risks.

c. We include acceptance of risk management and the level of risk for each TIA test. For detailed information about our risk management process, contact the FAA flight test team.

d. We, or our authorized designee as identified in the certification plan, accomplish all necessary conformity inspections and airworthiness determinations per the TIA. TIA testing can start after we satisfactorily complete the inspections and determine that the aircraft is airworthy. We record conformity inspections on the Conformity Inspection Record, FAA Form 8100-1.

2-30. Flight Test Conformity Inspections and Certification Flight Tests.

a. After you submit your Statement of Conformity, FAA Form 8130-9, we issue the TIA and arrange with FAA manufacturing inspection for the conformity inspections called for in TIA. The ground inspection physically verifies that the aircraft submitted for flight test meets the minimum requirements for quality, conforms with the technical data, and is safe for the intended ground and flight tests. Record the results together with any other data requested by FAA engineering and flight test personnel.

b. Our FAA manufacturing inspector initially accepts the test aircraft for FAA flight testing. Initial acceptance is based on their determination of the aircraft condition for safe operation and the testing to be conducted. The manufacturing inspector and the flight test pilot should establish a mutually agreeable way to inform the project manager of daily changes to the aircraft and problems encountered during flight test. Remember that the test aircraft must be placed in the experimental category and receive an experimental airworthiness certificate for the purpose of showing compliance.

c. We use certification flight tests to verify the flight test data you reported. These tests evaluate the aircraft's performance, flight characteristics, operational qualities, human factors, and equipment operation. They also determine operational limitations, procedures, and pilot information. Certification flight tests are conducted under the TIA and may include flight, ground, and functional and reliability testing. See AC 23-8, *Flight Test Guide for Certification of Part 23 Airplanes*; AC 25-7, *Flight Test Guide for Certification of Transport Category Airplanes*; AC 25.1581-1, *Airplane Flight Manual*; AC 27-1, *Certification of Normal Category Rotorcraft*; and AC 29-2, *Certification of Transport Category Rotorcraft.* These advisory circulars are available at http://www.airweb.faa.gov/AC.

d. Arrange with the FAA project team for ground and flight testing called for in the TIA. The FAA project flight test team or an authorized DER will conduct official ground and flight testing.

2-31. Aircraft Evaluation Group (AEG) Activities.

a. Operational and Maintenance Evaluations (AEG Responsibilities). We established AEGs to meet our operations and maintenance responsibilities during a type certification project. AEGs are comprised of operations and airworthiness inspectors who work directly with aircraft certification personnel to lend operational perspective to engineering activities. AEGs advise manufacturers of applicable operational and maintenance requirements during design and certification. They also make recommendations to flight standards about flight training, inspection programs, and flight crew qualifications. AEGs participate in the maintenance review board (MRB), flight standardization board (FSB), and the flight operations evaluation board (FOEB). They are also the Flight Standards focal point for the master minimum equipment list (MMEL), ICA, and post-certification activities, such as ADs.

b. Instructions for Continued Airworthiness (ICA). ICA are required in accordance with 14 CFR § 21.50 and prepared following 14 CFR §§ 23.1529, 25.1529, 27.1529, 29.1529, 31.82, 33.4, or 35.4.

(1) We approve the airworthiness limitations section of the ICA for type certification. The airworthiness limitations section of the ICA are specifically called out as part of the type design, under 14 CFR § 21.31 (c) and as one of the requirements for a type certificate (this includes STCs) under 14 CFR § 21.41.

(2) Pursuant to 14 CFR §§ 23.1529, 25.1529, 27.1529, 29.1529, 31.82, 33.4, and 35.4, the FAA through the ACO, with AEG concurrence makes compliance findings for ICA requirements and airworthiness limitations in your maintenance manuals.

(3) For STC, complete the ICA during the STC program. The ICA need only address continued airworthiness with respect to the design change for which you applied, as well as parts or areas affected by the design change. We will not issue an STC until we have accepted the ICA. If the design change does not affect or change the existing ICA or maintenance documentation, the applicant can submit an impact assessment of the need for ICA. The assessment must show that the STC project does not change any information, procedures, processes, requirements, or limitations in the current ICA (See Order 8110.54, *Instructions for Continued Airworthiness*).

(4) AEG and engineering personnel review the ICA.

(a) AEG team members determine the acceptability of ICA for operational and maintenance requirements.

(b) The AEG helps the ACO establish the adequacy of the ICA and determine compliance with the regulations.

(c) The ACO approves the airworthiness limitations section of the ICA.

(5) Once we have issued the STC, AEG inspectors continue to advise the flight standards district offices on operational and maintenance issues relating to aircraft on which the STC has been installed.

2-32. Aircraft Flight Manual Supplement.

a. In general, an FAA-approved aircraft flight manual supplement (AFMS) is required by 14 CFR §§ 21.5, 23.1581, 25.1581, 27.1581, 29.1581, and 31.81 if your modification results in a change to aircraft limitations, procedures, or performance. This applies whether or not the unmodified aircraft was type-certificated with an FAA-approved aircraft flight manual. If the unmodified aircraft was type-certificated without an FAA-approved aircraft flight manual, an FAA-approved supplemental aircraft flight manual will meet the requirements of 14 CFR §§ 21.5, 23.1581, 25.1581, 27.1581, and 29.1581.

b. If you modify an aircraft with cruising speeds, range, endurance, or fuel consumption information published in either an FAA-approved aircraft flight manual or an unapproved pilot operating handbook, you should determine how the modification affects this information. If the modification changes any of the information, you should either:

(1) Publish new cruising speeds, range, endurance, or fuel use performance data, or

(2) Prohibit, in the limitations section of the flight manual supplement, the use of the fuel consumption data in the AFM for the original type design. State, in the performance section of the supplement, that the data in the AFM for the original type design is not approved for use.

c. You will find aircraft flight manual content and format guidance in 14 CFR airworthiness standards and several advisory circulars. Regulatory requirements for flight manual content are in 14 CFR part 23, 25, 27, or 29, sections 1581 through 1589. Guidance for preparing aircraft flight manual supplements is in ACs 23-8, 25-7, 25.1581-1, 27-1, and 29-2.

d. Prepare a draft aircraft flight manual supplement before the ACO issues the type inspection authorization (TIA). Submit the draft manual to the ACO flight test team so they can become familiar with it. During flight testing, they will evaluate the draft manual and comment on it.

2-33. Supplemental Type Certificate Issued.

a. After we complete FAA compliance inspections and testing, you should submit all final data to the ACO project manager for review and approval. You must include items such as a flight manual supplement, test reports, or a list of life-limited parts.

b. We will evaluate the final data submittals for compliance with the certification basis. When we determine that the data demonstrates compliance, we'll grant final approval of the modification or installation, and issue you an STC. The complete certification basis will be included on FAA Form 8110-2.1 (the continuation sheets of FAA Form 8110-2), unless it is identical to that shown on the TCDS of the TC product. We then send you the STC, FAA Form 8110-2 and the continuation sheet, with a transmittal letter.

c. If, on your application form you indicated that the STC should be available for use by others, we will send a copy of the STC and FAA Form 8110-2 to the FAA STC database. This information is available to the public via the FAA web site at http://www.airweb.faa.gov/stc.

2-34. Phase V. Post Certification Activities.

This phase includes:

- Aeronautical product enters service.
- Continued operational safety.
- Changes to instructions for continued airworthiness (ICA).
- Changes and deviations.

- Data retention.
- Required documents.

2-35. Aeronautical Product Enters Service. As the aircraft, engine, or propeller enters service, the STC holder will be responsible for continued operational safety. The next section describes your responsibilities as STC holder, and our expectations.

2-36. Continued Operational Safety.

a. The ICA need only address continued airworthiness of the design change for which application was made, as well as parts or areas affected by the design change. The modified aircraft cannot be operated without an accepted ICA from us, even though an STC was issued. After the modified aircraft enters service, you must be able to provide ICA to those persons or agencies that are required to comply with the methods, techniques, and practices in them. Furthermore, you are responsible for evaluating any failures, malfunctions, or defects, and for reporting to the ACO those that caused any of the occurrences listed in 14 CFR § 21.3(c).

b. In accordance with 14 CFR § 21.99(a), if we determine that STC design changes are necessary because an unsafe condition exists in the installation or modification, you must submit design changes for approval. After we approve the changes, make them available to all operators of aircraft with the installation or modification.

c. Also, in accordance with 14 CFR § 21.99(b), if you determine through service experience that changes in the STC type design will increase the safety of the installation or modification, you may submit design changes for our approval and make them available to all operators of the aircraft with the installation or modification.

2-37. Changes to Instructions for Continued Airworthiness (ICA). 14 CFR § 21.50(b) requires ICA changes to be made available to any person who must comply with them. As STC holder, you provide these changes according to a plan accepted by both the ACO and AEG. Format the changes to directly supplement the original ICA, and clearly say what's being changed.

2-38. Changes and Deviations.

a. As an STC holder, you may find it necessary to change an STC or authorize an installer to deviate from an STC. You may authorize such changes or deviations: however, you must determine if the change or deviation causes a major or minor change in type design. (See 14 CFR § 21.93)

b. For *minor* changes in type design, you may obtain approval and authorize the change in accordance with a procedure agreed upon by you and the ACO. (See 14 CFR § 21.95)

c. For *major* changes in type design, you must submit descriptive and substantiating data, and obtain approval from the ACO of the change before authorizing the change. (See 14 CFR § 21.97)

2-39. Data Retention. At the ACO manager's discretion, you may maintain portions of type design and substantiating data on our behalf. Understand that type design records, including all substantiating data, are permanent and must not be destroyed. Data maintained by an applicant/STC holder must be made available to us for production inspection, surveillance, design change reviews, other routine activities or any other reasons we deem necessary. If you want to maintain data, set up a memorandum of agreement (MOA) with us. Using FAA Order 8110.4, appendix 10, your ACO will instruct you on what kind of data you are required to maintain under this agreement.

2-40. Required Documents.

a. When we issue an STC for an aircraft, the STC holder must supply the following documents at the time of aircraft delivery:

(1) A current approved airplane or rotorcraft flight manual supplement,

(2) A current weight and balance statement,

(3) ICA,

(4) Compliance status of ADs (see 14 CFR § 21.183 and 14 CFR part 39), and

(5) Other documents as necessary.

b. Figure 2-1 summarizes the STC process in list form. Figure 2-2 presents a flow chart of the TC, amended TC, and STC process. Your STC project may be simpler than this standard flowchart depicts.

Figure 2-1. STC Process

Phase I. CONCEPTUAL DESIGN (Paragraph 2-2)

- **a.** Process orientation**.**
- **b.** Pre-project guidance**.**
- **c.** Familiarization briefing**.**
- **d.** Certification plan requirement.

Phase II. REQUIREMENTS DEFINITION (Paragraph 2-7)

- **a.** Applying for STC and submitting of the certification plan**.**
- **b.** FAA establishing a project.
- **c.** When applicable, submit a project specific certification plan (PSCP).
- **d.** Establishing the certification basis.

Phase III. COMPLIANCE PLANNING (Paragraph 2-12)

- **a.** FAA involvement.
- **b.** Using parts produced by technical standard order (TSO) authorization or parts manufacturer approval (PMA) in certification testing.
- **c.** Completed (project specific) certification plan.
- **d.** Interim Type Certification Board (TCB) meeting for (project specific) certification plan agreement.

Phase IV. IMPLEMENTATION (Paragraph 2-17)

- **a.** Data submittal for approval.
- **b.** FAA design evaluation.
- **c.** Conformity inspections.
- **d.** Applicant test plan and FAA approval.
- **e.** (Before witnessing) engineering and flight tests.
- **f.** Engineering certification tests.
- **g.** Engineering compliance inspection.
- **h.** Analysis.
- **i.** Experimental airworthiness certificate.
- **j.** Ground inspections, ground tests, and flight tests.
- **k.** Review of applicant's flight test results.
- **l.** Type inspection authorization (TIA).
- **m.** Flight test conformity inspections and certification flight tests.
- **n.** Aircraft evaluation group (AEG) activities.
- **o.** Aircraft flight manual supplement.

p. Supplemental type certificate issued.

Phase V. POST CERTIFICATION ACTIVITIES (Paragraph 2-34)

a. Aeronautical product enters service.
b. Continued operational safety.
c. Changes to instructions for continued airworthiness (ICA).
d. Changes and deviations.
e. Data retention.
f. Required documents.

Figure 2-2. TC, ATC and STC Process

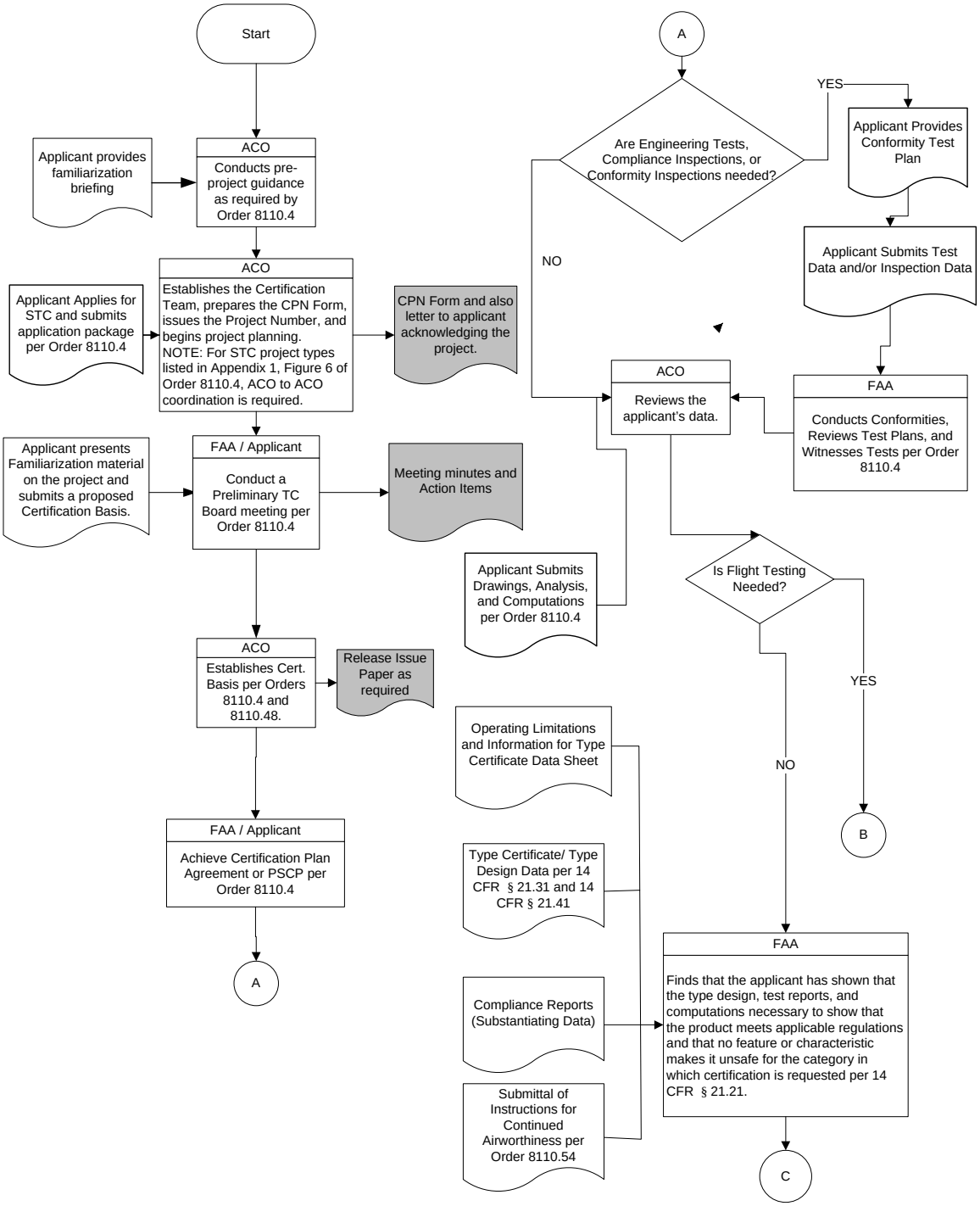


Figure 2-2. TC, ATC and STC Process, continued

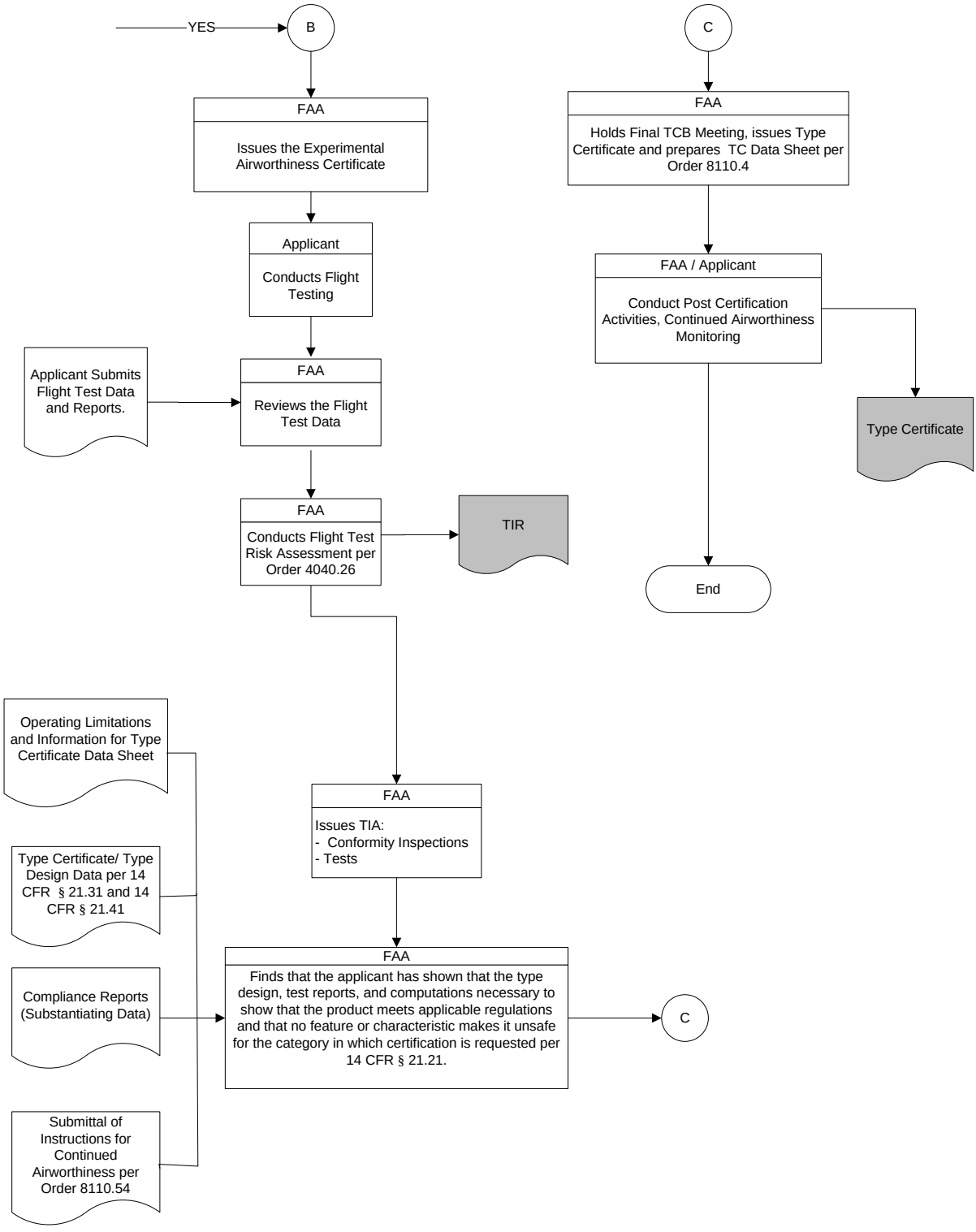


Figure 2-3. STC Project Initiation Checklist

This checklist clearly communicates the requirements to be fulfilled for STC issuance. Checklist requirements should, at a minimum, be handled early in the process between the applicant, the ACO project manager/engineer, and the responsible MIDO office of the project**.**

a. Is the STC application form and certification plan complete?

b. Will the model applicability of the STC expand? If so, what can be done on the initial certification that will make later STC expansion easier?

c. Will the STC be "multiple" or "one only?" If a "one-only," provide the serial number along with the product make and model.

d. For "multiple" STCs, installation instructions will be necessary. Sufficient information must be available to replicate the modification or installation. (14 CFR § 21.303.) Has a fabrication inspection system been defined?

e. Are ICA required? See chapter 5, subparagraph 5-3.i. and note.

f. Could an existing STC be applied, possibly eliminating this STC certification project?

g. What is the applicant's schedule and has it been coordinated with the FAA?

h. Where will product modification take place? If modification is outside the United States, see chapter 10 of this AC.

i. Will any parts be fabricated outside the applicant's facility? If so, what kind, where, and when will they be made? Qualification and conformity will be required. If parts are fabricated outside the United States, see paragraph 1-9 of this AC.

j. What is required for the conformity inspection process? The applicant is responsible for recording and reporting conformity inspection results on FAA Form 8100-1, *Conformity Inspection Record*, before the FAA conformity inspection. Early submittal of FAA Form 8130-9, *Statement of Conformity*, in-process conformities and the procedure for making the *Request for Conformity*, FAA Form 8120-10, is a necessity. Drawings should be FAA/DER approved before asking the FAA to conduct a conformity inspection. See 14 CFR § 21.33.

k. What kind of drawing system will be used? It should: include a drawing list; provide information required for the various types of drawings (detail, component, assembly, installation and so forth); describe the modification; list the materials and applicable specifications, processes such as heat treating, and protective coatings used; and provide the dimensions in enough detail to accomplish the modification. Any process specifications such as fiberglass work should be documented and reviewed by the FAA. New processes may have to be demonstrated to an FAA inspector. List the suppliers of materials.

Figure 2-3. STC Project Initiation Checklist, continued

l. Will designees be used on the program? If so, identify the number of designees, name and type of delegation for each, and explain how each designee will be used on the project.

m. What types of tests are anticipated? What constitutes test plans, conformities for setups and witnessing of tests, applicant versus FAA tests, and (if applicable) placing the aircraft in experimental category.

n. Will special instructions be necessary to tell the pilot how the modified aircraft will now operate? If so, prepare a flight manual supplement.

o. It is the applicant's responsibility to establish a certification test plan and compliance checklist, and to determine the modification meets all applicable airworthiness standards.

p. Was a Failure Hazard Analysis (FHA) or a Systems Safety Analysis (SSA) submitted to us so we can evaluate the risk assessment of the modification with respect to the product and make an assessment of our level of involvement?

q. What data should be submitted before issuance of TIA and STIR, and how are they used?

r. What guidance is available? (i.e., guides, ACs, Orders, Notices, and handouts.)

s. What can be done to the product while in modification/conformity process?

t. What is the potential for the modification impacting 14 CFR part 34 (Fuel Venting and Exhaust Emission Requirements for Turbine Engine Powered Airplanes) and 14 CFR part 36 (Noise Standards: Aircraft Type and Airworthiness Certification) requirements?

u. Is a document list submitted, with revision levels and approval dates, of safety analysis, test plans, test reports and software documents?

v. Is the product being modified the subject of an airworthiness directive or service problem?

Figure 2-4. Sample Certification Plan

I. General Information, which includes applicant identification, application date, and model designation.

II. Proposed Design Change Description - (Sometimes a depiction or picture of the modification may be helpful).

III. Intended Regulatory Operating Environment

a. 14 CFR parts 91, 121, and 137. This should identify the kinds of operations for which the product will be used, and the kind of program under which the aircraft will be maintained.

b. MMEL - master minimum equipment list.

c. FCOM - flight crew operating manual.

IV. Certification Requirements

a. Applicable regulation paragraphs and subparagraphs with the amendment levels, exemptions, Equivalent Level of Safety (ELOS) findings, and special conditions.
b. System special requirements, unique or novel aspects
c. Compliance checklist

V. Method of Compliance

a. Analyses – failure, safety, performance, other
b. Tests – qualification, flammability, laboratory, simulator, ground, flight, other.
c. Software compliance
d. Design

VI. Functional Hazard Assessment Summary

a. System criticality
b. Software criticality
c. Functional failure conditions summary

VII. Certification Documentation, including a list of data submitted to show compliance.

Figure 2-4. Sample Certification Plan, continued

VIII. Certification Project Schedule

a. Descriptive data submittal
b. Substantiating data submittal
c. Tests schedule, including TIA
d. Conformity inspections schedule
e. Compliance inspections schedule
f. Expected final approval

IX. Use of Designees and Identification of Individual DER/DAR or DMIR.

X. Continued Airworthiness Requirements.

XI. Limitations and Conditions. Indicate specific limitations and conditions required for full compliance with the proposed change in type design.

Figure 2-5. Sample Applicant Compliance Checklist Format

Figures 2-5.A. and 2-5.B. show the first and second pages of the Supplemental Type Certificate compliance checklist from appendix 1 of this AC. The following paragraphs describe the checklist entries. Letters of the paragraphs below match the circled letters in the figures. The regulations shown in the standard and template checklists do not show all subparagraphs. Where the method of compliance differs between subparagraphs of the same regulation, expand the checklist to show the method of compliance for each subparagraph.

a. When you initially use the checklist, this field will be blank. The ACO assigns a project number when accepting the project application.

b. Enter the name of the originator of the completed checklist.

c. Enter the date of the latest checklist revision.

d. Enter the latest checklist revision. Choose any method to track this, if it can distinguish different versions. For example, use sequential numbering or lettering for each new version of the checklist.

e. Enter the make of the airplane to receive this STC, as shown on the type certificate data sheet (TCDS) (for example: Cessna, General Electric).

f. Enter the complete model number of the aeronautical product to receive this STC, as shown on the TCDS (for example: 150C, PA-32-260).

g. Enter the number of the TCDS for the aeronautical product make and model listed in e and f. The TCDS information is on the Internet at http://rgl.faa.gov.

h. Enter the original certification basis of the aeronautical product as listed on the aeronautical product TCDS. You may reference the aeronautical product TCDS.

i. Enter the proposed certification basis for this STC project. See AC 21.101-1, Change 1 and FAA Order 8110.4 for guidance on choosing the proposed certification basis.

j. Check the box to indicate whether the proposed STC is for one serial number only or for duplication on other aeronautical products.

k. Briefly describe the modification similar to that stated on FAA Form 8110-12 (found in FAA Order 8110.4). A complete description of the change will appear in the certification plan provided to the ACO (described in FAA Order 8110.4).

l. Enter the page number and the number of pages.

m. Enter the applicable regulation amendment level used as the certification basis for the STC.

Figure 2-5. Sample Applicant Compliance Checklist Format, continued

n. Enter the method or methods used to show compliance with the regulations. Make an entry for each regulation or sub-paragraph in the checklist. Other regulations may apply, depending on the specific changes proposed for the STC. Determine the applicability to the project for all the regulations. Unique features of the project may require other combinations of methods. Check whether the methods listed are appropriate, and change them to reflect the certification plan for the specific STC project. When choosing the applicable regulations, consider the impact of the aircraft changes on structural integrity, performance, controllability, human factors and other areas. Use the following definitions when filling in this column. Include a more detailed description of the method of compliance (component testing, hand calculations, validated finite element model analysis, or a combination of methods) in any compliance plans referenced in the checklist plan column and remarks column described in subparagraphs ".o" and ".q" respectively.

(1) Flight Test (FT) – A test of the aircraft in the air or on the ground when the nature of the test requires a flight test pilot.

(2) Ground Test (GT) – Includes component bench testing, testing of simulated aeronautical product systems, and ground testing of the aeronautical product. These tests may precede a flight test, or be used to show compliance when appropriate.

(3) Analysis (AN) – Includes a quantitative or qualitative assessment, as appropriate, of structures, systems, components, or the entire aeronautical product. May be a precursor to ground and flight tests and a validation of the design. Should be validated using published previous experience or appropriate testing to be accepted for showing compliance to the regulations.

(4) Design (DE) – Encompasses the inherent features of structures, systems, or components. Inspection of aeronautical product hardware, drawings, bill of materials, or other documentation such as material specifications, shows compliance with the applicable regulations.

(5) Similarity (SI) – Comparison between a previously certificated design and the proposed design. The intent is to show that these designs are the same in all ways relative to showing compliance with the applicable regulation, so the proposed design will perform the same or better than the previously certificated design. Applicant must account for any differences in the regulations if the amendment levels of the regulations are not the same for the two designs. See the other guidance applicable to the different regulations to determine if similarity is proper.

(6) Equivalent Level of Safety Finding (ELOS) – Title 14 CFR part 21, § 21.21(b)(1) and FAA Order 8110.4 describe this method of compliance. We issue an ELOS when the

Figure 2-5. Sample Applicant Compliance Checklist Format, continued

applicant cannot show literal compliance with a regulation, but shows to FAA satisfaction that compensating factors achieve a safety level equal to that of the applicable regulation. Applicant may propose the use of an ELOS in writing to the ACO. FAA makes the finding of equivalency and issues the ELOS memo if satisfied. If proposing an ELOS for a given regulation, enter the reference for the proposal letter into the checklist under the "Plan, Drawing, Report Number" column for the regulation (see subparagraph ".o.") and on the last page of the checklist under the "EQUIVALENT LEVELS OF SAFETY (ELOS):" heading. Make all proposals for ELOSs to the ACO early in the project to allow time for processing.

(7) Petition for Exemption (PExmpt) –CFR § 11.15 defines a petition for exemption as "*…a request to the FAA by an individual or entity asking for relief from the requirements of a current regulation.*" Petitions for exemptions are rulemaking as described in 14 CFR part 11 and are subject to a public review process outside the scope of this AC. If you petition for exemption from a given regulation, enter the reference for the petition letter into the "Plan, Drawing, Report Number" column for the regulation (see subparagraph "o.") and on the last page of the checklist under the "EXEMPTIONS:" heading. Make all petitions for exemption to the ACO early in the project to allow time for processing.

(8) Not Applicable (N/A) – Means the specific regulation does not apply to the design or modification for this STC; therefore, a showing of compliance is not necessary. Enter the reason the rule is not applicable in the "Applicable Guidance, References, and Remarks" column of the checklist described in subparagraph ".q." below.

o. Enter the plan, drawing, and report numbers used to document the showing of compliance with the regulation. The items referenced here should contain enough detail to show compliance to the regulation.

p. Enter the name and designee number (as applicable) of the person or entity that will find or recommend compliance with each of the applicable regulations. This could be a designee (designated engineering representatives (DER), designated alteration stations (DAS), delegated option authorization) or the FAA. We encourage applicants to use designees. More information on designees is on the Internet at www.faa.gov/other_visit/aviation_industry/designees_delegations. Consultant DERs typically provide their services to applicants for a fee. A directory of DERs is available in AC 183.29-1, *Designated Engineering Representatives*. See an updated electronic directory and more information on DERs on the Internet at www.faa.gov/other_visit/aviation_industry/designees_delegations/find_designees/. Get designee concurrence before submitting the checklist to the ACO.

q. Enter the guidance followed plus other references and remarks clarifying how you are showing compliance with the applicable regulations. If entering N/A for Method of

Figure 2-5. Sample Applicant Compliance Checklist Format, continued

Compliance, enter the reason the rule doesn't apply in this column. The checklist in this AC lists the latest revisions of other ACs with applicable guidance in this column. These revisions are current as of the release date of AC 23-24, *Airworthiness Compliance Checklists For Common Part 23 Supplemental Type Certificate (STC) Projects*. When creating a project-specific checklist, enter the latest revisions of these documents in this column as found on the Internet at http://rgl.faa.gov. Reference other applicable guidance as appropriate.

Figure 2-5.A. – First Page of the Compliance Checklist

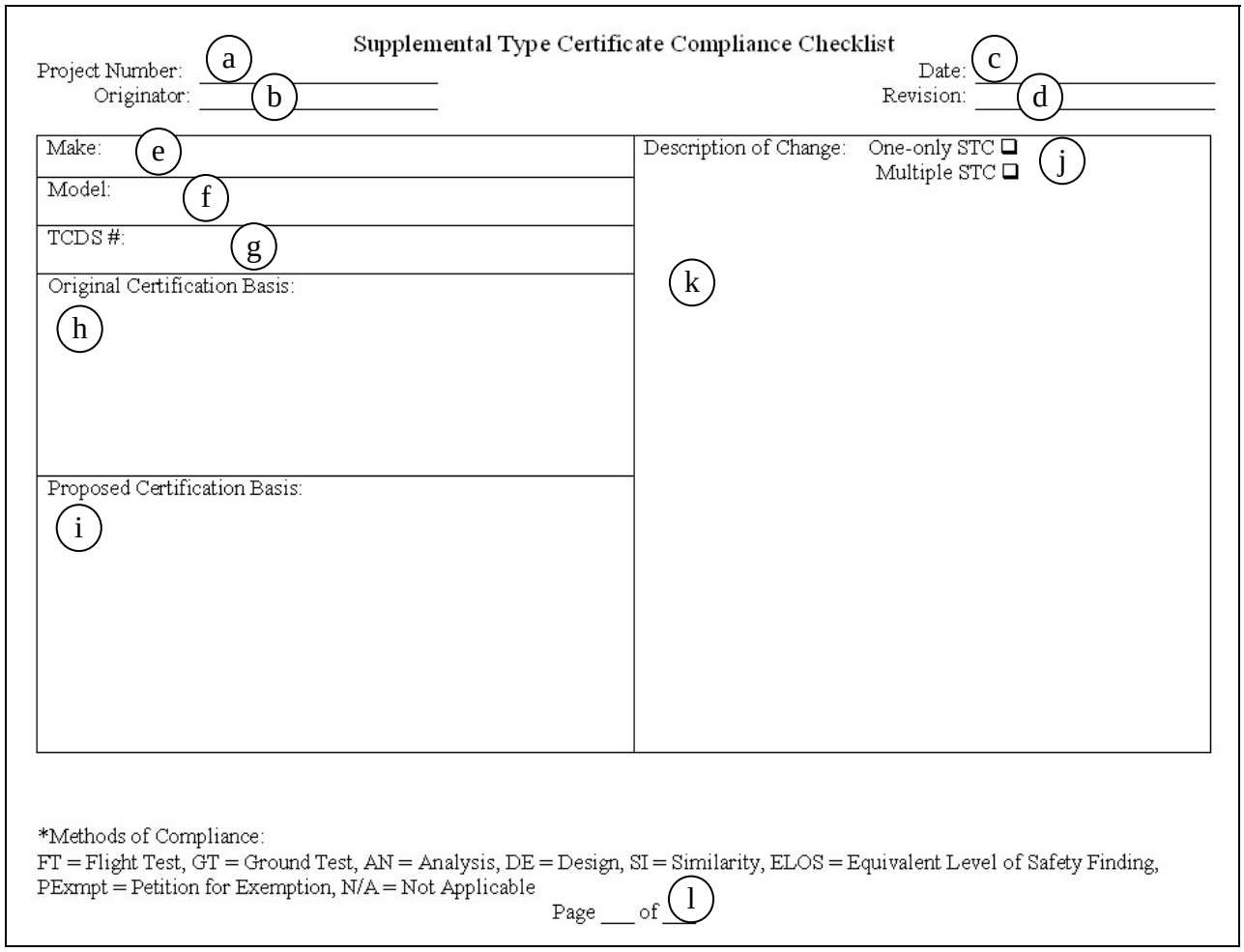


Figure 2-5.B. – Second Page of the Compliance Checklist

Supplemental Type Certificate Compliance Checklist

Project Number: (a) Date: (c)

Originator: (b) Revision: (d)

Regulation Title 14 CFR *(1964 CAR 3)*	Applicable Amendment	Method of Compliance*	Plan, Drawing, Report Number	Person or Entity Finding Compliance	Applicable Guidance, References, & Remarks
Title 14 CFR part 23: *(CAR 3)*	(m)	(n)	(o)	(p)	(q)
Subpart A -- General					
Section					
23.1 Applicability. *(3.0)*		DE			AC 23-8B
23.2 Special retroactive requirements.		AN, GT			
23.3 Airplane categories. *(3.20 (less 2nd sent. of (a)(2) and 2nd and 3rd sent. of (b)), 3.20-1, 3.20-2 (1st sent.)*		DE			AC 23-8B
Subpart B -- Flight					
GENERAL					
23.21 Proof of compliance. *(3.61, 3.71-1)*		AN, GT, FT			AC 23-8B
23.23 Load distribution limits. *(3.71)*		DE, AN, FT			AC 23-8B
23.25 Weight limits. *(3.74, 3.75)*		AN, FT			AC 23-8B
23.29 Empty weight and corresponding center of gravity. *(3.73 (1st sent.), 3.73-3(b))*		AN, GT			AC 23-8B
23.31 Removable ballast. *(3.72)*		DE, AN			AC 23-8B

*Methods of Compliance:
FT = Flight Test, GT = Ground Test, AN = Analysis, DE = Design, SI = Similarity, ELOS = Equivalent Level of Safety Finding, PExmpt = Petition for Exemption, N/A = Not Applicable

Page ___ of (l)

CHAPTER 3. APPLICABLE REGULATIONS

3-1. General. Each type-certificated U.S. aircraft, engine, or propeller design complies with regulations defined in 14 CFR and CARs. Not all specific regulations will apply to a modification and/or installation. You must identify the applicable regulations.

3-2. Certification Basis.

a. Each type-certificated product is associated with a list of the regulations, either 14 CFRs or CARs, to which you must show compliance.

b. The TC certification basis is specified by the applicable regulations located in the respective aircraft, engine, or propeller specifications, or on the type certificate data sheets (TCDSs). You can examine copies of these data sheets at the local FAA ACO, FSDO, or MIDO. The TCDSs are also available on our Regulatory and Guidance Library website at http://rgl.faa.gov.

c. The certification basis for the modification includes the certification basis of the model being changed, plus those requirements effective on the date of the application and are generally related to the components or areas affected by the change. Refer to AC 21.101-1, *Establishing the Certification Basis of Changed Aeronautical Products*, for guidance on establishing the certification basis for the project.

3-3. Availability of Regulations. Current regulations are available from the Superintendent of Documents; U.S. Government Printing Office; Washington, DC 20402. They may also be found in our Regulatory and Guidance Library website at http://rgl.faa.gov.

Figure 3-1. Regulations Most Commonly used for STC Applications

Regulation	*Subject*
14 CFR part 21	Certification Procedures for Products and Parts
14 CFR part 23 or CAR 3	Airworthiness Standards: Normal, Utility, Acrobatic, and Commuter Category Airplanes
CAR 4a	Airworthiness Standards: Older Model Airplanes (See S.R. 407 for DC-3 and Lockheed 18)
14 CFR part 25 or CAR 4b or CAR 4a-T	Airworthiness Standards: Transport Category Airplanes (See S.R. 422 for turbine aircraft certificated under CAR 4b)
14 CFR part 27 or CAR 6	Airworthiness Standards: Normal Category Rotorcraft
14 CFR part 29 or CAR 7 or CAR 7a	Airworthiness Standards: Transport Category Rotorcraft
14 CFR part 21 or CAR 8	Restricted Category
14 CFR part 31	Airworthiness Standards: Manned Free Balloons
14 CFR part 33 or CAR 13	Airworthiness Standards: Aircraft Engines
14 CFR part 34	Fuel Venting and Exhaust Emission Requirements for Turbine Engine Powered Airplanes
14 CFR part 35 or CAR 14	Airworthiness Standards: Propellers

Figure 3-1. Regulations Most Commonly used for STC Applications, continued

Regulation	*Subject*
14 CFR part 36	Noise Standards: Aircraft Type and Airworthiness Certification
14 CFR part 39	Airworthiness Directives
14 CFR part 43	Maintenance, Preventive Maintenance, Rebuilding, and Alteration
14 CFR part 45	Identification and Registration Marking
14 CFR part 47	Aircraft Registration
14 CFR part 91	General Operating and Flight Rules
14 CFR part 121	Operating Requirements: Domestic, Flag, and Supplemental Operations
14 CFR part 135	Operating Requirements: Commuter and On-Demand Operations

Note 1: Products are certificated under one or more of the airworthiness standards and environmental rules. Operating rules, such as 14 CFR parts 91, 121, or 135, may influence the aircraft design or require certain equipment to be installed on the aircraft. We certify equipment required by the operating rules for installation on the aircraft under the applicable airworthiness standards. As an applicant, you should be aware that, before placing a modified aircraft in service, a Flight Standards Service representative must verify that all equipment required by the operating rules meets the specified requirements in those rules.

Note 2: You can find these regulations in http://www.airweb.faa.gov/FAR (Short URL).

CHAPTER 4. USE OF DESIGNEES

4-1. General. This chapter covers using FAA designees in the STC process. You may propose to use an FAA designee to perform a task that an FAA employee would normally perform.

a. The designee system helps us by designating private persons to act as representatives of the Administrator. Regulatory information describing the designee system is found in 14 CFR part 183, Representatives of the Administrator. Help may include examining, inspecting, and testing of persons, aircraft, engines, or propellers, and approving or recommending approval of certain types of data for compliance with 14 CFR or CARs.

b. The types of designees applicants most often use in the STC application process are designated engineering representatives (DERs), designated manufacturing inspection representatives (DMIRs), and designated airworthiness representatives (DARs).

(1) We encourage applicants to use the internet to search for consultant DERs and DARs. The listings are available for downloading at http://www.faa.gov/other_visit/aviation_industry/designees_delegations/find_designees/.

(2) Designees are not FAA employees. *Consultant* designees (consultant DERs and DARs) are private individuals who represent the Administrator, and are allowed to charge for their services. They set their own rates and run their own businesses. *Company* DERs and DMIRs represent the Administrator, but are employees of the organization making the STC application.

4-2. Designated Engineering Representatives (DERS).

a. DERs may only approve or recommend approval of data, as complying with the requirements of FAA airworthiness standards. We may authorize DERs to witness tests on our behalf, in accordance with approved test plans. We may also authorize DERs to approve test plans. A DER's authority is limited to specific functions within one or more of the following categories:

(1) Structural.

(2) Powerplant (installation, engine or propeller).

(3) Systems and equipment (mechanical or electrical).

(4) Radio.

(5) Engines.

(6) Propellers.

(7) Flight analyst.

(8) Flight test pilot.

(9) Acoustical.

(10) Administrative or management.

b. An administrative DER acts as a focal point for FAA coordination activity.

c. An applicant's management DER performs certification management duties for us similar to that of the FAA project engineer. This includes organizing the certification program and directing, overseeing, and managing technical assessments and findings of compliance. The management DER ensures all technical data required to show compliance (except in those areas we reserved) is reviewed and approved. The management DER is usually a consultant DER whereas an administrative DER is usually a company DER.

d. Company DERs may only perform delegated functions for the organization employing them.

4-3. Designated Manufacturing Inspection Representatives (DMIRS).

a. A DMIR, within limits prescribed by 14 CFR § 183.31, and under general FAA supervision, may:

(1) Issue an original standard or special airworthiness certificate when they determine that the product(s) conforms to the approved design requirements and are in a condition for safe operation.

(2) Issue an experimental certificate to show compliance with 14 CFR chapters I and III for aircraft which the production approval holder (PAH) holds the TC and has undergone changes to the type design that require an FAA official flight test.

(3) Conduct conformity inspections to determine if:

(a) Prototype products and related parts conform to design specifications.

(b) Production products and related parts conform to the approved type design and are in a condition for safe operation.

b. DMIRs may only perform delegated functions for the organization that employs them.

4-4. Designated Airworthiness Representatives (DARS) and Organizational Designated Airworthiness Representatives (ODARS).

a. We delegate a DAR/ODAR to perform examinations, inspections, and testing services necessary to issue certificates.

b. We may use a manufacturing DAR/ODAR for conformity inspections and issuing the experimental and standard airworthiness certificates. However, the appropriate MIDO and FSDO delegate these functions to the DAR/ODAR before the DAR/ODAR executes the authorized functions. The DAR is not limited to work for only one entity, but is restricted by geographical limits unless granted permission to expand to other geographical areas by the cognizant MIDO.

4-5. Responsibilities of the Applicant. You are responsible for ensuring that each designee has the appropriate FAA authorization to approve data, perform inspections, and witness tests, and other particular functions, for the modification. You are also responsible to coordinate with us to ensure that the designee is authorized and delegated to perform each test and inspection. You should also coordinate the certification plan with the DERs before submitting it to the ACO since the DERs must understand the modification and comment on the proposed method of compliance.

CHAPTER 5. DATA

5-1. Required Data.

a. Data submitted to us should demonstrate that your modification, when installed on a type-certificated product, complies with the applicable regulations. You or your representative should obtain, organize, and submit this data to us for review and approval.

b. You can divide design data into two major categories: *descriptive*, and *compliance* or substantiation data. Descriptive data defines the design of the modification, while compliance data substantiates that the design meets the applicable regulations.

c. A copy of all data will remain on file with the FAA. However, we treat this data as your property and will not release it outside the agency without your consent.

d. Identify all data submitted. This includes title, drawing or report number, revision level, date, and your name. Each page of a report should contain enough information for complete identification. Identify the FAA project number.

e. Descriptive data requirements for a "one-only" STC are different than the requirements for a "multiple" STC. However, *the same level of safety is required* for either type of STC.

f. Accomplish the following tasks according to 14 CFR §§ 21.21 and 21.33(b) before submittal:

(1) Check all descriptive and substantiation data for completeness and correctness.

(2) The descriptive data conforms with the actual configuration of the modification. Base all stress analyses, test plans, and test results on the descriptive data.

(3) Identify the data describing and substantiating the modification. Present it orderly and clearly, stating how it contributes to the findings of compliance.

5-2. Descriptive Data.

a. In general, descriptive data should completely define, or describe, a given design. It may include drawings, sketches, marked photographs, process specifications, and so forth. We will verify the data for compliance with the applicable airworthiness regulations.

b. A "one-only" STC descriptive data package applies to only one installation/modification. The package may consist of marked-up photographs, sketches, written descriptions, marked-up excerpts from manufacturers' parts catalogs and maintenance manuals, and similar document excerpts. If you submit descriptive data other than drawings, the data must be of sufficient quantity and quality to properly ascertain the nature of the modification. This

includes your defining all critical equipment, parts, and attachments, and identifying any components of the original product that were removed.

> **Note:** Since parts catalogs are not FAA-approved documents, excerpts from parts catalogs alone are not sufficient.

c. A "multiple" STC descriptive data package should completely and accurately describe the fabrication, assembly, and installation of all portions of the modification. The descriptive data must be adequate for reproduction of parts and/or installation of subsequent modifications on other serial numbers of the same model type-certificated product. An acceptable package includes, but is not limited to:

(1) Engineering drawings,

(2) Material and manufacturing processes,

(3) Specifications and tolerances,

(4) Data necessary for fabrication of all parts and assemblies, and

(5) Installation drawings and/or instructions. See appendix 2.

d. Technical information should include the following, when applicable:

(1) Identification (title, drawing or report number, product applicability, revision level, date, and applicant's name).

> **Note:** When original equipment manufacturer or supplier parts, accessories or equipment are involved, whether new or used, provide purchase orders or other acceptable traceable documentation, including name plate identification, part number, revision letter, and serial number.

(2) Materials used, identified by material specification.

(3) Material test criteria and procedures.

(4) Fasteners used and locations. Identify each rivet, bolt, nut, screw, or other fasteners by specification or standard part numbers, such as Air Force-Navy Aeronautical Standard (AN), National Aerospace Standard (NAS), or Military Standard (MS).

(5) Dimensions, with tolerances included.

(6) Vendor data (manufacturer and part number of purchased parts).

(7) Process specifications.

(8) Ratings and power requirements of electrical equipment.

(9) Weight and balance data of assemblies and equipment items to be installed, and/or the complete modification, including:

- A complete list of parts added and/or removed.
- Updated aircraft equipment list.

(10) Installed placards.

(11) Instrument markings.

(12) Qualification test procedures.

e. Define the design of equipment or components to be installed, purchased and/or furnished. If the item is TSO approved, the nameplate data may be adequate. Other equipment may require a source-control drawing identifying the equipment by manufacturer, part number, drawing number, revision level, or any other necessary data. Installation instructions for the modification should include all applicable information provided by the equipment's manufacturer.

> **Note:** When a "multiple" STC kit is produced, it should contain an inventory of ALL parts and installation instructions. Details of the parts manufacturing data that is proprietary need not be included in the kit.

f. Include process specifications necessary for production of parts in the descriptive data package. Include all materials, fabrication, and assembly procedures.

(1) Industry standards and specifications include various SAE International Aerospace Standards, AN, MS, and NAS specifications, and various military handbooks. Supply a copy of each standard and specification as part of the descriptive data package. You may use certain other industry standard specifications or develop non-standard specifications.

(2) Non-standard specifications should include a complete and unambiguous definition of the materials to be used, detailed procedures, critical processes, temperatures, times, inspection criteria, rework limits, and so forth. We will review any nonstandard specification.

g. Identify installation instructions with a document number and an original issue date or revision level and date. They should be complete enough to allow the installer to duplicate the

installation.

h. Provide an aircraft flight manual supplement to the pilot if required by the modification (see 14 CFR § 21.5), regardless of the method used to provide operating instructions on the original aircraft.

5-3. Substantiating/Compliance Data.

a. In general, substantiating/compliance data is intended to show compliance with the applicable regulations. This data may include analyses, test plans and reports, and instructions for continued airworthiness and operations. You may use previously FAA approved data appropriate for the installation. Submit a copy of this data and authorization letter to us.

> **Note:** If the ACO engineer has relevant tests or other engineering data available from previous approvals, they may waive your requirement to conduct such tests or submit duplicate data for a current STC application. In this case, we will provide a brief rationale explaining these findings and include it in the project file. The ACO engineer may use the relevant data for comparison purposes, but won't disclose the data or its source to the current applicant. We will not copy substantiating data from a previous project file and put in the subsequent project file.

b. The compliance checklist specifies each applicable certification rule and the method by which compliance will be shown (analysis, structural test, ground test, flight test, and so forth). A checklist is a concise, easily reviewed program outline that ensures all parties addressed the applicable certification rules and their means of compliance. Prepare the compliance checklist and submit to us after the certification basis is identified (see chapter 3). Examine and identify each rule for applicability to the proposed modification, along with a method of showing compliance. You can update the checklist later to identify the report, letter, or test, used to show compliance. For a sample format, see figure 2-5. To identify the appropriate certification rules, you may need help from the FAA project team.

c. A basic load analysis is necessary when the structure is modified or structural loads are changed. The analysis establishes the flight, ground, landing and other applied loads determined from weight, center of gravity, power, and aircraft aerodynamic characteristics using design speeds, and load and safety factors specified in the certification basis. These loads, with the structural analysis and/or tests, form the foundation used to provide the required structural substantiation only if experience has shown this method to be reliable. Ultimate load testing may be required when limit load tests may be inadequate.

> **Note:** Have all structural loads approved by the ACO before you perform a stress analysis or test. The ACO may have a DER recommend approval**.**

d. Structural analyses establish mathematically that the appropriate structural strength requirements were met. These analyses build on the basic loads and material allowable data and may include static stress, fatigue, fail-safe, and damage tolerance. You should ensure that the analytical methods and assumptions you used apply, that you addressed all applicable loading conditions, and that you showed positive margins of safety for all structural elements.

e. Allowable material strength properties are established for the materials used in substantiating primary aircraft structure. The properties must be FAA-approved. For metallic materials, we recommend using, *Metallic Materials Properties Development and Standardization Handbook (MMPDS)*, but may accept other data. Nonmetallic materials may require developing allowable data.

f. If you anticipate using computer models for substantiation, discuss the validation of those models in the certification plan.

g. Safety assessments evaluate the effects of foreseeable failures of the aircraft structure and/or systems. The depth and level of the detail depends on the severity of the failure conditions, functions performed, and the complexity and novelty of the aircraft or modification. Faults that are undetectable are presumed to exist at the same time as each other single fault. Take any necessary actions (system redesign, aircraft flight manual procedure changes, and so forth) to correct unsafe conditions found. We may also require a safety assessment for aircraft systems.

h. Prepare test plans and reports for each required structural, component, software, ground test, and flight test. Test plans should include conformity inspection requirements. Submit them to us for approval *before* you assemble and test the articles.

i. ICA describes maintenance requirements necessary to maintain product airworthiness. Provide them in accordance with the applicable regulations, (14 CFR §§ 23.1529, 25.1529, 27.1529, 29.1529, 31.82, 33.4, or 35.4).

> **Note:** For any STC application submitted after January 28, 1981, you must furnish at least one set of the complete ICA to the aircraft owner or operator. See 14 CFR § 21.50.

j. Revise the weight and balance manual and/or aircraft flight manual for the original type design accordingly when modifications change the aircraft weight and balance, the operating limitations, procedures, performance, or the loading instructions for the modified aircraft. The applicable weight and balance data should be FAA-approved and documented in a supplement to the original weight and balance report. Update the aircraft equipment list.

k. Structural life limits are established based on fatigue test data with adequate factors of safety applied and added to the airworthiness limitations section of the ICA. You may have to produce new structural life limits when modifications change an aircraft designed with safe-life structures. (These are structures that don't fail when subject to the cyclic and sustained loads

and environments encountered in the service life).

l. Prepare electrical load analysis for the installation and electro-magnetic interference (EMI) reports as appropriate.

5-4. Drawing Package. The drawing package describes the manufacture and installation of all parts necessary for the modification. Identify all part contours, materials, manufacturing operations, dimensions, finish specifications, and other data, either directly on the face of the drawing or by reference to a process specification or other appropriate information. You should assign drawing numbers that follow a logical pattern.

> **Note:** Drawings are a major portion of the descriptive data required for a multiple STC. All drawings should be DER or FAA approved *before* our acceptance and conformity inspection. See 14 CFR § 21.33.

5-5. Drawing Revision Levels.

a. Each revision level should identify the changes and approval dates on the drawing. These items should be reflected in the drawing list submitted with the drawing package for FAA approval.

5-6. Good Drawing Practices. Thoroughly check drawings for accuracy and completeness before submitting them to us. This will reduce the likelihood that we will return drawings with unacceptable errors to you for resubmission. See section 5-10.

5-7. Tolerances.

a. Note the standard manufacturing tolerances on the drawing. You may refer to American National Standards Institute (ANSI) Specification Y14.5, *Dimensions and Tolerancing*, 1994, for guidance.

5-8. Drawing List. Prepare and submit a drawing list, or master drawing list (MDL), with the drawings. Include installation instructions, any process specifications, drawing or document number, revision level, any engineering change orders in effect, the date prepared, and the approval dates of all material. See appendix 2**.**

5-9. Examples.

a. See appendix 2 for a drawing list and several sample drawings. This is one way of meeting drawing package requirements. Process specifications for plating and inspection, as well as the installation instructions, are included in the drawing list, and they are divided into installation and manufacturing data. A revision control page is shown, but may not be needed on a very short drawing list.

b. We also included drawing examples showing a detail part, a subassembly, and an

installation in appendix 2. These illustrate the type of information required on drawings of various types and an acceptable way of organizing a drawing system.

5-10. Guidelines for Checking Drawings. Before you submit drawings to us, have them reviewed using a guide or other system, by someone *other than* the person responsible for drafting them. For descriptive data, the first such check may be performed by the engineer. The following is an example of a drawing checklist:

> **Note:** Company standards are allowed as long as they meet the intent of this guidance material.

a. Make sure the design is both accurately and completely portrayed. Then, review the contents of the drawing.

b. Each part should be correctly drawn and illustrated, with all necessary views of the part shown on the drawing.

c. Dimensions:

(1) Check the accuracy of all dimensions by scaling and, where advisable, also by calculation.

> **Note:** Preserve all calculations.

(2) Check the completeness of the dimensions to verify that no adding or subtracting is required for a needed dimension.

d. Tolerances should not be too "fine" or too "coarse," which might impact the duplication accuracy or operation.

> **Note:** Each production part should be within established tolerances.

e. Check finishes for proper specification on each part and assembly drawing.

f. Check material specifications to verify that every specification is correct and that all necessary information is given.

g. Part compatibility:

(1) Check for interference, or compatibility of each adjacent part, in the final assembly to ensure proper clearances. Use "worst case" tolerance limits.

(2) Lay out the mechanical movement clearances to scale and check them for interference (considering tolerances) in all positions at the extreme limits of travel.

h. Check detail parts to verify that all screws, bolts, pins, rivets, and so forth are standard product quality parts and that, where applicable, you have used stock sizes.

i. Present the following information in the Title block:

(1) Drawing number to identify the print for filing purposes and to prevent confusion with other prints.

(2) Name of the part or assembly.

(3) Scale to which it is drawn.

(4) Date.

(5) Name and address of the applicant and firm.

(6) Name of the draftsman, checker, and the person who approved the drawing.

(7) Product model, detail or assembly it is to be used on.

(8) Drawing number of the next higher assembly.

j. In the Bill of Material block, present:

(1) Number of the part or assembly.

(2) Name of the part or assembly.

(3) Material from which the part is to be constructed.

(4) Quantity required.

(5) Source of the part or material.

k. In the Revision block, list:

(1) Identification symbol.

(2) Numbered or lettered changes (A through Z is followed by AA through ZZ. Do not use I, O, Q, and X.

(3) Date.

(4) Nature of the revision.

(5) Authority for the change.

(6) Name of the draftsman who made the change.

Note: To distinguish the corrected drawing from its previous version, the title block may have a space for entering the symbol designating that the drawing was changed or revised.

l. Review other details:

(1) The border around the drawing defining the work area should be 7/8 inch to 1/2 inch from the edge.

(2) Dimensions and views should be sufficient to describe the part or assembly, and include a full sectional view of assembled parts. We prefer decimal dimensions. Avoid views with hidden lines when possible. Do not include dimensions to hidden lines.

(3) Note the tolerances on the drawing when they are different from those called out in the Title block.

(4) Indicate parts by a name, followed by a description of what they do, and where they are located on the product.

(5) Indicate the finish operation/process such as cadmium plate, zinc chromate coat, anodize, shot peen, tumble, sand blast, vinyl wash, epoxy, and so forth.

Note: Zinc chromate and vinyl wash denote primers. Specify final finishes as well--enamel, epoxy, lacquer, and dope. A complete designation of a finish process/operation should include a reference to a specification.

(6) Indicate the standard tolerances specified by the applicant/designer.

(7) Do not reference general notes from the field of the drawing. They apply "Unless Otherwise Noted."

(8) Specific notes (also listed under the general notes column) apply to particular parts, areas or operations and are usually referenced from the field of the drawing by the note number enclosed in a triangle.

m. Review the drawing in its entirety. Add explanatory notes as needed to increase its usefulness.

n. For further advice see

(1) French & Vierck, *Fundamentals of Engineering Drawing*, pp. 365-6, McGraw-Hill, Inc., 1960

(2) *Drawing Requirements Manual, and Airframe and Power Mechanics General Handbook*, Chapter 2, -- U.S. Government Printing Office, and

(3) Global Engineering Documents, 2625 Hickory Street, Santa Ana, CA 92707; telephone 1-800-854-7179.

CHAPTER 6. INSPECTIONS

6-1. General. 14 CFR part 21, subpart B, requires you to allow us to conduct any conformity and compliance inspections we deem necessary during type certification. This chapter describes the conformity and compliance inspections required during STC certification projects.

6-2. Conformity Inspections.

a. The FAA performs conformity inspections to verify that: a product, component or modification conforms to the data submitted to us; the product being certificated conforms to the type design; and the product can be replicated using the type design data (See 14 CFR § 21.33). These inspections physically compare the component or modification to the engineering specifications, drawings, and the airworthiness standards. If the drawing or specification is not clear, we can't complete the conformity inspection. Conformity inspections should be successfully completed before any official FAA tests (ground or flight) are conducted. We use these forms internally to request inspections:

(1) FAA Form 8120-20, *Request for Conformity*,

(2) FAA Form 8110-1, *Type Inspection Authorization.*

b. We use FAA aviation safety inspectors (manufacturing), FAA-authorized designated manufacturing inspection representatives (DMIR), or manufacturing DARs to accomplish conformity inspections. FAA aviation safety inspectors are located at MIDOs. Each MIDO serves a geographic area. For a list of MIDO offices, ask your ACO.

c. Test articles are built in accordance with engineering data. All components that are to be part of an initial STC modification and require tests other than flight (structural, fuel flow, and others) require a complete part conformity inspection before you start the test, unless you gain prior authorization to allow a post test conformity inspection. All modifications that require flight testing must have a completed conformity inspection in accordance with the TIA, be tagged (FAA Form 8130-3, *Airworthiness Approval Tag*), and have a satisfactory installation conformity before FAA ground or flight tests can be conducted.

d. Our manufacturing aviation safety inspector may conduct progressive inspections at appropriate intervals during the modification process, if this is coordinated early in the project.

6-3. Compliance Inspections. FAA engineering or AEG personnel, or an authorized DER, arrange and conduct these compliance inspections to verify that a particular component or modification to an existing design meets the airworthiness requirements of the applicable 14 CFR parts or CARs through a combination of specification review and physical inspection of the component, installation, or product.

6-4. Parts Manufacturer Approval (PMA) and Production Inspections. If you manufacture production parts before obtaining a "multiple" STC, maintain control over all manufactured

"production parts" (parts that were, or will be, produced) until you gain FAA approval of the STC and production approval. Do not ship production parts produced before PMA approval. Design changes may require additional certification testing or modifications to the parts. The MIDO will only do conformity inspections on parts required for ground or flight tests required to obtain STC approval. They will not inspect production parts. See AC 21-32, *Control of Products and Parts Shipped Prior to Type Certificate Issuance*. The order that governs the issuance of PMA is Order 8110.42, *Parts Manufacturer Approval Procedures.*

CHAPTER 7. TYPE INSPECTION AUTHORIZATION

7-1. General. The TIA details and authorizes our required conformity and airworthiness inspections, and the ground and flight tests necessary to fulfill the requirements for certification. It may also contain an operational and maintenance requirements section. Your ACO prepares the TIA coordinating with the appropriate FAA engineering, manufacturing inspection, and flight test organizations. After the examination of the technical data is complete and the flight test risk management assessment is performed we will issue the TIA. FAA certification flight testing commences only after you successfully complete your flight tests, we issue the TIA, and we complete section 18A of the TIA form.

7-2. FAA Form 8110-1, Type Inspection Authorization. This TIA form is the cover page providing basic information: your name, aircraft type, certification basis, nature of the type design or modification, certification project number, and internal FAA coordination information.

7-3. TIA Description. The second page covers general information, including a description of the type design or modification and unique features or special interfaces. This section may list the applicable 14 CFR rules or FAA policy, or both, to which compliance will be shown.

7-4. TIA Section 18, Part I. This section has conformity instructions for the FAA manufacturing inspection to verify that the modification conforms to your approved design data. This section may outline any other ground inspections and tests required by our engineering staff. It will also specify that an experimental airworthiness certificate is required. We also use this section to delegate the tests and inspections to DARs, DMIRs, and/or DERs.

7-5. TIA Section 18, Part II. This section requests that the FAA perform specific flight tests to demonstrate that the aircraft or aircraft modification complies with our regulations. The flight test plan you submitted for our approval is typically referenced or included in this section of the TIA. Your flight test plan should contain clear, detailed procedures allowing the FAA crew to conduct the flight test and determine whether the aircraft passes or fails. This section is also used to delegate the flight testing to flight test pilot and flight test analyst DERs. We also use this section to evaluate the flight manual supplement and any other instruments used during this TIA flight test.

7-6. TIA Section 18, Part III. This section is for requesting the AEG (our certification and flight standards liaison) to perform specific tests to demonstrate that the aircraft or aircraft modification complies with the FAA regulations. This section also is needed when the nature of the type design or type design change may affect the pilot type rating, procedures, pilot training program, master minimum equipment list (MMEL), or the aircraft maintenance procedures.

7-7. Supplemental Type Inspection Report (STIR). We (or a DER, if delegated), prepare the STIR on FAA Form 8110-26, documenting the results after satisfactorily completing all TIA inspections and tests. Results are reported by the individuals who performed the inspections and tests: the FAA manufacturing aviation safety inspector for conformity inspections and tests, (or authorized designee), and the FAA test pilot and flight test engineer, (or authorized DER), for

compliance inspections, ground tests, and flight tests. If a designee prepares the STIR, they submit it for our review and approval.

CHAPTER 8. TESTS

8-1. General. Depending on how complex the project is, we may require several types of testing for an STC. Before any certification testing, we or our DER must have approved the test plan and the test article must have a complete part and installation conformity inspection. See chapter 6.

8-2. Component Tests. Before completing the modification or installation, you may have to verify by testing that certain detail parts, components, or subassemblies meet the applicable regulations. Submit a test plan for each certification test to us for review to preclude unnecessary or unacceptable tests. Upon approval of the test plan, the FAA project engineer will issue FAA Form 8120-10, *Request for Conformity*, for inspection on the test fixture and test article(s) to the MIDO. The MIDO (or designee) will do the conformity inspection. The tests should then be witnessed by either the FAA project engineer or an authorized DER.

8-3. Ground Tests.

a. You may have to complete electromagnetic interference (EMI), environmental, fuel flow, structural, or similar ground tests when the modification or installation is complete. Submit a test plan for all such tests to us for review and approval before testing. See chapter **7**.

b. Aircraft that employ electronic engine controls, commonly named full authority digital electronic/engine controls (FADEC), are recognized to be more susceptible to EMI than aircraft with only manual (non-electronic) controls. For this reason, you must demonstrate that the critical function components of the system under consideration, continue to perform their intended function during and after exposure to required electromagnetic fields. We may accept deviations from system specifications, but those must be independently assessed by the FAA/DER on a case-by-case basis.

8-4. Flight Tests.

a. Applicant flight testing happens before we issue the TIA. We will review your flight test reports, and repeat some or all of the tests as necessary. Those tests we repeat will be identified and performed per the TIA.

b. We will perform flight tests for modifications which could affect the aircraft's performance, flight characteristics, powerplant operation, and/or overall handling qualities. Changes to systems, equipment, instrumentation, and flight manuals may also require flight tests. Any modification which may affect the noise signature and/or navigation of the aircraft (including performance changes) will usually require fight testing. The FAA project engineer can give you general information on the types of tests that may be required.

> **Note**: Our successful completion of the TIA tests is one of the final steps to STC issuance.

c. Applicant testing.

(1) Research and development flight tests are to ensure that the design changes comply with the applicable 14 CFR parts. We don't participate in, or witness these tests. However, we will discuss them with you and offer guidance, so your tests can be made meaningful and safe.

(2) Base your flight test plans on your knowledge of the modification and development tests, and on the certification basis. Include recommended tests, instrumentation to be used, necessary safety equipment, data acquisition and reduction methods. We will issue the TIA upon approval of the test plan and the descriptive and compliance data, after we establish conformity with the data, and complete our risk management process.

> **Note:** After you successfully complete the inspection and test requirements, submit your flight test report to us for review.

d. FAA testing may include repeating some tests, partially or completely, to verify compliance with the certification requirements. Our testing may be done by an FAA pilot or an authorized DER flight test pilot.

e. Before FAA testing, we (or our designee) do the installation conformity inspection of the modified aircraft used for flight tests. If we find discrepancies, you must correct them, plus repeat any test that could have been influenced by the discrepancy.

f. Current and accurate aircraft weight, and the center of gravity (CG) location, is extremely important to ensure that the modified aircraft can be loaded to the critical weight and CG limits for flight testing. The flight test aircraft should be weighed and witnessed by an FAA representative before testing begins. If appropriate, you can determine the aircraft weight and CG by analysis. We will verify the resulting weight and balance determination. After we find it accurate, use it for all subsequent flight test weight and CG calculations.

g. Securely restrain any temporary ballast necessary for flight testing, so it withstands the inertial loads caused by a survivable emergency landing. A preferred form of ballast is small, solid pieces of a high density metal (lead, cast iron, or steel) fixed to the structure or in a suitable container fixed to the structure. We don't accept using passengers as ballast. FAA approval of ballast installation for FAA flight testing will be required before the TIA may be issued.

h. Instrument calibration, when required, should be done by an approved instrument repair inspector with calibration cards provided by the instrument supplier before the FAA flight test program Types of instruments to be calibrated may include altimeters, tachometers, temperature gauges, and airspeed indicators. Do the flight test within 3 months of calibration. However, on critical items, do the flight test within 30 days of calibration.

> **Note:** You may have to calibrate the entire airspeed system before flight testing.

i. Demonstrate rapid emergency egress provisions to the FAA inspector and pilot for acceptability before FAA flight tests. If required, provide properly packed parachutes, with current repack dates, to the FAA. Parachutes are to be selected appropriate for aircraft test speeds and test pilot weight.

j. We will issue an experimental airworthiness certificate or special flight permit before you operate any aircraft that lacks a valid STC, or does not conform to its STC. Although the operations may eventually lead to a STC, you may conduct them only as a matter of research, or to show compliance with the appropriate 14 CFR.

k. Provide a draft flight manual supplement, if required, to us before any flight tests. After FAA flight testing, finalize the draft and submit it for FAA review and approval. For information on how to format and prepare flight manual supplements see the following ACs:

- 23-8, *Flight Test Guide for Certification of Part 23 Airplanes*,
- 25-7, *Flight Test Guide of Transport Category Airplanes*,
- 25.1581-1, *Airplane Flight Manual*,
- 27-1, *Certification of Normal Category Rotorcraft*, and
- 29-2, *Certification of Transport Category Rotorcraft*.

l. Check the aircraft TCDS to identify the FAA-approved aircraft flight manual, if appropriate. For many older aircraft, the TCDS states that placards and markings are required instead of a flight manual. Do not assume that your pilot handbooks or the manufacturer flight manual are FAA-approved. They may not be.

8-5. Simulator Tests. We may require simulator tests for certain projects. Submit all such test plans to us for review and approval.

CHAPTER 9. ADMINISTRATIVE ACTIONS

9-1. Cancellation of a Project. If projects are inactive for more than 6 months we may cancel them, notify the applicant and return the data. An applicant can re-start the cancelled project by resubmitting an application.

9-2. Issuance of an STC. Once all required inspections and tests are completed and we've verified compliance with the applicable regulations, we can prepare and issue the STC, FAA Form 8110-2, *Supplemental Type Certificate*. We will complete the Supplemental Type Inspection Report (STIR) within 90 days after issuing the certificate.

9-3. Re-Issuance of an STC. Notify the issuing ACO in writing to reissue an STC for either a name change, address change, or to correct typographical errors. Endorsement is required for a name change. Return the original STC to the issuing ACO.

9-4. Transferring Ownership of an STC. If you are an STC holder, we recommend that you notify the issuing ACO in writing 30 days prior to the transfer in order to facilitate the transfer. After the notification timeframe, endorse the back of the original STC and submit it to the issuing ACO shown on the front of the certificate. If an STC was issued to an organization, include an affidavit certifying the organization's authorization to execute the transfer on their behalf. We will then:

a. Cancel the endorsed STC and file it in the STC data file.

b. Reissue the certificate in the name of the new holder, retaining the same STC number, the original application date, the original issue date, and the new reissue date.

c. Forward the data file on the STC to the ACO covering the new holder's facilities if the new holder is located in another geographic area. We instruct the new holder to contact the appropriate geographic ACO responsible for all matters concerning the STC and the appropriate geographic MIDO for matters concerning any PMA activity with the STC.

d. If the transfer is planned to an organization outside the United States, we will notify and begin the necessary coordination process with the applicable foreign authority.

9-5. Use of an Available STC.

a. If you as an STC holder agree to permit another person to use the certificate to modify an aircraft, aircraft engine, propeller or appliance, you must give written permission, in a form acceptable to the Administrator, to each person making alterations based on the STC. If you make the alterations to your own aircraft, aircraft engine, propeller, or appliance only, the permission statement provision does not apply. See 49 U.S.C. § 44704.

b. The installer, mechanic, or repair station which obtained permission directly from you to use the STC must furnish a copy of your permission statement to the modified product owner or operator before completing the alteration. See 49 U.S.C. § 44704.

c. A copy of each permission statement should be retained by the STC holder, installer, and the owner or operator of the product on which an STC alteration is installed.

d. Enter the following notification statement on page one of Form 8110-2 under the "Limitations and Conditions" section, directly ahead of the statement "This certificate and the supporting data...": "If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission."

e. The permission statement you issue, to be acceptable to the Administrator, should contain at least the following:

(1) A written statement of the agreement specifying the product(s) to be altered.

(2) The STC number.

(3) The person(s) you are allowing to use the STC.

Note: You may list other information if you wish, such as the effective date, how many times the STC may be used for fleets of aircraft, and so forth.

9-6. Amendments to an STC.

a. "Multiple" STCs may be amended to add new models and show revised data. We amend the certificate with the original STC number and an amendment date. We place that amendment date in the "Date Amended" block.

b. "One-only" STCs will not be amended to become "multiple" STCs. We do not issue new "one-only" STCs for the same modification by the same applicant. If you want a "multiple" STC for the same type "one-only" STC installation, you should upgrade the data and apply for a separate new "multiple" STC with a new STC number. As with any other "multiple" STC application, submit sufficient data to verify that manufacturing and installation of the design may be duplicated on the subsequent aircraft, engines, or propellers.

9-7. Duration of an STC. An STC is effective until surrendered, suspended, revoked, or terminated (if we have set a termination date)**.**

9-8. Loss of an STC. Notify the local ACO immediately in writing, of losing an STC and the circumstances. We will issue a duplicate STC, retaining the original number. A statement on the face of the STC will identify it as a replacement. If you find the original certificate later, return it to the FAA ACO for processing and retention in the STC records. Under no circumstances should you keep two original certificates with the same STC number.

CHAPTER 10. SPECIAL CONSIDERATIONS FOR U.S. STCs USING FOREIGN-REGISTERED TEST AIRCRAFT

10 - 1. General.

a. The fundamental requirements for an STC are the same, whether the aircraft is U.S.-registered or foreign-registered. If you are an applicant, provide adequate descriptive data and compliance data to substantiate the design change.

b. An ACO can accept an STC project using foreign-registered test aircraft, but special considerations apply. You must meet all FAA requirements for the design change. You may have additional requirements imposed by the State of Registry in accordance with ICAO Annex 6, since the State of Registry must accept all modifications to an aircraft's type design.

c. Current STC requirements include:

(1) The test aircraft must be an FAA type-certificated aircraft.

(2) The project must have the full cooperation of the State of Registry including an agreement to return the aircraft to service.

(3) You are responsible for the test aircraft's configuration which should conform to an FAA type-certificated configuration in all aspects that concern the design change.

(4) The aircraft should be eligible for a standard airworthiness certificate.

10 - 2. Special Considerations for an Applicant Using a Foreign-Registered Test Aircraft.

a. Notify your ACO as soon as possible in order to minimize delays in any project contemplating use of a foreign-registered test aircraft. You are responsible for full disclosure of project details to the civil aviation authority (CAA) of the State of Registry through the ACO.

b. If the modification work is to be performed outside the United States, you must include details of the installation plan in the application package, and we will notify the CAA of the country where the modification work is being performed and the CAA of the State of Registry if they are not the same.

c. You are responsible for coordinating any designee overseas travel with the ACO. The CAA where the aircraft is located must be notified by us and must agree to the use of our designees to work in their country.

d. If flight testing is required for the approval, you are also responsible for determining whether the State of Registry's requirements for flight test pilots differ from U.S. requirements.

You should propose to us how these test pilot requirements will be met. Also, for testing within the United States, you will need us to issue a special flight authorization.

e. The airworthiness configuration of the foreign-registered aircraft is your responsibility. This includes responsibility for the interface between the proposed type design change and all prior modifications. Ensure that you have complete records on the aircraft's prior modifications.

10 - 3. Special Considerations for the FAA ACO.

a. We direct ACOs to be aware that when they accept a modification, the State of Registry may require regulatory compliance findings to other standards, such as joint aviation requirements (JARs) or EASA certification specifications (CS). Your designees should be authorized to make findings to the State of Registry's regulations.

b. We instruct ACOs to review your proposal for any potential undue burden issues stemming from foreign manufacturing. The ACOs use Order 8100.11, *Developing Undue Burden and No Undue Burden Decision Papers Under 14 CFR Part 21,* paragraph 10.

c. Once we issue the STC (as in the case of a U.S.-registered aircraft) you, as the owner of the STC, are responsible for continued airworthiness support.

APPENDIX 1. FAA FORM 8110-12, APPLICATION FOR TYPE CERTIFICATE, PRODUCTION CERTIFICATE, OR SUPPLEMENTAL TYPE CERTIFICATE

Complete one copy of FAA Form 8110-12 as follows (see sample form at the end of this appendix):

Item 1. Enter the name and address of the party, corporation or organization to whom the STC will be issued. The name will appear on the certificate exactly as it is entered here. **Note:** A post office box will not be accepted.

Item 2. Check the block for "Supplemental Type Certificate."

Item 3. Check the product involved (aircraft, engine, or propeller).

Note: Aircraft models having different TCs will require separate substantiations for each aircraft on the Approved Model List (AML). For 14 CFR part 23 airplanes in particular, how to create and use an AML is discussed in Advisory Circular AC 23-22, *Guidance for Approved Model List (AML) Supplemental Type Certificated (STC) Approval of Part 23 Airplane Avionics Installations*. But note that although AML STCs are predominantly issued to 14 CFR part 23 airplanes, they are not limited to that type of product. Consult with your local ACO to see if AML is appropriate for your proposed change.

Items 4 and 5. Leave it blank for STCs.

Item 6.

a. List the manufacturer of the aircraft, engine, or propeller and the specific models to be included as shown by the identification plates. These designations are also listed in the applicable specification, or data sheet, which may be examined at local FAA offices. Popular names such as "Cub," "Skylane," etc. should not be used. If the STC is utilizing a Proposed AML effectivity, insert a statement that states: "See attached Proposed AML for make and model effectivity".

Note: If the requested approval is for a "one-only" aircraft, engine, or propeller, the applicant should indicate the applicable serial number. This data should be in 6b**.**

b. Use this space for a brief narrative description of the change. Include descriptive data such as installation instructions and/or drawing lists if they are available at the time of application and the effected airplanes serial number. (See sample form).

c. 1. Answer "No" if descriptive data and parts will not be made available to others. Descriptive data must completely describe the change, but may consist of marked photographs, sketches, and word descriptions. Detailed installation instructions are not required for a "one-only" installation intended for one specific aircraft.

2. Answer "Yes" if descriptive data and parts are to be made available to others. Installation instructions and good quality descriptive data, with sufficient detail to ensure repeatability, are required for duplicate parts and installations.

d. 1. Answer "No" if descriptive data will be made available, but parts will not be supplied. Data requirements are the same as for 6.c.2.

2. Answer "Yes" if installation instructions and parts will be made available. Installation instructions are required which will permit duplication of the installation to the standards required for certification.

Note: When 6.d.2. is answered "Yes" and the STC has been approved, compliance with 14 CFR § 21.303 will be required as evidence of inspection approval of manufactured parts.

Item 7. The application should be dated and signed by the applicant or authorized agent as the certifying official. The certifying official must be the holder or the person duly authorized to sign for the holder, company, or corporation. Upon receipt of the application and certification plan, an FAA project number will be assigned and the applicant notified of this action. All subsequent submittals and correspondence should reference this project number.

Sample STC Application

No certificate may be issued unless a completed application form has been received (14 C.F.R.-21)

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION **APPLICATION FOR TYPE CERTIFICATE, PRODUCTION CERTIFICATE, OR SUPPLEMENTAL TYPE CERTIFICATE**		*FORM APPROVED* *O.M.B. No. 2120-0018*
1. Name and address of applicant Acme Aircraft Corporation 123 Noname St. Nowhere, Kansas 71953	2. Application made for - ☐ Type Certificate ☐ Production Certificate ☒ Supplemental Type Certificate	3. Product Involved ☒ Aircraft ☐ Engine ☐ Propeller
4. TYPE CERTIFICATE (*Complete item 4a below)*		
a. Model designation(s) (All models listed are to be completely described in the required technical data, including drawings representing the design, material, specifications, construction, and performance of the aircraft, aircraft engine, propeller which is the subject of this application.) **LEAVE BLANK FOR STC APPLICATION**		
5. PRODUCTION CERTIFICATE (*Complete items 5a-c below. Submit with this form, in manual form, one copy of quality control data or changes thereto covering new products, as required by applicable FAR.)*		
a. Factory address (*if different from above)* **LEAVE BLANK FOR STC APPLICATION**	b. Application is for - ☐ New production certificate ☐ Additions to production Certificate *(Give P.C. No.)*	P.C. No.
c. Applicant is holder of or a licensee under a Type Certificate or a Supplemental Type Certificate *(Attach evidence of licensing agreement and give certificate number)* ——————>		T.C./S.T.C. No.
6. SUPPLEMENTAL TYPE CERTIFICATE (*Complete items 6a-d below)*		
a. Make and model designation of product to be modified Schtickenrudder P-48, P-48A, P-48B		
b. Description of modification Install wing flap hinge bracket (P/N 60000) in accordance with Acme drawing list 60DL, Rev. N/C, dated 01/25/88		
c. Will data be available for sale or release to other persons? ☒ YES ☐ NO	d. Will parts be manufactured for sale? *(Ref. FAR 21.303)* ☒ Yes ☐ NO	
7. CERTIFICATION - I Certify that the above statements are true.		
Signature of certifying official	Title General Manager	Date 02/01/88

FAA Form 8110-12 (4-03) SUPERSEDES PREVIOUS EDITION (REPRESENTATION)

U.S. Department
of Transportation
Federal Aviation Administration

INFORMATION FOR APPLICANT

APPLICATION FOR TYPE CERTIFICATE, PRODUCTION CERTIFICATE, OR SUPPLEMENTAL TYPE CERTIFICATE

Paperwork Reduction Act Statement:
This collection of information is for the purpose of issuing a U.S. Type Certificate, Production Certificate, or Supplemental Type Certificate to any applicant meeting the criteria established in 14 CFR part 21. The FAA uses the information to evaluate an applicant's application for a U.S. Type Certificate, Production Certificate, or Supplemental Type Certificate. The information on FAA Form 8110-12, Application for Type Certificate, Production Certificate, or Supplemental Type Certificate is solicited under the authority of 49 U.S.C. 44702 as implemented by 14 CFR part 21. The burden associated with completing FAA Form 8110-12 is 48 minutes. Providing this information is mandatory if an applicant wishes to obtain a Type Certificate, Production Certificate, or Supplemental Type Certificate. Confidentiality is neither provided nor necessary. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control number associated with this collection of information is 2120-0018.

Tear off this cover sheet before submitting this form.

FAA Form 8110-12(4-03) Supersedes Previous Edition (Representation)

APPENDIX 2. SAMPLE DRAWING PACKAGE

This appendix includes a two-page sample drawing list and three sample drawings (sample installation drawing, assembly/subassembly drawing, and part fabrication detail drawing) for installing the Acme Aircraft Corporation flap hinge bracket installation.

Acme Aircraft Corporation
Drawing List 60DL
Flap Hinge Bracket Installation (P-48 Series)
Revision Control Page
Page 1 of 2

Revision	Date	Page Nos. Affected	Approved
N/C	01/02/88	1, 2	(approval signature)
A	01/25/88	1, 2	(approval signature)

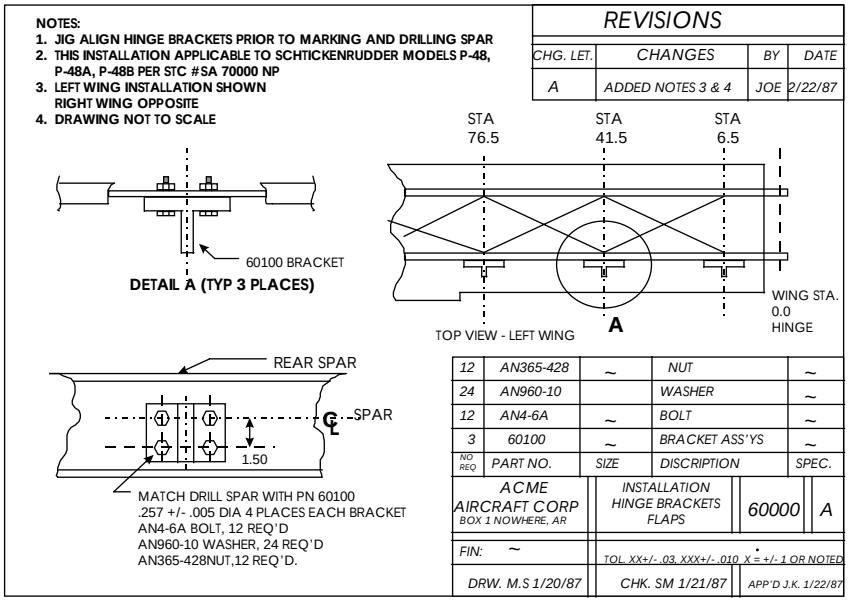
Company Approved: (approval signature)
Date: 01/25/88

Acme Aircraft Corporation
Drawing List 60DL
Flap Hinge Bracket Installation (P-48 Series)
Page 2 of 2

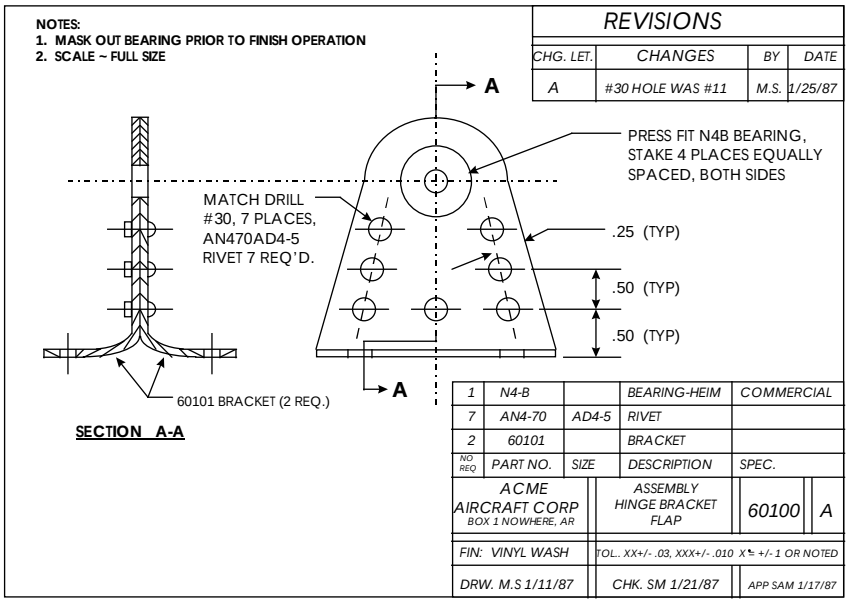
Document Number	Title	Rev.	Date
Installation Data	Installation Instructions	A	07/05/87
60-II	P-48 Series Flap Hinge Bracket		
60000	Flap Hinge Brackets Installation	A	02/22/87
Manufacturing Data			
60100	Flap Hinge Bracket Assy.	A	01/25/88
60101	Wing Flap Hinge Bracket	B	01/25/88
•			
•			
AAC41	Epoxy Specification	N/C	04/19/86
AAC60	Inspection Procedures	N/C	01/02/88

Company Approved: (approval signature)
Date: 01/25/88

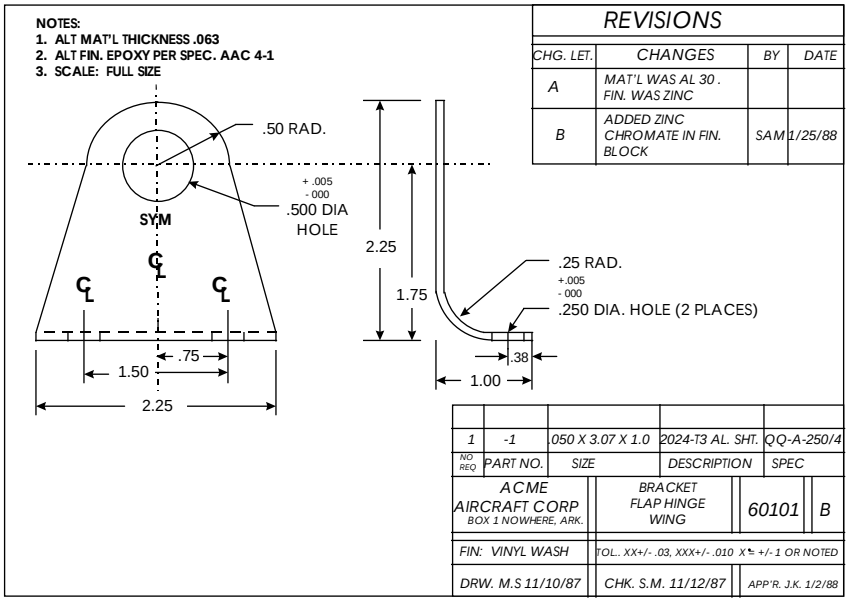
Sample Installation Drawing



Sample Assembly/Subassembly Drawing



Sample Part Fabrication Detail Drawing



APPENDIX 3. SAMPLE SUPPLEMENTAL TYPE CERTIFICATE

United States Of America
Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate

Number ST00001DC

This Certificate issued to U.S. Cargo Conversion Company
5201 Tranquility Lane
Colorful, Colorado 80110

certifies that the change in the type design for the following product with the limitations and conditions therefore as specified hereon meets the airworthiness requirements of Part 25 of the Federal Aviation Regulations.*

Original Product Type Certificate Number: A16WE

Make: The Boeing Company

*** SEE PAGE 3**

Model: 737-300 Series

Description of Type Design Change: Conversion of a Boeing 737-300 passenger configuration to freighter configuration (including full cargo floor, main deck cargo door, interior and associated systems) in accordance with PCCC Master Drawing List PC-001, Revision B, dated March 23, 2001, or later FAA-approved revisions.

Limitations and Conditions: The installation should not be incorporated in any aircraft unless it is determined that the interrelationship between this installation and any previously approved configuration will not introduce any adverse effect upon the airworthiness of the aircraft.

(Limitations and Conditions continued on page 3 of 4)

This certificate and the supporting data which are the bases for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: March 20, 2001

Date of issuance: April 24, 2002

Date reissued:

Date amended:

By direction of the Administrator

(*Signature*)
Manager, Aircraft Certification Office

(*Title*)

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.

FAA Form 8110-2 (10-68) *Page 1 of 3* *This certificate may be transferred in accordance with FAR 21.47.*

FAA Form 8110-2.1: SAMPLE DOCUMENTING A CERTIFICATION BASIS

United States Of America
Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate

(Continuation Sheet)

Number ST00001DC

Instructions for Continued Airworthiness (ICA), U.S. Cargo Conversion Company Document No. 123, Rev. A, dated 9/08/1988, or later FAA accepted revision must be made available to the operator at the time of installation.

Certification Basis:

Based on 14 CFR §§ 21.115 and 21.101, and the FAA policy for significant changes in FAA Order 8110.48, the certification basis for the Boeing Model 737-300 series passenger to Freighter is as follows:

a. The type certification basis for Boeing Model 737 series airplanes is shown on TCDS A16WE for parts **not changed or not affected** by the change.

b. The certification basis for parts **changed or affected** by the change since the reference date of application, March 20, 2001, is based upon part 25 as amended by Amendment 25-101. Based on 14 CFR §§ 21.115 and 21.101, and the FAA policy for significant changes in FAA Order 8110.48, the certification basis for this modification was determined to be:

Regulations at the latest amendment 25-0 through 25-101
25.1 - 25.31, 25.301 - 25.307, 25.561 - 25.563, 25.581, 25.601 - 25.625, 25.671 - 25.689, 25.729, 25.777, 25.783 - 25.793, 25.801 – 25.812, 25.843, 25.851 - 25.869, 25.871, 25.903, 25.1301, 25.1309, 25.1322 – 25.1326, 25.1351 – 25.1363, 25.1411 – 25.1423, 5.1431 – 25.1461, 25.1501, 25.1519 – 25.1533, 25.1541 – 25.1563, 25.1581 – 25.1585, Appendix F

Regulations at an intermediate amendment
25.574 Amendment 25-54
25.629 Amendment 25-46
Appendix H Amendment 25-54

Regulations at the amendment level in TCDS A16WE
25.25, 25.321 - 25.373, 25.471 - 25.519, 25.731 – 25.735, Appendix G

If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission. More on Continuation page #2.

----------END----------

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.

SAMPLE SUPPLEMENTAL TYPE CERTIFICATE

FAA Form 8110-2.1. SAMPLE DOCUMENTING A CERTIFICATION BASIS (CONTINUED)

The type design of the Windjet 100 series airplanes was approved by issuing Type Certificate A11DC. The Windjet 100 series airplanes were certified to amendment 22 of 14 CFR part 25. In June 2000, the TC was amended to include the Windjet 100AC. The Windjet 100AC is a retrofit of a Windjet 100 airplane with an Advanced Cockpit (AC). The following is based on information from the Windjet 100 Type Certificate Data Sheet (TCDS):

1. For all Model Windjet 100AC airplanes, issuance of a TC is based on compliance with the following:

a. Conversion of a Windjet 100 to a Windjet 100AC can be accomplished by Windjet Aircraft Drawing SP10000.

b. The Certification Basis is defined as:

(1) Title 14 CFR part 25, dated February 1, 1965, with Amendments 1 through 22 "Airworthiness Standards: Transport Category Airplanes," and 14 CFR § 25.471 of Amendment 25-23, for all areas not affected by the change.

(2) Title 14 CFR part 25, dated February 1, 1965, including Amendments 25-1 through 25-89 for the change and all areas affected by the change. The following lists the Federal Aviation Regulations complied with through Amendment Level 25-89.

25. 125	25. 605	25. 685	25. 841	25. 1039	25. 1326	25. 1435	25. 1541
25. 145	25. 607	25. 689	25. 843	25. 1141	25. 1327	25. 1439	25. 1543
25. 149	25. 609	25. 693	25. 855	25. 1142	25. 1329	25. 1441	25. 1545
25. 207	25. 611	25. 699	25. 857	25. 1145	25. 1331	25. 1443	25. 1549
25. 301	25. 613	25. 703	25. 858	25. 1161	25. 1333	25. 1445	25. 1551
25. 303	25. 615	25. 729	25. 863	25. 1165	25. 1335	25. 1447	25. 1553
25. 305	25. 619	25. 733	25. 901	25. 1207	25. 1337	25. 1449	25. 1555
25. 307	25. 621	25. 771	25. 903	25. 1301	25. 1351	25. 1451	25. 1563
25. 397	25. 623	25. 773	25. 943	25. 1303	25. 1353	25. 1453	25. 1581
25. 399	25. 625	25. 777	25. 952	25. 1305	25. 1355	25. 1457	25. 1583
25. 405	25. 629	25. 779	25. 954	25. 1307	25. 1357	25. 1459	25. 1585

APPENDIX 4. GUIDE FOR PREPARING FAA FORM 8120-10, REQUEST FOR CONFORMITY

U.S. Department of Transportation
Federal Aviation Administration

REQUEST FOR CONFORMITY
RFC Tracking Number:
Revision: , Rev. Date:
Page 1 of

To: _____ Attention: _____
_____ Project No.: _____
_____ Initial Date: _____

Request for Conformity Inspection

☐ Part Conformity _____
☐ Installation _____
☐ Other (Specify) _____

A conformity inspection pertaining to the subject is requested for the following:

Applicant Name: _____
Company Name: _____
Street: _____
City: _____ State: _____ Zip: _____

Time/Date Available: _____ ☐ Applicant will Contact FAA
Type Installation: _____
Make/Model: _____ Quantity: _____
Requesting Document (P.O.) and Date: _____

Design Data:
(with Rev/Date) _____

Special
Instructions: .

Applicant Contact: _____ Phone: _____
FAA Project Manager: _____ Phone: _____
FAA Project Engineer: _____ Phone: _____
MIO Type Certification Mgmt. Spec: _____ Phone: _____
MIDO Project Principal Inspector: _____ Phone: _____

Remarks: _____

☐ T.I.A. Issued (Type Inspection Authorization)
☐ FAA Form 8100-1 Required (Conformity Inspection Report)
☐ T.I.R. Required (Type Inspection Report)
☐ FAA Form 8130-9 Required (Statement of Conformity)
☐ 8130-3 Tags Required (Airworthiness Approval Tag)

Note: Please return this request for conformity with the FAA conformity documentation to the Project Principal Inspector (PI), then to the MIO Type Certification Management Specialist (TCMS), and then to the FAA Project Engineer (PE).

Reviewed By: FAA Project Engineer, Axx-xxx

FAA Form 8120-10 (11-05) Supersedes Previous Edition (Representation) U.S. Department of Transportation Federal Aviation

REQUEST FOR CONFORMITY

RFC Tracking Number:
Revision:
Continuation Sheet

Page of

DESIGN DATA (continued):

Special Instructions (continued):

Remarks (continued):

FAA Form 8120-10 (11-05) Supersedes Previous Edition (Representation)

1. Request for Conformity Inspection: Enter the FAA office that the applicant asks to perform the conformity inspection.

2. Project No.: Enter the FAA project number for the project.

3. Date: Enter the current date.

4. Part Conformity/Installation/Other: Check the applicable blocks.

5. Applicant Name: Enter the name of the applicant as shown on the original project application.

6. Company Name: Enter the name of the supplier, vendor, or test firm where the desired inspection will occur.

7. Street/City/State/Zip: Enter the address of the company named above. A post office box is not acceptable.

8. Time/Date Available: If you know when the product, part, assembly, appliance, or test article will be ready, enter the expected date.

9. Type Installation: Enter a brief descriptive statement, which includes the product, part, assembly, appliance, or test article to be inspected (for example, landing gear assembly, galley flammability test articles, wing spars, and so forth).

10. Make/Model: Identify the end product being certificated or modified.

11. Quantity: Enter the quantity of parts requiring inspection (for example, 1 shipset, 5 test samples, and so forth).

12. Requesting document such as a purchase order (P.O.) and date: Reference the applicant's letter or other correspondence identifying the pending certification test.

13. Design Data: Identify the data to be used for the inspection, that is, drawings (including revision and date).

14. Special Instructions: Enter any special instructions, as necessary.

15. Applicant Contact: Enter the name, title (if known), and telephone number of the person to contact at either the applicant's or the vendor organization to arrange the inspection.

16. FAA Project Manager: Enter the name and telephone number of the FAA project manager.

17. FAA Project Engineer: Enter the name and telephone number of the FAA project specialist involved in the pending test. In "Remarks," (if applicable), enter:

a. The name of the designated engineering representative authorized to disposition unsatisfactory conditions found during conformity inspection.

b. The name of the designated airworthiness representative requested by the applicant.

18. MIO type certification management specialist (TCMS): Enter the name and office symbol of the manufacturing inspection office (MIO) TCMS, who covers the project manufacturing inspection district office's principle inspector (PI) conformity activities.

19. MIDO Project Principle Inspector: Enter the name and office symbol of MIDO PI responsible for the conformity request.

20. "Form Blocks": Place a check mark in each applicable block:

a. TIA Issued: Check this block for requests to supplement a previously issued type inspection authorization (TIA).

b. TIR Required: Check this block to have related conformity inspection records placed in the pending type inspection report (TIR) or supplemental type inspection report (STIR) (when the FAA has issued a TIA).

c. 8130-3 Tags Required: Check this block when you will move or ship the inspection articles from the inspection site to a remote testing site, and want assurance that the article will be inspected. FAA Form 8130-3 is the conformity inspection tag.

d. FAA Form 8100-1 Required: Check this block for every request. FAA Form 8100-1 is the conformity inspection record.

e. FAA Form 8130-9 Required: Check this block for every request. The FAA requires this form under 14 CFR § 21.53.

21. **Note:** Enter "Please return this request for conformity, with the FAA conformity document, to the project PI. The project PI sends the documents to the MIO TCMS, who sends them to the FAA project engineer."

22. Reviewed By: Enter the name, title, and office symbol of FAA project engineer reviewing the FAA conformity document.

23. Continuation Sheet: Enter additional information on Design Data, Special Instructions, and Remarks, if necessary. The purpose for the STC checklist is to monitor and communicate *early,* and throughout the certification process, the requirements to be fulfilled for an STC to be issued.

The checklist has all FAA requirements that an STC applicant should meet. Throughout the certification process, each item in the checklist should be checked, marked and dated when complete. Both the applicant and ACO should use the checklist to monitor the progress of the STC project, and to ensure that all requirements are met. Applicant**,** project manager/ engineer and the MIDO should likewise use this checklist and share in updating it.

APPENDIX 5. STC FILE CHECKLIST

					Task Completed	Date
PROJECT INITIATION:						
Application for STC, FAA Form 8110-12						
One-only						
Multiple						
Certification program notification						
Project notification letter to applicant						
PSCP or Certification Plan						
ACO to ACO Coordination	____	**Not required**	_____	**Required**		
Prototype Aircraft U.S. Registered?	____	**Yes**	_____	**No**		
FCAA coordination	____	**Not required**	_____	**Required**		
DATA TO SUPPORT STC:						
Compliance checklist						
Master drawing list						
Photographs, sketches, drawings						
Installation instructions						
Instructions for Continued Airworthiness						
Substantiation Reports/ FAA Form 8110-3 Approvals:						
Structural						
Systems and equipment						
Electrical load analysis						
Propulsion						
Flight Test						
Weight and balance						
Continued airworthiness						
Qualification Ground Testing:						
Structural						
Systems and equipment						
Environmental						
Flammability						
Propulsion						
HIRF (RTCA/DO-160)						
Software (RTCA/DO-178)						
Compliance to 14 CFR § 21.93 (b) (Acoustical Change)						
Compliance to 14 CFR § 21.93 (c) (Emissions Change)						

	Task Completed	Date
CONFORMITY/FLIGHT TESTING:		
Statement of Conformity, FAA Form 8130-9	_____	_____
Request for Conformity, FAA Form 8120-10	_____	_____
Conformity Inspection Record, FAA Form 8100-1	_____	
Type Inspection Authorization, FAA Form 8110-1	_____	_____
Type Inspection Report:		
Part I (STIR, FAA Form 8110-26)	_____	_____
Part II (Flight Test Report)	_____	_____
Flight Manual Supplement or Supplemental Flight Manual	_____	_____
PROJECT CLOSEOUT:		
Project substantiation summary	_____	_____
STC Issuance	_____	_____

APPENDIX 6. LIST OF FAA FORMS

The following forms are available at http:// www.faa.gov/library/forms/

1.	FAA Form 337	Major Repair and Alteration (Airframe, Powerplant, Propeller, or Appliance.
2.	FAA Form 8000-4	Air Agency Certificate
3.	FAA Form 8000-5	Certificate of Designation
4.	FAA Form 8100-1	Conformity Inspection Report
5.	FAA Form 8110-1	Type Inspection Authorization
6.	FAA Form 8110-2	Supplemental Type Certificate
7.	FAA Form 8110-2-1	Type Certification Continuation Sheet
8.	FAA Form 8110-3	Statement of Compliance with the Federal Aviation Regulations
9.	FAA Form 8110-9	Type Certificate
10.	FAA Form 8110-12	Application for Supplemental, Production or Type Certificate
11.	FAA Form 8110-14	Statement of Qualifications (DAR – ODAR - DMIR - DER)
12.	FAA Form 8110-26	Supplemental Type Inspection Report
13.	FAA Form 8120-10	Request for Conformity
14.	FAA Form 8130-3	Airworthiness Approval Tag
15.	FAA Form 8130-9	Statement of Conformity
16.	FAA Form 8430-9	Certification of Authority

APPENDIX 7. LIST OF FAA AIRCRAFT CERTIFICATION/FIELD OFFICES

Anchorage Aircraft Certification Office
(ACE-115N)
Federal Aviation Administration
222 West 7th Ave #14
Anchorage, AK 99513-7587
Telephone: (907) 271-2668
FAX: (907) 279-6365

Atlanta Aircraft Certification Office
(ACE-115A)
Federal Aviation Administration
1895 Phoenix Blvd., Suite 450
Atlanta , GA 30349
Telephone: (770) 703-6035
FAX: (770) 703-6097

Boston Aircraft Certification Office
(ANE-150)
Federal Aviation Administration
12 New England Executive Park
Burlington, MA 01803
Telephone: (781) 238-7150
FAX: (781) 238-7170

Chicago Aircraft Certification Office
(ACE-115C)
Federal Aviation Administration
2300 East Devon Avenue
Des Plaines, IL 60018
Telephone: (847) 294-7357
FAX: (847) 294-7834

Denver Aircraft Certification Office
(ANM-100D)
Federal Aviation Administration
26805 E. 68th Ave., Room 214
Denver, CO 80249
Telephone: (303) 342-1080
FAX: (303) 342-1088

Fort Worth Rotorcraft Certification Office
(ASW-170)
Federal Aviation Administration
2601 Meacham Blvd.
Fort Worth, TX 76137
Telephone: (817) 222-5170
FAX: (817) 222-5959

Fort Worth Special Certification Office
(ASW-190)
Federal Aviation Administration
2601 Meacham Blvd.
Fort Worth, TX 76137
Telephone: (817) 222-5190
FAX: (817) 222-5959

Los Angeles Aircraft Certification Office
(ANM-100L)
Federal Aviation Administration
3960 Paramount Blvd.
Lakewood, CA 90712
Telephone (562) 627-5200
FAX: (562) 627-5210

New York Aircraft Certification Office
(ANE-170)
Federal Aviation Administration
1600 Stewart Avenue, Suite 410
Westbury, NY 11590
Telephone: (516) 228-7300
FAX: (516) 794-5531

Seattle Aircraft Certification Office
(ANM-100S)
Federal Aviation Administration
1601 Lind Avenue SW
Renton, WA 98057
Telephone: (425) 917-6400
FAX: (425) 917-6590

Engine Certification Office (ANE-140)
Federal Aviation Administration
12 New England Executive Park
Burlington, MA 01803
Telephone: (781) 238-7140
FAX: (781) 238-7199

Fort Worth Airplane Certification Office (ASW-150)
Federal Aviation Administration
2601 Meacham Blvd.
Fort Worth, TX 76137
Telephone: (817) 222-5150
FAX: (817) 222-5959

Wichita Aircraft Certification Office (ACE-115W)
Federal Aviation Administration
1801 Airport Road, Room 100
Wichita, KS 67209
Telephone: (316) 946-4100
FAX: (316) 946-4107

Military Certification Office (ACE-100M)
8200 E. 34th. St. N.
Bldg. 1000, Suite 1005
Wichita, KS 67226
Telephone: (316) 350-1580
FAX: (316) 350-1586

APPENDIX 8. GLOSSARY OF TERMS

AC: Advisory Circular.

ACO: Aircraft Certification Office

AEG: Aircraft Evaluation Group

AFM/RFM: Aircraft/Airplane/Rotorcraft Flight Manual

AFMS/RFMS: Aircraft/Airplane/Rotorcraft Flight Manual Supplement

Agent: Individual authorized by the applicant to act on behalf of applicant.

AML: Special case of multiple STC using an approved model list to control installation eligibility, so adding new make and model products does not require amending the STC.

AN: Aeronautical Standard

Applicable Regulations: Those portions of 14 CFR or CAR which apply to the STC modification (also called the certification basis).

ATC: Amended Type Certificate

Authorized Designee: FAA designee granted FAA approval to perform a specific task for the applicant, such as witnessing a certain test or conducting a certain conformity inspection.

CAA: (Foreign) Civil Aviation Authority

CAM: Civil Aeronautics Manual

CAR: Civil Air Regulations

Certification Basis: (See "Applicable Regulations.")

Certification Plan: Written plan for the coordination of the STC application process, including identification of all applicable regulations and anticipated methods for demonstrating compliance with the regulations, proposed use of designees, and anticipated project schedule.

Certification Testing: (See "Component Testing", "Ground Testing" and "Flight Testing." Also called Compliance Testing)

CG: Center of Gravity

CMACO: The ACO managing the product's TC. Also manages the continued airworthiness for all products they approve for as long as the products are in service.

Compliance Data: Data necessary to substantiate that the modification or installation complies with the applicable regulations (also called substantiating data).

Compliance Inspection: Specification review and physical inspection of hardware to verify that a particular component or modification complies with the requirements of the applicable regulations.

Compliance Testing: (See "Component Testing", "Ground Testing" and "Flight Testing." Also called Certification Testing)

Component Testing: Testing of a detail part, component, or subassembly to demonstrate that it functions as required to meet the applicable regulations.

Conformity Inspection: Physical comparison of the component or modification to the engineering drawings and specifications to verify that component or modification conforms to the data.

DAR: Designated airworthiness representative

DAS: Designated Alteration Station

DER: Designated Engineering Representative

Descriptive Data: Data necessary to completely define the design of the modification or installation.

Designee: Individual authorized by FAA to approve data, conduct inspections, witness tests, etc.

DMIR: Designated Manufacturing Inspection Representative

ELOS: Equivalent Level of Safety

EMI: Electromagnetic Interference

Experimental Airworthiness Certificate: As referenced in this guide, a certificate to operate the aircraft with the modification installed before STC approval is granted in order to perform research and development testing and FAA flight testing.

FAA: Federal Aviation Administration

FADEC: Full Authority Digital Electronic/Engine Controls

Flight Testing: Testing in flight of the final modification or installation on the aircraft. Can also include related ground testing

14 CFR: Title 14 of the Code of Federal Regulations

FSDO: Flight Standards District Office

Ground Testing: Structural, environmental, fuel flow, or similar tests (other than tests in flight) performed on the final modification or installation to demonstrate that it complies with the applicable regulations.

ICA: Instructions for Continued Airworthiness

Major Change: Change to an aircraft, engine, or propeller which appreciably affects weight, balance, strength, reliability, operational characteristics, airworthiness characteristics, power, noise characteristics, or emissions.

MDL: Master Drawing List

MIDO: Manufacturing Inspection District Office

Minor Change: Change to an aircraft, engine, or propeller which does not appreciably affect weight, balance, strength, reliability, operational characteristics, airworthiness characteristics, power and noise characteristics, or emissions.

MISO: Manufacturing Inspection Satellite Office

MMEL: Master Minimum Equipment List

MOA: Memorandum of Agreement

MRB: Maintenance Review Board

MS: Military Standard

"Multiple" STC: An STC applicable to more that one serial number aircraft, engine, propeller, or appliance.

NAS: National Aerospace Standard

NTIS: National Technical Information Service

ODA: Organization Designation Authorization

ODAR: Organizational Designated Airworthiness Representative

"One-only" STC: An STC applicable to only one serial number aircraft, engine, propeller, or appliance.

PACO: ACO working a certification project. May need to coordinate with the CMACO, if the project is a follow-up certification activity, such as an STC or PMA.

PAH: Production Approval Holder

PCSP: Project Specific Certification Plan

PHAC: Plan for Hardware Aspects of Certification

PMA: Parts Manufacturer Approval

POH: Pilot's Operating Handbook

Project Engineer: FAA ACO engineer assigned to the STC project to evaluate the data submittals.

Project Manager: FAA ACO engineer or supervisor assigned to coordinate the approval process of an STC application.

Project Number: Number assigned by the FAA ACO to the STC application to facilitate approval process.

Project Team: FAA personnel assigned to the STC project.

Request for Conformity: Request from the FAA project engineer to the FAA manufacturing aviation safety inspector to perform a conformity inspection on a specific article.

Statement of Conformity: Official signed statement from the applicant signifying that the modification or installation conforms to the design data and to the type design. (FAA Form 8130-9.)

STC: Supplemental type certificate, issued for a major design change to a type-certificated product when the changes are not so extensive as to require a new type certificate.

STC Application: Application for a supplemental type certificate. (FAA Form 8110-12.)

Substantiating Data: (See "Compliance data.")

STIR: Supplemental Type Inspection Report, an official document that allows the manufacturing inspector to record the results of the inspections and tests conducted on modified products presented for STCs (FAA Form 8110-26).

TC: Type Certificate

TCAS: Traffic Collision (Alert) and Avoidance System

TCB: Type Certification Board

TCDS: Type Certificate Data Sheet, part of the TC which documents the conditions and limitations necessary to meet the airworthiness requirements of Title 14 of the Code of Federal Regulations, and provides a concise definition of the configuration of a type-certificated product.

Test Article: Components, aircraft, engines, or propellers used specifically for certification testing.

TIA: Type Inspection Authorization, an official document listing the inspection, ground test and flight test requirements for the modification. TIA initiates official FAA flight testing (FAA Form 8110-1).

TIR: Type Inspection Report, an official document used with the TIA that enables the manufacturing inspector to report the results of the ground inspection (part one of the TIA).

TSO: Technical Standard Order, a minimum performance standard issued by the Administrator for specified materials, parts, processes, or appliances used on civil aircraft.