

The FAA and Industry Guide to Avionics Approvals

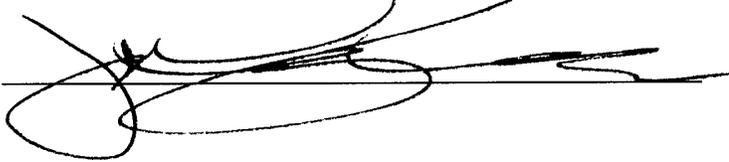
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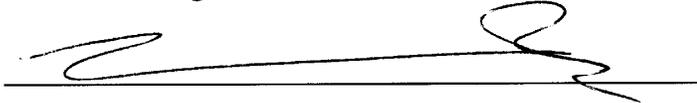
Date: 4-13-01

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Director, Flight Standards Service, AFS-1



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INTRODUCTION

Background

The Federal Aviation Administration (FAA) and Industry are committed to improving the effectiveness and efficiency of the product certification or approval process by establishing up-front a clear understanding of the needs and expectations of both parties in the certification or approval process. In 1998, an Industry/FAA team formalized these principles and wrote *The FAA and Industry Guide to Product Certification*. That guide was published in 1999 and Certification Process Improvement (CPI) was implemented at that time under the authority of FAA Notice 8110.80.

The objectives of CPI, reducing the cycle time to certify or approve products while ensuring regulatory compliance, requires earlier involvement of the FAA and applicants in project planning, open and constructive communication, and safety focused project management. This process will result in a more effective use of FAA and industry resources, particularly by using FAA designees with oversight focused on critical safety areas. Also, by reducing the time and cost of product approval, safety enhancements through new technology and design innovation can be more rapidly integrated into aviation products. To achieve these objectives, during 1999 and 2000 the FAA successfully engaged in Partnership for Safety Plans (PSPs) with several applicants, primarily airframe or engine manufacturers.

During the time the CPI process was being developed, RTCA Task Force 4 – Certification was assembling recommended avenues to make the certification process more responsive to the changing operational environment of the National Airspace System (NAS). Also, a major step toward improving aviation safety is increased installation of advanced avionics that provide better pilot awareness. Streamlining certification of avionics installations is one avenue to do this while improving the efficiency of the approval process.

In 1999, RTCA formed a Certification Select Committee to implement the recommendations developed by the RTCA Task Force. The recommendations are generally focused around needed improvements in the efficiency and responsiveness of the certification process to facilitate implementation and certification of new avionics technologies. One recommendation specifically referenced broader use of CPI.

A working group under the leadership of the RTCA Certification Select Committee developed this guide to focus on the unique nature of avionics approvals.

Scope

This guide focuses on special issues typically faced by applicants and the FAA during the avionics approval process and provides information regarding the most efficient path for various types of avionics approvals. The approval process may include either Technical Standard Order (TSO) approval or installation approval via Type Certificate (TC) or Supplemental Type Certificate (STC), or both. The process varies depending on the applicability of TSO standards and issues that arise regarding the installation of the equipment.

Appendices I, II, and III provide helpful concepts for streamlining the approval process of avionics installations in multiple models, follow-on field approvals, and so forth. For the purposes of this document, it should be noted the term *Approval* includes certifications, authorizations, and other forms of approval.

The basic structure and premise of the processes described may be applied to non-avionics appliances as well. It should be noted, however, that depending on the type of product, the applicability will vary. The application of this guide to appliances other than avionics should be coordinated with the FAA.

Purpose

The FAA and Industry Guide to Avionics Approvals describes how to plan, manage, and document an effective, efficient avionics approval process and working relationship between the FAA and an applicant. This guide should be used by the FAA and applicants of avionics equipment to obtain design, production, and installation approvals.

This guide complements *The FAA and Industry Guide to Product Certification*, which contains a description of the purpose and vision of the improved certification process -- CPI. It is expected that the CPI principles of up-front planning, project management, and documenting the certification process and working relationship are applicable to all applicants. This extends from large Type and Production Certificate applicants to those applying for avionics approval through the TSO approval process. *The FAA and Industry Guide to Product Certification* is intended to be the overarching guide to using CPI. That guide should be the foundation and primary reference to this document when the FAA and avionics applicants engage in the CPI process.

This guide shares the vision for CPI described in *The FAA and Industry Guide to Product Certification*. CPI enables a credible and concise avionics approval process that results in the following:

- Timely and efficient design and production approvals.
- Clearly defined and understood roles, responsibilities, and accountability of all stakeholders.
- Timely identification and resolution of the certification basis, potential safety issues, and business practice requirements.
- Optimal delegation using safety management concepts with appropriate controls and oversight.

It is important for FAA and applicant stakeholders to understand the concepts presented in *The FAA and Industry Guide to Product Certification*. Then, use of this guide will be more meaningful as users apply the concepts to their approval process.

This guide includes an overview of how the Phases for product certification apply to the avionics approval process. The guide describes Key Players' roles and responsibilities as they apply to avionics approvals and is supported by Appendices. Appendix I contains a model for a Partnership for Safety Plan (PSP) specific for developing the relationship between the FAA and

avionics applicants. Appendices II and III contain models for Project Specific Certification Plans (PSCPs), which are the primary tools of the approval process. Appendix II focuses on the design approval aspects of a project while Appendix III focuses on the installation aspects of such projects. Appendix IV contains the Project Evaluation Form used at the end of each project to evaluate the effectiveness of the process. Appendix V is the Glossary and Acronyms.

AVIONICS CERTIFICATION PROCESS IMPROVEMENT

General

The RTCA Task Force 4 - Certification made several recommendations to improve the certification process for avionics equipment. One recommendation was to develop processes that would encourage earlier deployment of safety enhancing avionics systems. Another recommendation was to implement a process where the FAA and the applicants come to an early and clear agreement on their respective roles, responsibilities, expectations, schedules, and standards to be used in the certification process. The below listed items are issues that should be addressed when developing a new avionics product. This will provide the FAA and the applicant a clear understanding of the best processes to use in the certification of these systems.

- Project Operational Concept (including background, operational purpose, justification, project maturity and user interest)
- Project benefits, e.g. safety enhancements and efficiency
- Anticipated constraints of the project and equipment
- Project specific Operation Procedures (including new phraseology, task analysis, contingency and emergency procedures)
- Human factors issues (including display requirements, crew training, additional workload demands, and crew resource management)
- Equipment compatibility issues
- Technical requirements (including Minimum Operational Performance Standards (MOPS), bench and flight tests, and Instructions for Continued Airworthiness)
- Operational safety assessment (including a proposed target level of safety and failure mode analysis)
- Operational test and evaluation plan
- Potential Flight Standards approval issues, i.e. Operations, Maintenance, Aircraft Evaluation Group (AEG), etc.
- Need for Flight Procedures coordination, i.e. special approaches
- Certification basis and means of compliance
- Project planning and management (including type design and production issues)
- Significant issues, issues papers, exemptions, special conditions, equivalent safety finding proposals, Airworthiness Limitations, and applicable in-service maintenance/operational history
- Clear, up-front, pass/fail criteria, wherever possible
- Critical assumptions, installation interface issues, and data for Airworthiness Limitations
- Conformity requirements involving major critical production processes, new materials, new technologies, delegation (what, why, oversight criteria)

- Co-production issues, foreign supplier arrangements requiring undue burden assessment, other authorities' involvement, validation needs, etc.
- Resource needs/constraints of all stakeholders accommodated to the greatest extent possible
- Equipment and installation approval processes for other countries that require FAA resources
- Identification of the equipment manufacturer and the certification applicant's roles, responsibilities, and communication channels with the FAA when the manufacturer and the applicant are not the same

Expanded Use of Approved Model List

For avionics equipment that may be installed similarly on several different aircraft models, one certification approach to consider for certain applications is the generic STC approval process. The goal of the generic STC approval process is to develop installation instructions that can be used to install avionics equipment in several different aircraft models. This concept reduces the number of follow-on approvals that must be obtained by the avionics installers.

One way to do this is for the manufacturer to develop installation instructions that incorporate both generalized installation guidelines and specific instructions. The generalized installation guidelines could reference standard practices used in the installation, for example aircraft electrical wire selection as specified in Advisory Circular 43-13. The specific installation instructions would address more critical elements of the installation, for example guidance about antenna placement. These instructions should include procedures for determining the placement, installation, and post installation checkout of the avionics equipment. For example, post installation checkout procedures could include the following: electrical load analysis, equipment mounting/wiring testing/verification, Electro-magnetic Interference (EMI)/Radio Frequency Interference (RFI) test, compass interference test. Assistance from an avionics repair station and the local FAA Flight Standards Inspection Office should be obtained in developing and reviewing these instructions.

It is important that the applicant and the FAA Aircraft Certification Office (ACO) agree to the use of this process early in a project. Together they should review the installation instructions to verify their applicability for the aircraft models requested. The resulting STC, with its associated approved model list, would greatly reduce the need for the installers to request a field approval. This will save valuable resources for both industry and the FAA.

Non-TSO Avionics

When a Technical Standard Order does not exist for a specific avionics system, the system may be certified in accordance with the airframe/engine regulations. The PSCP associated with this approval would identify certification requirements for both the avionics system and the installation of that system. The manufacturer may elect to develop the PSCP in such a way that would allow the format of the PSCP to be transferred to another applicant. This would allow the manufacturer to develop avionics systems for which a TSO does not exist and without a specific installation in mind. The manufacturer would develop the product to meet requirements documented in the PSCP, which would include intended functions, software level, and

environmental test requirements. The manufacturer would be responsible for showing that the avionics system performs its intended function and meets its specified software and environmental requirements. This PSCP would model the relevant portions of the TSO PSCP. The manufacturer would have the option of continuing the STC process or transferring the PSCP to the installation company and allowing them to finish the STC process.

Partnership for Safety Plans and Project Specific Certification Plans

To come to an early and clear agreement on the certification process, the first plan the FAA and applicant develop is the PSP (Phase I). An example of this agreement between the FAA and an avionics applicant is shown in Appendix I. It defines generic procedures to plan for product approval, establishes the general expectations or operating norms, and identifies deliverables. The PSP also defines the discipline and methodology to be used in planning and administering subsequent specific approval projects. Examples of content include generic processes and procedures for use of designees, conformity inspections, communication, issue resolution, and generic metrics for measuring project progress.

Depending on the specifics of a project, two PSCPs may be recommended. The first PSCP is the one that covers the Technical Standard Order Authorization (TSOA) aspects of a project. The PSCP in Appendix II of this guide is for applicants wanting approval of an avionics appliance through TSO procedures outlined in Title 14 of the Code of Federal Regulations, CFR Part 21, Subpart O. This PSCP covers the design approval phase as well as the production phase of obtaining a TSOA. The PSCP described in Appendix III covers the installation approval phase of a project and is tailored for installation of avionics appliances. There may be cases when a Line Replaceable Unit (LRU) or some form of interface unit is required for an installation when there is not an applicable TSO but still requires qualification testing. These types of LRUs are often approved during the installation phase; therefore, in this case the certification aspects may be covered by the installation PSCP. In the case where an applicant is seeking qualification of an LRU (TSO not applicable) without an installation, the TSOA PSCP should be used and revised accordingly.

The primary reason for not combining the two PSCPs is the approval requirements and stakeholders involved in obtaining a TSOA versus an installation approval are quite different. Additionally, the two approvals often involve different applicants. Once a PSCP is developed for the installation of a specific avionics appliance, it may be used as a basis for an installation PSCP by another applicant with the same installation.

These PSCPs are designed to be used as project management tools providing milestones, performance measures, and information unique to obtaining a TSOA or installation approval for a certification project. It takes the generic principles and procedures outlined in the PSP and applies them to specific projects.

The Project Evaluation Form (Appendix IV) is a tool that can be used for project management as the project moves through the six phases. The FAA and applicant Project Managers (PMs) should jointly prepare a Project Evaluation Form at the beginning of a project. The applicant/FAA team should continuously evaluate the project for immediate process improvement. For long duration projects, the PMs should complete the “Deliverables” portion of

the form at the end of each phase. For projects with a short completion time, the form should be completed at the end. The PMs are encouraged to include the completion of the Project Evaluation Forms as milestones when preparing their PSCP schedule.

To facilitate continuous improvement, the team should implement any necessary corrective actions, and the Project Evaluation Forms should be maintained in the official project file for future national or local program evaluation. When the evaluation identifies the need for corrective actions or improvements, it should be included as a part of the Compliance Summary Document for future reference.

PSCP Selection

It should be recognized that an avionics approval (depending on the project specifics) may take the form of one of several processes. The decision tree shown in Figure 1 is an aid to determine which of the two basic PSCPs to use for a particular avionics approval.

- 1) TSOA (correlates to TSO PSCP block 8 in Figure 1)

TSOA is a design and production approval based on meeting FAA criteria, which is published in a TSO. It is granted after the ACO and Manufacturing Inspection District Office (MIDO) review and concur with an applicant's statement of conformance to the requirements of the TSO. It does not include installation approval.

- 2) First-of-Type STC and basis for LRU PMA if seeking PMA (correlates to Installation PSCP block 11 in Figure 1)

STC is an aircraft modification and installation approval based on the applicant showing that the modification and installation meets the minimum airworthiness requirements.

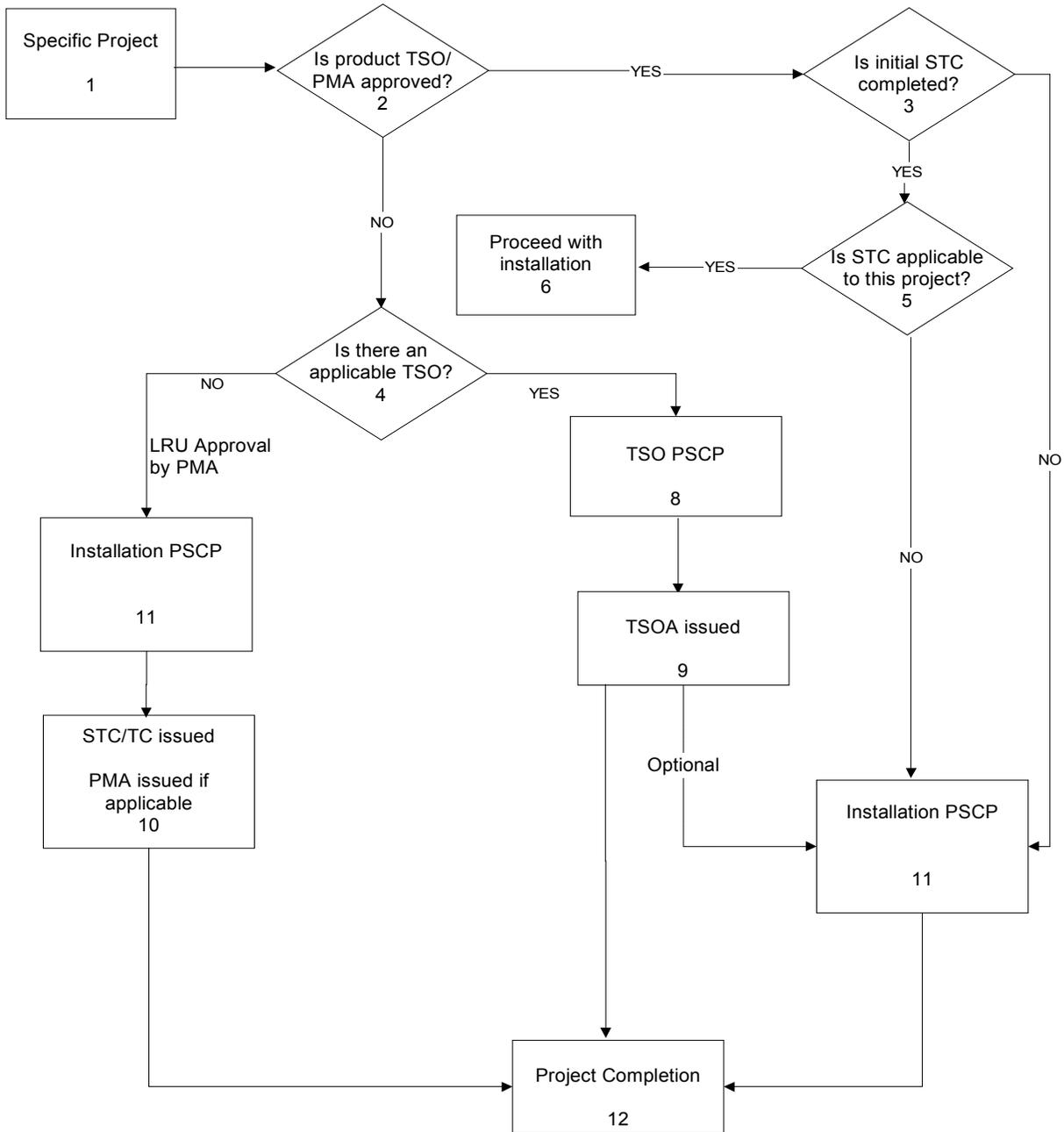
PMA is a design and production approval that can be based on the prior approved design and installation data such as an STC. The installation approval is documented by an STC. Consequently, the PMA provides eligibility for installation only for the aircraft specified on the STC.

- 3) Follow-on STC and basis for LRU PMA if seeking PMA (correlates to Installation PSCP block 11 in Figure 1)

STC is an aircraft modification and installation approval based on the applicant showing that the modification and installation meets the minimum airworthiness requirements.

PMA is a design and production approval that can be based on the prior approved design and installation data such as an STC. The installation approval is documented by an STC. Consequently, the PMA provides eligibility for installation only for the aircraft specified on the STC.

Figure 1. Project Specific Certification Plan Selection Decision Process



4) “Follow-on” Field Approval via Form 337 (Does not require a PSCP)

A “follow-on” Field Approval is an installation approval based on a previously approved STC. The level of similarity between the candidate installation and the STC upon which the data approval is based depends on the level of complexity of the installation. There can be cases where the interface complexity is such that the data approval may rise to the level of an STC even though the product being installed is the same as the original installation. In these cases an STC application would be needed. For those less complex installations the data utilized may come from any number of sources in addition to the previously approved data. The inspector may elect to use the previously approved STC and then field approve the remaining data necessary for the installation. The inspector could also utilize Designated Engineering Representative (DER) data plus the STC data and field approve any remaining elements of the alteration not covered by these sources. (When using STC data as the basis for any approval, written permission must be obtained from the holder of the STC.)

The applicant will present the FAA Form 337 completed in accordance with Advisory Circular 43-9. The inspector will evaluate the data and if satisfactory will sign Block 3 of the form indicating data approval. The form will then be returned to the applicant and the alteration can be accomplished. The flight manual supplement is signed by the ACO unless a handbook bulletin or an Advisory Circular specifically authorizes the inspector to approve it.

Production approvals (TSOA and PMA) always require an FAA approved production system. This means the MIDO has evaluated the production quality system and found that it meets the requirements. This evaluation and finding of compliance is accomplished before the TSOA or PMA is granted and is included within blocks 9 and 10 in Figure 1, although it is not shown.

Note that if both installation and operational approvals are desired for a TSO product, both the TSO PSCP and installation PSCP are needed as depicted by the “optional” flow out of block 9.

PHASES OF AVIONICS APPROVAL

The FAA and Industry Guide to Product Certification defined six Product Certification Phases that move from early project concept and initiation through post approval activities. The following discussion is an interpretation of the CPI phases as they apply to the approval of avionics equipment.

The content of the PSP and PSCPs outline the FAA and applicant agreement and operating practices for a Product Certification or Approval project. Each phase is built on early mutual awareness of key certification issues, commitment to planning and managing projects, early identification and resolution of issues and other elements to achieve the aforementioned vision.

As one works through the six phases outlined in this guide, the new process of extensive up-front engagement of both the FAA and an applicant becomes evident. *The FAA and Industry Guide to Product Certification* depicts the key players in the process, the tasks for each phase, and the required information, deliverables, and criteria for success. This guide adds information for each

phase especially relevant to avionics approvals. (It is best that when using this guide that the users also understand the foundational information presented in *The FAA and Industry Guide to Product Certification*.)

The FAA and Industry Guide to Product Certification identifies “Criteria for Success” that are applicable to ALL phases that must be embedded in both the FAA’s and applicant’s culture to ensure a successful process:

- Establish mutual trust.
- Ensure confidentiality.
- Meet all commitments.
- Emphasize empowerment.
- Maintain open and timely communication.
- Provide proper levels of technical project and management leadership with frequent reviews to ensure all are aware of project status, significant issues, and commitments.
- Conduct early familiarization meeting(s) and document accordingly.
- Conduct meeting(s) using well-structured agendas/presentations, ensure key players attend, and document agreements, issues and actions accordingly.
- Agree to clear time frames, expectations, and action plans to accomplish all phases.
- Produce timely, high quality documentation of decisions, agreements, schedules, milestones, action item assignments, compliance/conformance submittals, and approvals.

In general, tasks, required information, deliverables, and additional criteria for success for the six Phases presented in *The FAA and Industry Guide to Product Certification* apply also to all phases of the avionics approval process. When the FAA and the applicant work through the six phases, they should refer to *The FAA and Industry Guide to Product Certification* to ensure they address the applicable deliverables for each phase. (Some deliverables listed in that guide may not apply specifically to avionics certification projects.) Deliverables specific to the avionics certification process are listed in the following descriptions of the phases as they apply to avionics projects.

Phase I: Partnership for Safety Plan

This is a written agreement that states how the FAA and applicant will conduct product certification, establish the general timelines and expectations, and identify deliverables. The agreement defines the generic discipline and methodology to be used in early exchange of information to plan for successful avionics certification projects. It includes project schedule milestone development, generic delegation procedures, conformity procedures, communications protocol, an issues resolution process, and the generic operating norms for developing metrics for project evaluation. It should include agreement on the process to follow for typical approvals. It should document the roles, responsibilities, and communication protocol if the avionics manufacturer is supplying a product to a second company that will seek certification and installation approval. It should also include a personnel transition plan to minimize disruption of a project and maintain continuity throughout the approval process.

For applicants with a narrow product line or with few projects, the relationship normally agreed to with a PSP may not need a PSP separate from the PSCPs. However, it is important that the

CPI principles normally embodied in a PSP be captured in the PSCP. The PSCP would then be more a combination of the PSP and PSCP. The FAA and the applicant must agree that combining the two documents streamlines the process.

It is recommended that the ACO assign all of an applicant's projects to the same team of engineers. This helps to maintain continuity in the working relationship agreed to in the PSP. However, it is recognized that ACO and applicant's personnel may be reassigned or leave their organization. To minimize disruption of a project and to maintain continuity throughout the approval process, it is recommended that a transition plan be included in the PSP.

Deliverables from Phase I include:

- Consensus driven PSP with appropriate signatures

Phase II: Conceptual Design and Standards

This phase is initiated when the applicant begins the design concept for a product that may lead to a viable project that can be approved. The intent is to ensure early, value added, joint involvement with an expectation to surface critical areas and the related regulatory issues (certification basis, if applicable), and provide a first draft of the PSCPs. This is an opportunity to apply the PSP principles to develop a mutual understanding of the potential new projects. The FAA and the applicant should determine the approval process path using the decision tree described in the next section. It should be clearly understood that the FAA's objective is to find compliance with the regulations and not to dictate design.

Because avionics designs often introduce new technology, information about new designs, materials, processes, and so forth, is required. Also, proposed certification bases and means of compliance are especially important for advanced designs and are part of the required information. Any new avionics approval must consider both the product design and production approval as well as the operational and installation approvals. The applicant needs to discuss these issues with the appropriate FAA counterparts. This normally will involve staff within the ACO, MIDO, and Flight Standards District Office (FSDO) as well as staff within the appropriate Certification Directorate, Division, or Flight Standards Division.

Deliverables from Phase II include:

- Initial Safety Assessment
- Establishment of the FAA and applicant project certification team
- Draft critical issues list and mitigation plans
- List of relevant software policy material and preliminary compliance plans (preliminary Plan for Software Aspects of Certification (PSAC))
- List of relevant human factors policy material and preliminary compliance plans
- Consensus regarding which PSCP(s) will be used
- Determination of need for any TSO deviations
- Draft PSCP(s)

Phase III: Refined Product Definition and Risk Management

Efforts in this phase clarify the product definition and the associated risks, and they conclude with a mutual commitment to move forward with product approval. Specific regulatory requirements (certification basis, if applicable), means of compliance, and critical issues are revised. The PSCP is refined.

Deliverables from Phase III include:

- Safety Assessment
- Refined PSCP(s)
- Refined critical issues list and mitigation plans
- Applicant notification of certification project initiation
- FAA acknowledgment of project initiation
- Certification Project Notification, if applicable (FAA internal step)

The refined PSCPs should now include project milestones and related events such as program status reviews. Definition of project issues such as means of compliance including special conditions, equivalent safety findings, deviations, exemptions, and so forth, should be complete. However, as a project progresses to later phases, other major issues may be identified. Unanticipated issues should be resolved as quickly as possible; developing a plan to achieve resolution fits the intent of CPI.

Follow-on Field Approval issues should be identified and coordinated with the appropriate contacts from the FAA's Flight Standards Division at this point.

Phase IV: Certification Project Planning

During this phase, the PSCPs are completed and signed. The plans are tools to which the responsible parties commit and are used to manage the avionics certification project.

Deliverables from Phase IV include:

- Signed PSCP (See Appendices II & III)
- Project schedule with established FAA/applicant milestones for completion of analyses, test plan submission, TIA, conformities, flight test, AEG evaluations
- Updated critical issues list and resolution plan
- Compliance Check List
- Defined delegations and oversight criteria
- Resource requirements
- Conformity procedures
- Refined operational and installation issues

Phase V: Certification Project Management

During this phase, the applicant and the FAA work closely in managing, refining, and achieving their PSCPs to ensure that all agreed upon product specific approval requirements are met.

Deliverables from Phase V include:

- Completed test plans/reports, conformity requests, inspections, and compliance documentation
- Compliance and conformance findings
- TSO/JTSO required data submittal
- Quality Control System Manual
- Issue Papers, Exemptions, Equivalent Safety Findings
- Technical Standard Order Authorization
- Instructions for Continued Airworthiness
- Issued Supplemental Type Certificate

Phase VI: Post Certification

During this phase, closeout activities provide the foundation for continued airworthiness activities and certificate management for the remainder of the product's life cycle.

Deliverables from Phase VI include:

Project Closure

- Project Lessons Learned
- Revisions to PSP resulting from lessons learned
- Project Evaluation Form(s)

Continued Airworthiness

- Approval of design changes
- Applicant's submittal of reporting of failures, malfunctions, and defects in accordance with 14 CFR Part 21, § 21.3
- FAA review of data submitted in support of 14 CFR Part 21, § 21.3
- Applicant's development of service bulletins or other service related documents, as applicable
- FAA response to applicant regarding service related issues
- FAA issuance of airworthiness directives, as applicable
- FAA notification to other civil aviation authorities of service related issues

ROLES AND RESPONSIBILITIES

General roles and responsibilities for each of the partnership stakeholders are presented in *The FAA and Industry Guide to Product Certification*. These principles of teamwork,

communication, and accountability apply equally to the avionics approval process. In some cases, specific roles and responsibilities may be somewhat different for avionics approval and are denoted in the appropriate sections.

FAA and Applicant Management

The applicant and the FAA work to establish a PSP to reach a clear common understanding of their respective responsibilities for the design and production definition and the approval requirements. The respective managements provide leadership and resources to product approval teams through the Project Managers (PM) in order to resolve issues and accomplish the project. The management has ultimate responsibility through the product approval team for the quality of compliance finding work, standard application of regulatory compliance policy and procedures, and the timely, efficient completion of the product approval projects.

It is important to ensure that appropriate managers provide the commitment necessary to accomplish the approval goals. For projects such as advanced avionics, it is essential that FAA management in the Flight Standards Division support the process because of the important reliance on operational and installation issues. Within Aircraft Certification, the Aircraft Engineering Division will play an important role in the process.

FAA and Applicant Project Managers

The FAA, designees, and applicant's Project Managers are the principal focal points for the project. They coordinate and direct the certification team's effort and ensure things are kept moving to achieve the product approval objectives. The PMs ensure the right people from the FAA and applicant are involved in the project. The PMs develop and maintain the PSCP (See Appendices II and III). The PMs ensure that the Product Certification Project team is aware of design features, proposed means of compliance, new materials, new production processes, co-production or foreign supplier issues, and other critical issues for timely resolution. The PMs ensure effective communication flow and quality documentation among specialists, FAA offices, and the applicant. The PMs are also responsible for coordinating new design features with the responsible FAA offices, participating in the development of new project-specific policy safety issues, and coordinating technical decisions and regulatory issues with their respective team members.

FAA and Applicant Project Engineers

The FAA engineers, as assigned for appropriate disciplines, are the principal contacts for the applicant's engineers. Their activity is always in coordination with the FAA's and the applicant's Project Managers and follows the agreed PSCP. The engineers and designees understand the technical details of the project, application of applicable rules and policy, and are responsible for the majority of the compliance findings associated with the project.

Directorate Standards Staff

The directorate Standards Staff provides the certification team with clear and timely regulatory and policy guidance specific to the project. The Project Officer is the focal point within the

accountable project directorate for that policy. The directorate ensures timely support of the project regulatory and policy development for installation of new systems. The directorate provides guidance on standardized application of rules and policy. The directorate ensures that last minute changes in policy are applied to the applicant's products only when critical new safety issues are identified, that is, the potential for an accident or service difficulty sufficient to warrant Airworthiness Directive action if the product were in service.

Aircraft Engineering Division

The Aircraft Engineering Division provides the certification team with clear and timely TSO regulatory and policy guidance specific to the project. The Avionics Systems Branch within that Division approves all TSO deviations. That branch also ensures timely response to requests for TSO deviations. The Avionics Systems Branch also provides guidance on standardized application of rules and policy for avionics related issues.

FAA Manufacturing Inspection

The FAA Aviation Safety Inspectors provide consultation and advice on production processes proposed in the design. They conduct and oversee, through designees, a variety of conformity inspections and evaluations of aircraft airworthiness, and they issue airworthiness certificates or other approvals. They conduct evaluations of the manufacturer's quality and production systems for eventual production approval.

FAA National Resource Specialists

The National Resource Specialists (NRSs) play a technical leadership role within the FAA and with industry in the design and development of aircraft and in the application of regulatory policies and practices for certification of state-of-the-art technology. NRSs in disciplines pertinent to Avionics Approvals are: Flight Deck Human Factors; Aircraft Computer Software; Flight Management; Advanced Avionics/Electrical; Electromagnetic Interference; and Aeronautical Communications.

Either the NRSs or the Technical Specialists, or both, provide professional technical guidance, advice, and assistance in their discipline to the certification team on issues that require precedent setting means of compliance relating to new or complex technology and technical specialties.

FAA Aircraft Evaluation Group

The FAA Aircraft Evaluation Group (AEG) provides a link to applicable Flight Standards Service technical services. The AEG serves as the focal point for all Flight Standards interests in the approval process. They Flight Standard personnel assist engineers in determining that means of compliance meet operations and maintenance requirements. They work with the Flight Standards Flight Technologies and Procedures Division to ensure that requirements and policies affecting new avionics equipment are fully coordinated with the applicant.

FAA Flight Technologies and Procedures Division

The FAA Flight Technologies and Procedures Division (AFS-400) is the principal organization in the Flight Standards Service that develops FAA requirements and policies for the operational certification, implementation, and approval of advanced CNS technology. They participate in a “hands-on” manner with the aviation community in the testing, prototyping, research, engineering, and development of new flight technologies and procedures. AFS-400 interfaces daily with numerous other government and industry partners and stakeholders on national and international levels to achieve the introduction of new CNS technology into global all weather operating environments.

IN CLOSING . . .

The FAA and applicants, in a Partnership for Safety, are dedicated to providing a highly effective and efficient Certification or Approval Process. Our mutual expectations for the FAA and applicants' Partnership for Safety are to plan early, communicate often, and cooperate on initiatives that make aircraft increasingly safer. All Key Players on Product Certification or Approval teams make our commitments happen.

Our commitment to Public Safety –

◆ Communicate often to:

- Explain our expectations and listen to concerns
- Strive for safe solutions to key safety decisions
- Work as “One Safety team”

◆ Be accountable to:

- Identify best practices and provide quality service
- Allocate resources appropriately, including delegations
- Apply rules and policy properly in a standardized way
- Keep commitments

◆ Come to closure to:

- Complete projects to the PSCP and finish on schedule
- Work cooperatively and constructively
- Follow the agreed issues resolution processes

APPENDIX I

PARTNERSHIP FOR SAFETY PLAN

between the

FEDERAL AVIATION ADMINISTRATION

and

APPLICANT

The material contained herein is an aid for constructing a Partnership for Safety Plan (PSP) between the FAA and avionics equipment applicants. This aid is intentionally not a “boilerplate,” but it allows the freedom to innovate and meet the needs of the applicant and the FAA. However, it is essential that the PSP addresses the same key content areas of this aid ensuring that, as written, it captures the meaning and intent of this guide.

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PURPOSE

The purpose of this Partnership for Safety Plan (PSP) is to define a working relationship between the Aircraft Certification Service of the Federal Aviation Administration (FAA) and the applicant. It provides the foundation from which to build mutual trust, leadership, teamwork, and efficient business practices.

The scope of this PSP is intended to cover the working relationship between the FAA and an applicant seeking FAA approval for avionics equipment. The applicant may be either an avionics manufacturer or installer, or both. The types of FAA approval may include a Technical Standard Order (TSO) Authorization, Supplemental Type Certificate (STC), or Parts Manufacturer Approval (PMA). The avionics approval may involve one or more of these types of FAA approvals depending on the type of avionics equipment (whether a TSO exists), and whether the applicant is seeking an installation approval. Avionics approvals typically include a component level design and manufacturing approval (TSO or PMA), and an installation approval (STC or field approval). The needs of the applicant and the FAA may vary from project to project. If an applicant already has a PSP with the FAA, the content of this guide may be used to refine the existing PSP and to consider the alternate paths to approvals and certifications described herein.

This Plan enables the FAA, the applicant, and their staffs to expedite approval projects by focusing on safety significant issues. It is the mutual goal of the FAA and the applicant to meet or exceed the expectations of this agreement to achieve the following vision.

Vision of the Product Approval Process

A credible and concise product approval process that results in all of the following:

- Timely and efficient product type design and production approvals
- Clearly defined and understood roles, responsibilities, and accountability of all stakeholders
- Timely identification and resolution of the certification basis, potential safety issues, and business practice requirements
- Optimal delegation using safety management concepts with appropriate controls and oversight

In the establishment of this PSP, it is understood that a cooperative working relationship is required for this process to be effective. To successfully achieve this Vision, it is understood that the applicant and the FAA team members will work in accordance with the guidelines contained in this PSP.

EFFECTIVITY

This PSP becomes effective upon approval by the FAA Directorate/Division Manager and the applicant's President, Chief Executive Officer (CEO), or Senior Vice President (VP), or officer empowered to commit for the applicant. It continues in effect until it is superseded, revised or terminated and may be amended by mutual consent of the parties. Any change in the services

furnished or other provisions of this PSP is formalized by an appropriate written amendment signed by both parties, which outlines the nature of the change.

PARTNERSHIP FOR SAFETY

1. General

This PSP is a living document developed by the FAA and the applicant to the greatest extent possible in advance of any specific approval project. The PSP is an important prerequisite to a specific product approval project. It establishes the principles and procedures for early identification of critical issues and early planning so that, subsequent to this PSP, future projects can be completed in a timely and efficient fashion. The PSP will be managed and maintained by the FAA's and the applicant's management focal points in accordance with the "Communications" section below. The PSP will include, but not be limited to, consideration of the elements outlined below. The applicant and the FAA agree to work to the principles and operational norms outlined in this PSP and to future Project Specific Certification Plans (PSCP) that may be developed in conjunction with this agreement. The PSP should also define the process for determining when a PSCP is not required for a specific project. For, example, minor changes as defined in 14 CFR Part 21, § 21.93, paragraph (a), and § 21.611, paragraph (a), would not require the development of a PSCP. The PSP should also address the process used for the incorporation and approval of minor changes. The PSCP is discussed in Appendix II of *The FAA and Industry Guide to Product Certification* and Appendices II and III of this document.

The principles of CPI are such that an applicant needs only one PSP with the FAA. Since the PSP is used to define communication, coordination, and delegation between the applicant and the FAA, it needs to be accepted by the relevant organizations that will use it. If the applicant is likely to have approval projects with more than one FAA Aircraft Certification Office (ACO) or Manufacturing Inspection District Office (MIDO), the PSP should be developed with the secondary FAA offices involved as well.

If an applicant's organizational structure is such that lines of business work independently with their respective FAA offices, then separate PSPs may be appropriate. Alternately, a PSP agreement with the primary FAA office may be used as the basis for a PSP with other offices. When an applicant requires involvement with additional FAA offices, the applicant should share with those offices any existing agreements with the FAA, such as PSPs or PSCPs. This is especially important when an applicant and an ACO agree to a process for an avionics installation and then the applicant seeks approval for a similar process with another ACO.

2. Corporate Planning

The applicant and the FAA jointly conduct periodic management program reviews using an agreed process to provide early insight into future potential projects. These reviews also provide a forum to begin early planning for those potential projects as outlined in the early involvement Phases of *The FAA and Industry Guide to Product Certification*. The reviews would, to the extent possible, touch broadly on areas that should require special attention, for example, special conditions, exemptions, equivalent safety findings, unique designs, new materials or processes,

production or operational aspects, foreign validation, co-production or use of foreign suppliers, and continued airworthiness.

The FAA and the applicant will participate in early identification of product concepts, applicable standards, and in the product definition and risk management phases. This will be accomplished as potential approval projects arise to ensure agreement and commitment on dealing with critical issues in a value-added way. This is an iterative process requiring ongoing mutual evaluation and continuous improvement of the PSP and related processes. The PSP gives the FAA a means to keep the applicant informed of new proposed regulations or policy that could affect future product approval projects.

The PSP should document the agreement between the FAA and the applicant regarding the use of a PSCP. As noted above, some TSO projects and STC changes may not require a PSCP. Although the preference would be to always use a PSCP, a cost/benefit analysis may show a low return on investment for less complex or recurring TSOA projects. With this in mind, the applicant and the FAA should work together to ensure developing and using the PSCP is efficient and commensurate with the project. The point is that a PSCP should add value to the process by improving project efficiency for both the applicant and the FAA.

Project tracking and documentation provide for early identification and resolution of potential conflicts. Early communication between the applicant and the FAA in the conceptual/prototype stages of product development is critical to ensure availability of resources, adequate planning, and flexibility for both the FAA and the applicant. Effective project management oversight, planning, communication, and documentation is needed. This process is management and discipline dependent.

Avionics equipment may require one or more PSCPs, depending on the type of project. For clarity and agreement between the applicant and the FAA, the PSP should include content to help all stakeholders decide which PSCP to use. When a project triggers the PSCP threshold, the decision tree shown in Figure 1 of this guide (or a modification of it so that it fits the applicant's specific business) may be useful in the PSP. The decision tree is a visual aid to help determine which PSCP to utilize for a specific project.

The decision tree illustrates both types of PSCPs with four different approvals. The TSO PSCP is specifically for products where a TSO exists and a TSOA is to be issued for design and manufacturing approval. The Installation PSCP should be used where the project will result in one of the following:

- First-of-Type STC and basis for LRU PMA if seeking PMA, or
- Follow-on STC and basis for LRU PMA if seeking PMA.

Typical projects that may not require a PSCP include, but are not limited to: minor changes to existing TSOs or STCs and TSO projects that have been previously approved by the applicant at the same ACO. Projects that may not benefit by having a PSCP are those low in complexity with little risk regarding the approval process or interpretation of the requirements for airworthiness.

3. Communication and Coordination

In the PSP, communication and coordination paths should be clearly defined between the FAA and the applicant. Focal points will be identified to avoid conflict and to keep both parties informed of all critical communications that affect the needs and responsibilities of their respective roles. This does not preclude any team members from communicating with any other members, but they need to ensure the focal points are informed. Thus, critical links should be defined to ensure roles and responsibilities are clear and to facilitate conflict resolution. The focal points will be responsible for the maintenance of the PSP.

The PSP should identify each organization that is responsible for elements in the approval process and the responsibility those organizations share in the approval of the product. The roles and responsibilities of each organization should be clearly stated in the PSP. In the approval process of avionics, several FAA organizations are responsible for different aspects of the approval. For example, the office responsible for developing the TSO and approving deviations related to any TSO is the Aircraft Engineering Division within the Aircraft Certification Service. This division is also responsible for developing policy as it relates to the avionics appliance.

The regulations and policy for installation of avionics into an aircraft falls under the responsibility of the directorates within Aircraft Certification. The type of aircraft in which the avionics are installed determines the accountable directorate:

- Small airplanes – Small Airplane Directorate
- Transport airplanes – Transport Airplane Directorate
- Rotorcraft – Rotorcraft Directorate
- Installations specific to engines or propellers – Engine and Propeller Directorate

Each directorate is also responsible for supporting certain ACOs and MIDOS to provide the FAA resources to support the applicants' projects. The ACO is responsible for determining that the avionics and installation complies with the required regulations and policies. Operational issues during the approval process are the responsibility of the Flight Standards Aircraft Evaluation Group. The approval for avionics production is the responsibility of the MIDO. The Project Specific Certification Plan should identify what is expected from each of these organizations.

4. Delegation

The FAA depends on using both individual and organizational delegations in the approval process. Delegation will be used to the maximum extent practicable with appropriate oversight safeguards as defined in the FAA's delegation management process policies.

A Designated Alteration Station (DAS) is an organization that is delegated to issue STCs in accordance with an FAA approved procedures manual. The FAA approved DAS procedures manual is, in effect, a partnership between the DAS and the FAA. An existing approved procedures manual, for a DAS or any other FAA organizational delegation, may be incorporated by reference in the applicant's PSP but is not a substitute for the PSP. This concept would also apply to other delegated organizations. The following paragraphs are applicable to individual designees.

The FAA engineering and Aviation Safety Inspectors' designees, designee oversight controls, related documentation, and so forth, should be identified and agreed upon early, preferably prior to a specific project. This should also include, by reference, reliance on existing agreements or working procedures generated between the FAA and the applicant, where appropriate. The PSP should be specific as to what aspects of the FAA project responsibilities are delegated, and should address the delegation and oversight process as well as designees' disciplines and limitations. The FAA and the applicant agree to manage all designee activity within the regulations and policy regarding designee appointment, procedures, and oversight.

The expanded use of designees in the approval process is an important part of streamlining the avionics certification process. The FAA continues to explore ways to expand the use of DERs to help reduce the review time necessary for granting TSO authorization. When an applicant requests a TSOA they should work closely with the FAA to determine the scope of delegation the FAA will authorize. The FAA will explain the latest policies regarding use of DERs in this process, what authorizations are needed, and how best to utilize DERs in a project approval process.

It is essential that the FAA and the public have confidence in the integrity of the designee system and that it function properly. Both the FAA and the applicant agree to foster an environment where open communication between the designees and the applicant's management, and between the designees and their FAA counterparts, is standard practice. That environment should encourage the designees, within the scope of their delegation, to openly communicate approval items with the FAA, which is necessary to maintain confidence in the designee system. The applicant agrees to create a working environment where designees can make compliance and conformity findings free from undue pressure and with the support and knowledge of the FAA. It should be clearly understood that the FAA's objective is to find compliance with the regulations and not to dictate design.

Because of the close integration of the design, production, and continued airworthiness processes, it is necessary to have all stakeholders in the delegation process agree on the extent of delegation, the procedures, and the degree of delegation oversight to be used in each project. The applicant and FAA engineers, Aviation Safety Inspectors, flight test pilots, and FAA designees will agree upon and document a plan. This plan will describe how the designees in different disciplines will work together directly to the greatest extent possible to ensure compliance with Title 14 of the Code of Federal Regulations while providing more timely project management.

The PSP should also describe the respective FAA and applicant roles in the conformity inspection process. As noted in applicable FAA Orders and policy, the goal of the FAA and the applicant is to develop a system that ensures conforming products, and one that the FAA can rely upon, to the greatest extent possible, using the designees with appropriate oversight to expedite the work. This should include, in coordination with the delegation section of the PSP, criteria for determining which conformities will be conducted, which are delegated to both engineering and Aviation Safety Inspectors' designees, and how deviations will be dispositioned.

The system should include, but is not limited to:

- Maintaining the custody chain of conformed articles destined for an official FAA test.
- Notifying the FAA Manufacturing Aviation Safety Inspector of any changes to ground/flight test articles after conformity inspection has been completed.
- Ensuring requests are not duplicated and the timely and efficient conduct of conformities and dispositioning of deviations.
- Identifying who issues the requests, conducts the inspections, and dispositions the deviations.
- Providing for the completion of inspection, documentation, and dispositioning of deviations or changes before tests are conducted.

5. Production Quality System Evaluation

The PSP should describe the FAA and the applicant's roles in the production approval process. The goal of the FAA production approval is to verify that the applicant has established a system which ensures that only products and parts conforming to the FAA approved design are released to service. Evaluations to determine adequacy of this system should be conducted by the FAA as early as feasible during the project, where practicable. The FAA Aviation Safety Inspectors' designees, with appropriate oversight, could be used to facilitate the work.

6. Transition Plan

It is recommended that the ACO assign all of an applicant's projects to the same team of engineers. However, it is recognized that the ACO and the applicant's personnel may be reassigned or leave the organization. To minimize disruption of a project and maintain continuity throughout the approval process, a transition plan should be implemented when ACO/ applicant project personnel are replaced. The following is a recommended plan:

1. The ACO/ applicant will be notified of any changes to the project personnel within a prescribed time frame prior to the change, when possible. (For example, 2 weeks.)
2. During the prescribed period, new personnel will be trained on the contents of this PSP.
3. During this period, new personnel will be briefed on the status of all the applicant's projects (including the applicant's drawing, data, and document system).
4. Incoming personnel shall accept previous formally communicated and agreed to positions.
5. A meeting between the ACO and the applicant with new and remaining personnel will be conducted to review all ongoing projects and to review this PSP so that all personnel involved will have a common understanding of the PSP.
6. Individuals assigned to perform a backup role will have the background and authority to make decisions during personnel absences.

CONTINUOUS IMPROVEMENT

1. Issues Resolution Process

The objective of this process is to identify and resolve issues and disagreements as early as possible at the team working level facilitated by the applicant's and the FAA's PMs. The applicant and the FAA PMs will jointly maintain a project issues tracking list. They will continually manage those issues to ensure adequate progress is being made on the resolution of issues to ensure compliance with the regulations while not adversely affecting project schedules. The PMs will periodically keep their management and other certification team members apprised of the progress on resolving issues. If there is agreement on the progress of issues resolution, the applicant and the FAA PMs will document the actions, decisions, and outcomes in the project records. Any necessary changes to the project schedule or the issues will be coordinated and agreed upon by all affected team members. Should any problems arise with open issues where their resolution is not proceeding according to the agreed PSCP, the PMs will utilize the following issues resolution process:

1. If there is disagreement, the applicant and the FAA PMs, their respective managers, and other appropriate team members in the affected disciplines will review the issue and recommend a solution. If they agree, the resolution will be documented and all team members will be informed.
2. If the managers and appropriate team members are unable to agree, the office raising the concerns will prepare a white paper detailing the issue, respective parties' positions, and options for resolution. Timelines will be established for resolution of each issue to permit tracking via the project issues list and ensure timely resolution. Where appropriate, the FAA Issue Paper process should be used, but it should not be applied just for the sake of tracking, which can be done through the project issues tracking list maintained by the FAA and the applicant PMs.
3. The issue will then be submitted to the applicable directorate manager(s), the FAA, and the applicant PM's management, and, where appropriate, the FAA regional counsel and other appropriate FAA division(s) for review and disposition.
4. The applicant and the FAA PMs will document in the project records conclusions, recommendations, and outcome of the issue resolution.

2. Performance Measures

a. General

Project tracking and documentation provide for early identification and resolution of potential conflicts. Early communication between the applicant and the FAA in the conceptual/prototype stages of product development is critical to ensure availability of resources, adequate planning, and flexibility for both the FAA and the applicant. This process requires effective project management oversight, planning, communication, and documentation.

Priority must be placed on early identification and resolution of issues critical to the success of the project. Some of these issues are listed in the Avionics Certification Process Improvement section of this guide.

Performance measures should focus on producing quality deliverables that show an efficient and credible approval process. These and other project deliverables can be associated with the Phases in the approval process as delineated in this guide. Good planning will define the significant tasks, associated required information, and expectations necessary to meet the project completion objectives. The operating norms agreed upon between the FAA and the applicant will establish the basis for operating under this PSP and subsequent PSCPs and provide a means of measuring progress.

b. Operating Norms

The FAA will establish with the applicant agreed, documented, operating norms. These norms will guide the timeliness and quality of deliverables and services provided by both the FAA and the applicant during the project. Operating norms should be defined to meet the needs of the applicant and the FAA consistent with agreed PSCPs.

Many factors affect the planning and management of approval projects, such as project size and complexity, and degree of delegation. The FAA and the applicants recognize, for example, that certification of an advanced avionics design concept, then initial installation, may have significantly different resource needs and timing than a modification to a design or an installation. The PSP and each PSCP should identify appropriate agreed operating norms since there could be different team members on different PSCPs. An agreed PSP and early pre-project communication and planning in accordance with that PSP are essential prerequisites to preparing for successful approval projects. The objective of any successful project is to meet or beat the plan. Unless compelling reasons are presented to deviate from this guide, the operating norms for certain key deliverables should be set as low as possible within the following typical ranges:

Avionics Approval Process Norms

Within 2 weeks after submittal of 8110-12 application (Phase III):

- Acknowledgment of application issued.
- ACO Project Manager determines project significance per Order 8110.4.
- ACO issues Certification Project Notification (CPN) and sends to appropriate directorate.
- ACO receives concurrence or non-concurrence regarding project significance from appropriate directorate (per Order 8110.4).
- Appropriate directorate assigns Program Officer.

Within 1 month after application:

- Project team identified (FAA and applicant).
- PSCP drafted.
- Project familiarization and up-front planning meeting at ACO.

Within 1 month after up-front planning meeting:

- Certification basis identified, if applicable.
- Technical and certification issues are defined.
- PSCP should be revised as appropriate to include comments and issues generated from the up-front planning meeting.

Within 2 to 3 months after up-front planning meeting:

- Certification basis established, if applicable.
- Resolution of technical and certification issues. (Where resolution is not possible at this early date in the project, the issues will be carried forward in the program on the critical issues list.)
- Issue papers written, as appropriate.
- Update the project schedule, if needed.
- PSCP agreed and signed, including the mutually agreed project schedule.

3 months prior to scheduled issuance of TC/STC/TSOA :

- Resolution of all remaining technical and certification issues.
- All issue papers closed.
- Update to the project schedule, if needed.

One month prior to scheduled issuance of TC/STC/TSOA:

- All required certification inspections and tests have been completed.
- Compliance data and documentation is submitted. (If the data is not FAA designee approved or recommended for approval, more time may be required. The use of designees should be taken into account early in the project planning and documented in the PSCP.)

Additional Norms:

- Request for a meeting should be accommodated within one month of the request.
- Meeting minutes should be completed, agreed upon, and signed within one month of the respective meeting.
- Request for a document review should be accommodated within six weeks of the request.
- Issue papers should be completed and released within one month of identifying the issue.
- Schedule slips and significant design changes will be communicated within one month of their identification.
- Deviation requests should be granted or denied within 6 weeks of the manufacturer's written request to the ACO^(*).
- FAA letters of Validation for non-US certifications should be provided within 3 weeks of the request.

^(*) For deviation requests, any request for TSO deviation should identify the specific section in the TSO performance standard from which the manufacturer is requesting a deviation. The request should also include the compensating equivalent means of performance proposed by the manufacturer.

Additional norms may be necessary or appropriate depending upon the specific project needs. When developing a PSCP, the need to define norms should be assessed for all issues identified. Any major issues, design changes, or compliance requirements should result in agreed revisions to the PSCP with appropriate milestones for closure. As the project progresses, other major issues may be identified. Where appropriate, issue papers and a revised PSCP will be prepared within one month after identification of the issue along with a plan to achieve its resolution. In such cases, the FAA will work within boundaries of their policies and public rulemaking procedures. The PSP compels the partners to work together to understand the product architecture early enough to preclude last-minute guidance (verbal or written), new interpretations, or rule escalation that would adversely affect the mutually agreed upon program goals.

c. Project Evaluation Form

The Project Evaluation Form (Appendix IV of this guide) is a tool that can be used for project management as the project moves through the six phases. The FAA and the applicant PMs should jointly prepare a Project Evaluation Form at the beginning of a project. The applicant/FAA team should continuously evaluate the project for immediate process improvement. For long duration projects, the PMs should complete the “Deliverables” portion of the form at the end of each phase. For projects with a short completion time, the form should be completed at the end. The PMs are encouraged to include the review and update of the Project Evaluation Form as milestones when preparing their PSCP schedule.

To facilitate continuous improvement the team should implement any necessary corrective actions. The Project Evaluation Form should be maintained in the FAA and applicant’s official project file for future national or local program evaluation. When the evaluation identifies the need for corrective actions or improvements, it should be included as a part of the Compliance Summary Document for future reference. A copy of the form should also be sent to the FAA’s Aircraft Engineering Division, AIR-100, for FAA and industry review of the CPI process.

SIGNATORIES

The FAA and the applicant agree to the provisions of this PSP as indicated by the signature of their duly authorized representatives.

Agreed by: (This is a representative sample of possible signatories and could include others deemed appropriate to provide necessary commitments and accountability. Include Names and date)

Applicant President, CEO, or Senior VP

FAA Directorate/Division Manager(s)

Applicant Certification Manager

FAA ACO Manager(s)

Applicant VP Quality Assurance

FAA MIO/MIDO Manager(s)

FAA AEG Manager(s)

APPENDIX II

PROJECT SPECIFIC CERTIFICATION PLAN

for Technical Standard Order Authorization

between the

FEDERAL AVIATION ADMINISTRATION

and

APPLICANT (Specify Name)

for

(List specific product here)

The material contained herein is an aid for preparing the Project Specific Certification Plan (PSCP) for a product being approved under 14 CFR Part 21, Subpart O, Technical Standard Order Authorizations. This aid is intentionally not a “boilerplate,” but allows the freedom to innovate and meet the special project needs of the applicant and the FAA. However, it is essential that the PSCP addresses the same key content areas of this aid ensuring that, as written, it captures the meaning and intent of this guide. The PSCP should include elements that were not addressed in detail in the PSP, and it should incorporate by reference appropriate procedures, agreements, or other elements pertinent to the project.

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PURPOSE

The purpose of this Project Specific Certification Plan (PSCP) is to define and document a product approval plan between the Aircraft Certification Service of the Federal Aviation Administration (FAA) and the applicant. The plan should expedite the issuance of Technical Standard Order Authorization (TSOA) for the applicant's (*specify LRU or system*) under standardized procedures. The applicant is (*specify applicant's name and location of manufacturing*).

If an installation is being worked as a parallel project, it should be stated as follows: As a parallel certification project, the installation approval will be covered by a stand-alone PSCP. This PSCP will provide the foundation from which to build mutual trust, teamwork, and efficient business practices between the FAA and the applicant during approval of the product. It is the mutual goal of all team members to meet or exceed the expectations of this agreement.

It is understood that this PSCP will be executed in accordance with the PSP. However, there are certain situations where a PSP is not warranted. In these situations, those applicable sections for a PSP must be incorporated into this PSCP. (*Only use the following sentence if a PSP has not been developed:*) There is no current PSP with (*specify applicant*), but specific sections have to be added in this PSCP that include the CPI principles normally contained in a stand-alone PSP.

In the establishment of this PSCP, it is understood that a cooperative working relationship is beneficial for these procedures to be effective. To implement the PSCP procedures successfully, it is understood that both the applicant and the FAA team members shall work in accordance with the established guidelines. The FAA team members will recognize and utilize the knowledge of the FAA designees to the greatest extent possible and keep the applicant's team members abreast of approval issues that may arise. The PSCP schedule will be within specified ranges agreed to in the norms of the PSP. Additional milestones will be considered by the FAA and the applicant as firm commitments unless they agree to a change. It is intended that all team members facilitate review and approval of the necessary design and production data and related compliance documents in a timely manner with the objective of bettering the PSCP schedule wherever possible.

The PSCP is a living document. This means that if both the FAA and the applicant agree that modification of the Plan is needed, an amended Plan is drafted. The Plan will be developed to the greatest extent possible as soon as the FAA and the applicant agree that the approval project is a viable one for which resources can be planned and committed for its completion. As the project progresses, the PSCP will be managed and maintained jointly by the FAA and the applicant's Project Managers.

EFFECTIVITY

This PSCP shall become effective upon approval by the Managers of the (*specify name of ACO*) Aircraft Certification Office, the appropriate Standards Office (Directorate or Aircraft Engineering Division), the (*specify name of MIDO*) Manufacturing Inspection District Office, the (*specify name of AEG*) Aircraft Evaluation Group, and the applicant's Certification or Airworthiness Manager. This PSCP may be amended by mutual agreement or terminated by

either the applicant or the FAA. This PSCP will continue in effect throughout all Phases of the product approval unless it is superseded, revised, or terminated with written notice by either the applicant or the FAA. Any change in the services furnished or other provisions of this PSCP will be formalized by an appropriate written amendment signed by affected parties, which will outline the nature of the change.

PRODUCT APPROVAL

1. Project Description

This section should contain a description of the project. It should include a listing of the TSOs being applied for. The Plan should include a detailed description of the product. The description should consider the annunciation, control, and display requirements specified in the TSO standard and its intended installation environment. The level of software assurance used should support those requirements and be clearly identified in the TSO software documentation and installation instructions. The description should also include a detailed list of all systems functionality with an indication of any functionality that is not covered under TSO. The intended uses of each function should be documented, as well as the operational assumptions. This detailed function or features list is critical as it will help focus the FAA evaluations on the extra functionality early in the program, leaving the applicant with the traditional role in the TSO process focusing on ensuring compliance with the TSO requirements.

2. Project Schedule

A detailed project schedule should be provided as an appendix to the PSCP. It should identify all major milestones, including appropriate project management reviews and any required scheduled deliverables such as those listed below. (*Being in an appendix will facilitate schedule changes without having to revise the PSCP.*) If required, these milestones need to be established in accordance with the operating norms identified in the PSP. Every effort must be made to establish realistic schedules considering both the FAA and the applicant's total workloads and other resource commitments. Design, production, operational, and maintenance aspects, as well as foreign authority validation requirements, should be planned for and considered. All issue papers, if applicable, should also be included with a resolution plan and prioritization of the issues to be resolved. The schedule should adhere to the Phases and process flow identified in *The FAA and Industry Guide to Avionics Approvals*. This would include identifying in the schedule all appropriate deliverables for the project such as, but not limited to, those shown below:

Deliverables:

- Familiarization, up-front planning, and technical meeting(s) minutes
- Roles and responsibilities of FAA and applicant project teams
- Product approval team and management status reviews
- Delegation plan
- Draft and Final PSCP
- Applicant's TSO Statement of Conformance

- Listing of specific TSOs being applied for
- A listing of deviations, as applicable, to the TSO performance standards
- Letter accepting TSO deviations
- Compliance Summary Document
- Quality Control Procedures
- Production approvals
- Data submittals (to support compliance and conformance (e.g., test plans/reports, analyses, installation instructions, operating manual, etc.)
- Human Factors Approval Plan, if applicable
- Other data required by applicable TSO
- TSOA letter
- Foreign approvals anticipated that will involve the ACO
- List of specific Joint Airworthiness Authorities (JAA) TSOs (JTTSO) being applied for including a listing of deviations, if any, to the JTTSO performance standards
- Foreign approval compliance documentation list
- Letters of conformance and application for the foreign approvals
- FAA letters of validation for the foreign approvals
- Project Evaluation Form

3. TSO and JTTSO Application and Means of Compliance

a. TSO Application

In this section the applicant should identify the TSO authorization requested. The applicant should also identify if a JTTSO authorization is to be requested. The certification basis should also be identified, along with any requested deviations. The Certification Basis of obtaining a TSO is 14 CFR Part 21, Subpart O, the applicable TSOs. When making application for a TSO the applicant submits:

- 1) A statement of conformance certifying that the applicant has met the requirements of Part 21, Subpart O, and
- 2) A statement certifying that the article concerned meets the applicable TSO that is effective on the date of application for that article. The application, if applicable, includes the listing of deviations to the TSO and equivalent safety findings, if any. An issues list should be included to highlight for resolution those special requirements and other areas that may be significant, even though they may not warrant a special condition, exemption, or equivalent safety finding.

The Certification Basis of obtaining a JTTSO is JAR Part 21, Subparts N-O, and the applicable JTTSOs. Application is made by letter to the ACO and includes:

- 1) A copy of the statement of conformance that certifies the applicant has met the requirements of JAR 21, Subpart N-O, that the article concerned meets the applicable JTTSO, and lists any deviations from the JTTSO requirements.

- 2) A copy of the list that shows the compliance data provided to the National Airworthiness Authority (NAA) by the FAA or the applicant.

The ACO issues a letter of validation to the NAA responsible for JTSA approval.

Other non-U.S. approvals require a process similar to the JTSA process. These applications are made to the ACO and result in an approval on an individual country basis (national approval). These approvals do not confer a TSO or JTSA authorization. The FAA maintains advisory documents that explain procedures required for different countries.

b. TSO Table and Minimum Operational Performance Standards (MOPS)

A table that lists the applicable TSO requirements should be used. This table should identify the requirements and the means used to show compliance to the requirement.

4. Communication and Responsibilities

a. Communication

This section describes the communication responsibilities of the FAA and the applicant's certification teams. The FAA and the applicant establish the appropriate communication and coordination paths by identifying the respective team members. The FAA and the applicant's PMs must be kept informed of all critical communications. Critical links should be defined to ensure that roles and responsibilities are clear to define accountable team members responsible for deliverables and to facilitate conflict resolution. This does not preclude any team member from communicating with any other member, but they need to ensure the PMs are informed. Team members typically will communicate with the PMs via email and telephone.

b. Roles and Responsibilities

This section describes the roles and responsibilities of the applicant and the FAA team members. Table 1 is a sample of the typical table to show the FAA and applicant team members and their roles and responsibilities. Please note that your program may require team members with different roles and responsibilities than those listed in the sample shown in Table 1.

In some cases, additional members should be included. For instance, the project may require FAA or applicant legal representatives on a consultation basis. If international certification is involved, other authorities should be included. This is especially important if assistance with test witnessing, conformity inspections, or type certification validations is anticipated.

Table 1: FAA/ Applicant PSCP Team Members

FAA Team Member	Applicant Team Member	Roles and Responsibilities
Name Phone Number FAX Number Email address	Name Phone Number FAX Number Email address	TSO Program Manager – FAA/applicant team leader: PSCP focal point
		Installation Program Manager: provide assistance to TSO PM
		Systems and Equipment Engineer: review test plans, data, issue request for conformity inspections, delegation approval
		Project Engineer – Software Aspects: engineering review and approval of all software documents, coordination with software DER and Installation PM
		Project flight test pilot: develop flight test plan as required; review display for symbology and human factors; review of the users manual; flight test expert to the Installation PM
		Principal Inspector related to Software Quality Assurance
		Principal Inspector related to Manufacturing/Production Quality Assurance
	N/A	FAA AIR-130 Project Officer: 14 CFR Part 21 policy and guidance
	N/A	Project Nav. – FAA AIR-130: focal point regarding policy and interpretation with Nav. MOPS, ensure standardization related to Nav. Issues
	N/A	Project Human Factors – FAA AIR-130: focal point related to human factors; policy and interpretation with MOPS and TSO technical performance standards related to human factors
	N/A	FAA Aircraft Evaluation Group – Maintenance: review and determine adequacy of maintenance documents including Instructions for Continued Airworthiness
	N/A	FAA Aircraft Evaluation Group – Operations: review and determine adequacy of system operational issues and documents including Users Manual
	N/A	FAA NRSs and Technical Specialists, as appropriate, and as needed: Provide technical guidance.

Each member of the certification team should be listed.

5. Delegation

A TSO program is a self-certified process where the applicant makes conformance statements to the FAA indicating compliance with those items listed in 14 CFR Part 21 § 21.605 and to the applicable TSO. However, the process may be difficult if the TSO applicant is new to this process or has limited knowledge of the TSO certification process. In this case, it may be helpful for the applicant to become familiar with the certification process or use a designee who is familiar with the process to review the data that is to be submitted to support the project.

The expanded use of designees in the approval process is an important part of streamlining the avionics certification process. The FAA continues to explore ways to expand the use of DERs to

help reduce the review time necessary for granting TSO authorization. When an applicant requests a TSOA, they should work closely with the FAA to determine the scope of delegation the FAA will authorize. The FAA will explain the latest policies regarding use of DERs in this process, what authorizations are needed, and how best to utilize DERs in a project approval process.

6. Testing Plan

a. General

This section should outline the applicant's approach to developing test-based compliance documentation. Plans for Hardware and Software Aspects of Certification (PHAC and PSAC respectively) are typical means used to identify Verification and Validation (V&V) methodologies. This portion of the PSCP should also consider the requirements of the specific TSO and associated MOPs where performance under normal and severe environmental conditions is concerned. A strategy for the planning, preparation, and conduct of the required environmental and qualification testing would be appropriate content. The plan should identify the proposed methods for evaluating the flight crew interface aspects of the product. The plan should address the occasions when and how FAA human factors evaluations are to occur, and recognize that the findings from such evaluations need to be documented and validated to ensure appropriate "credit" will be evaluated if needed for subsequent installation approvals.

b. Flight Test

In some cases – such as for Traffic Alert and Collision Avoidance System (TCAS) products – flight tests are necessary to provide compliance data. While FAA participation in these flight tests is not required, the responsible ACO office may have an interest in observing use of the product in its actual operating environment. This section of the PSCP should specify how to accommodate such requests. Where a concurrent aircraft level project (STC) has been initiated, use of language in the project's TIA may be used to enable FAA participation. This will also facilitate the applicant's ability to take credit for these tests as part of the STC project. Since a TIA is not necessary to authorize the applicant's conduct of flight tests associated with gathering TSO compliance data, special approval may be needed for ACO personnel to participate in flight tests that are solely in support of a TSO project. This issue should be negotiated with the responsible ACO manager early on in the TSO project.

The need for evaluation of the product's human factors attributes should also be addressed in this section. Many new and revised TSOs contain requirements for human centered design considerations. In addition, some FAA ACOs are including this type of evaluation as a part of the TSO project where the product has a major man-machine interface element (such as display systems). This item should be discussed with the ACO early in the project's life cycle. For some products, use of a bench simulator or demonstrator may be adequate. Others may require a combination of bench and flight test evaluations. Where flight test human factor assessments are warranted, a plan for FAA participation similar to that described immediately above may be needed.

c. Configuration Control

Articles used for compliance testing must be subject to a control process to ensure an accurate accounting of their configuration. This section of the PSCP should indicate the process/procedure to be used. Where an FAA-approved company quality control system exists, an inspection conducted in accordance with that system and resulting in a Certificate of Conformity is typically adequate. In general, all drawings, specifications, and other documentation defining the hardware and software design of the article should be released into the applicant's configuration control system prior to conducting any conformity inspection.

An inspection process involving MIDO personnel, or resulting in an 8100-1 Conformity Report or 8130-3 conformity finding, is not required. However, one of these alternate means of configuration control may be necessary when the TSO test article is installed on an aircraft for the purpose of obtaining certification data in support of an STC/TC project. The applicant's plan for these requirements should be included in this section.

The applicant should also describe a process to maintain configuration control of the test article throughout compliance testing. Test articles may require repair or design changes as a result of qualification testing. The applicant should establish a process to maintain configuration control for all changes or repairs incorporated into the test article. This process should be sufficient to ascertain where credit may be taken for tests already completed and where re-testing is required.

7. Compliance Documentation

This section should describe the procedures for submittal and processing of compliance documentation. The PSCP should identify what data will be submitted and by whom. It should account for all data (not just drawings) pertinent to defining the type design, including manufacturing specifications, and pertinent to conducting the showings of compliance required for FAA approval. The following list of items should be considered:

- PSAC (Plan for Software Aspects of Certification)
- Environmental test reports
- TSO MOPS compliance test reports
- Software Accomplishment Summary (SAS)
- Software Configuration Summary
- Functional Hazard Assessment (FHA)/System Safety Assessment (SSA) at LRU level
- Bill of Material
- LRU identification tag(s)
- Operating manual

DERs should be utilized to submit data as defined in the PSP. DERs submit FAA Form 8110-3 with data that has been DER approved or recommended for approval. Data submitted without an FAA Form 8110-3 will require FAA engineering review and approval, which may add to the processing time. This should be taken into account when developing the project schedule.

The FAA and the applicant will agree and document the amount of time needed for review, disposition, and approval or acceptance of the data, as appropriate. Typically, this may be up to four (4) weeks for designee recommended approval data. Some submittals, due to size or complexity, may require more time. Some examples include: Instructions for Continued

Airworthiness and safety analyses. The timing and process for such submittals should be agreed upon between the FAA and the applicant and documented in the PSCP. Data submittals that are designee approved are reviewed only for designee oversight purposes, whereas data that is recommended for approval must be reviewed for those aspects that the designee could not or did not evaluate. Hence, communication and pre-planning for data submittal and consideration of the level of delegation between designees and the FAA is essential and encouraged to ensure timely efficient data approval.

PRODUCTION APPROVAL

This section of the PSCP should outline production quality project issues and tell how they will be managed to permit early approval of the production system. The goal is to have concurrent design and production approval issuance. The primary focal points for the production approval process are the FAA Principal Aviation Safety Inspector and the applicant's Project Quality Manager. Production approval is granted after the applicant has demonstrated, and the FAA has verified, that the applicant has developed and is capable of maintaining a quality assurance system. This system will ensure that only products and parts conforming to the design data are released for commercial service use. For existing Production Approval Holders (PAH) who will be adding a new product to an existing approved production system, issues to be considered should include the following:

- Approval of new materials, new processes, new suppliers, co-production agreements, new technologies or new applications of existing technology, etc.
- FAA undue burden assessment of either non-US suppliers or co-producers, or both
- Instructions for assembly and test of the final product to ensure conformance
- Coordination with engineering on production Material Review Board requirements and integrating engineering and production Certificate Management activities
- Controls to be placed on production as a result of design Airworthiness Limitations or the criticality of parts and components
- Configuration control requirements
- Any other reviews necessary to ensure that a conforming product will be produced under the FAA approved quality inspection system

Applicants who do not hold an existing production approval for the type of product that is being approved under this PSCP must also demonstrate, to the satisfaction of the FAA, the existence of and compliance with a quality system that satisfies ALL the requirements of the applicable subparts of 14 CFR Part 21.

POST APPROVAL REQUIREMENTS -- COMPLIANCE SUMMARY DOCUMENT

The applicant and FAA PMs will prepare a summary at the end of each approval project to capture and retain the corporate knowledge learned during the project. The summary should capture only unique data, precedent issues (for example, regulatory, policy, or technical), and both the applicant and the FAA perspectives, feedback, and lessons learned. This document is not to be a complete history of the project but should only document those areas out of the

ordinary that require process improvements, affect rule/policy making, and so forth, in order to provide continuous improvement of the FAA and the applicant's working relationship. This summary, plus the project evaluation forms, should be evaluated by the team and appropriate changes to the PSP or future PSCPs should be made. When the team identifies where changes to the guide would be beneficial, those should be referred to AIR-100 for consideration.

PROJECT ISSUE PLANNING

The applicant and FAA PMs will jointly maintain a project issues tracking list. This list, at a minimum, should include issues identified as potential “show-stoppers.” The list will identify the issue, the plan and milestones for their resolution, as well as the primary responsible team member for ensuring the closure of each issue within the operating norms of the project schedule. The PMs will continually manage those issues to ensure adequate progress is being made on their resolution to not adversely affect the project schedule. The PMs will identify to their management and other appropriate team members, concerns and problems with open issues and seek early resolution of any items not proceeding according to the agreed PSCP. A specific issue resolution process example is shown in the PSP. (Appendix I of *The FAA and Industry Guide to Product Certification*) The process, as defined in a PSP, may be incorporated by reference in the PSCP, or a specific process could be included here to meet any unique needs of the particular project.

CONTINUOUS IMPROVEMENT

1. General

In this section a statement should be made that the continuous improvement processes detailed in the PSP will be followed.

2. Project Evaluation Form

The Project Evaluation Form (Appendix IV of this guide) is a tool that can be used for project management as the project moves through the six phases. The FAA and the applicant PMs should jointly prepare a Project Evaluation Form at the beginning of a project. The applicant/FAA team should continuously evaluate the project for immediate process improvement. For long duration projects, the PMs should complete the “Deliverables” portion of the form at the end of each phase. For projects with a short completion time, the form should be completed at the end. The PMs are encouraged to include the completion of the Project Evaluation Forms as milestones when preparing their PSCP schedule.

To facilitate continuous improvement, any necessary corrective actions should be implemented by the team and the Project Evaluation Form should be maintained in the FAA and applicant’s official project file for future national or local program evaluation. When the evaluation identifies the need for corrective actions or improvements, it should be included as a part of the Compliance Summary Document for future reference.

During initial CPI implementation, an FAA/AIA/GAMA Product Certification Continuous Improvement Steering Committee reviews all project evaluation feedback on current projects.

The team evaluates project lessons learned and recommends guide changes for continuous improvement. This same process will be used for feedback and continuous improvement for the avionics certification process. A copy of the form should also be sent to the FAA’s Aircraft Engineering Division, AIR-100, for FAA and industry review of the CPI process.

SIGNATORIES

The FAA and the applicant agree to the provisions of this PSCP as indicated by the signature of their duly authorized representatives.

Agreed by: (This is a representative sample of possible signatories and could include others deemed appropriate to provide necessary commitments and accountability. Include Names and date)

Applicant Certification Manager

FAA ACO Manager

Applicant Project Manager

FAA Project Manager

Applicant Project Quality Manager

FAA MIDO Manager(s)

**FAA Aircraft Engineering Avionics
Systems Manager**

FAA Principal Inspector

FAA AEG Inspector(s)

Appendix I to the PSCP

Insert Project Tasks and Schedule here

APPENDIX II to the PSCP

Compliance Checklist

21.601 Applicability.

Requirement	Compliance
<p>(a) This subpart prescribes</p> <ol style="list-style-type: none"> (1) Procedural requirements for the issue of Technical Standard Order authorizations; (2) Rules governing the holders of Technical Standard Order authorizations; and (3) Procedural requirements for the issuance of a letter of Technical Standard Order design approval. <p>(b) For the purpose of this subpart</p> <ol style="list-style-type: none"> (1) A Technical Standard Order (referred to in this Subpart as “TSO”) is issued by the Administrator and is a minimum performance standard for specified articles (for the purpose of this subpart, articles means materials, parts, processes, or avionics) used on civil aircraft. (2) A TSO authorization is an FAA design and production approval issued to the manufacturer of an article which has been found to meet a specific TSO. (3) A letter of TSO design approval is an FAA design approval for a foreign-manufactured article which has been found to meet a specific TSO in accordance with the procedures of § 21.617. (4) An article manufactured under a TSO authorization, an FAA letter of acceptance as described in §. 21.603(b), or an avionics manufactured under a letter of TSO design approval described in § 21.617 is an approved article or avionics for the purpose of meeting the regulations of this chapter that require the article to be approved. (5) An article manufacturer is the person who controls the design and quality of the article produced (or to be produced, in the case of an application), including the parts of them and any processes or services related to them that are procured from an outside source. <p>(c) The Administrator does not issue a TSO authorization if the manufacturing facilities for the product are located outside of the United States, unless the Administrator finds that the location of the manufacturer’s facilities places no undue burden on the FAA in administering applicable airworthiness requirements.</p>	

21.603 TSO marking and privileges.

Requirement	Compliance
<p>(a) Except as provided in paragraph (b) of this section and § 21.617(c), no person may identify an article with a TSO marking unless that person holds a TSO authorization and the article meets applicable TSO performance standards.</p> <p>(b) The holder of an FAA letter of acceptance of a statement of conformance issued for an article before July 1, 1962, or any TSO authorization issued after July 1, 1962, may continue to manufacture that article without obtaining a new TSO authorization but shall comply with the requirements of §§ 21.3, 21.607 through 21.615, 21.619, and 21.621.</p> <p>(c) Notwithstanding paragraphs (a) and (b) of this section, after August 6, 1976, no person may identify or mark an article with any of the following TSO numbers:</p> <ol style="list-style-type: none"> (1) TSO-C18, -C18a, -C18b, -C18c. (2) TSO-C24. (3) TSO-C33. (4) TSO-C61 or C61a. 	

21.605 Application and issue.

Requirement	Compliance
<p>(a) The manufacturer (or an authorized agent) shall submit an application for a TSO authorization, together with the following documents, to the Manager of the Aircraft Certification Office for the geographic area in which the applicant is located:</p> <ol style="list-style-type: none"> (1) A statement of conformance certifying that the applicant has met the requirements of this subpart and that the article concerned meets the applicable TSO that is effective on the date of application for that article. (2) One copy of the technical data required in the applicable TSO. (3) A description of its quality control system in the detail specified in § 21.143. In complying with this section, the applicant may refer to current quality control data filed with the FAA as part of a previous TSO authorization application. <p>(b) When a series of minor changes in accordance with § 21.611 is anticipated, the applicant may set forth in its application the basic model number of the article and the part number of the components with open brackets after it to denote that suffix change letters or numbers (or combinations of them) will be added from time to time.</p> <p>(c) After receiving the application and other documents required by paragraph (a) of this section to substantiate compliance with this part, and after a determination has been made of its ability to produce duplicate articles under this part, the Administrator issues a TSO authorization (including all TSO deviations granted to the applicant) to the applicant to identify the article with the applicable TSO marking.</p> <p>(d) If the application is deficient, the applicant must, when requested by the Administrator, submit any additional information necessary to show compliance with this part. If the applicant fails to submit the additional information within 30 days after the Administrator’s request, the application is denied and the applicant is so notified.</p> <p>(e) The Administrator issues or denies the application within 30 days after its receipt or, if additional information has been requested, within 30 days after receiving that information.</p>	

References	Title	Notes
Design		
Analysis		
Test		
Other		

21.607 General rules governing holders of TSO authorizations.

Requirement	Compliance
<p>Each manufacturer of an article for which a TSO authorization has been issued under this part shall--</p> <ol style="list-style-type: none"> (a) Manufacture the article in accordance with this part and the applicable TSO; (b) Conduct all required tests and inspections and establish and maintain a quality control system adequate to ensure that the article meets the requirements of paragraph (a) of this section and is in condition for safe operation; (c) Prepare and maintain, for each model of each article for which a TSO authorization has been issued, a current file of complete technical data and records in accordance with § 21.613; and (d) Permanently and legibly mark each article to which this section applies with the following information: <ol style="list-style-type: none"> (1) The name and address of the manufacturer. (2) The name, type, part number, or model designation of the article. (3) The serial number or the date of manufacture of the article or both. (4) The applicable TSO number. 	

References	Title	Notes
Design		
Analysis		
Test		
Other		

21.609 Approval for deviation.

Requirement	Compliance
<p>(a) Each manufacturer who requests approval to deviate from any performance standard of a TSO shall show that the standards from which a deviation is requested are compensated for by factors or design features providing an equivalent level of safety.</p> <p>(b) The request for approval to deviate, together with all pertinent data, must be submitted to the Manager of the Aircraft Certification Office for the geographic area in which the manufacturer is located. If the article is manufactured in another country, the request for approval to deviate, together with all pertinent data, must be submitted through the civil aviation authority in that country to the FAA.</p>	

21.611 Design changes.

Requirement	Compliance
<p>(a) <i>Minor changes by the manufacturer holding a TSO authorization.</i> The manufacturer of an article under an authorization issued under this part may make minor design changes (any change other than a major change) without further approval by the Administrator. In this case, the changed article keeps the original model number (part numbers may be used to identify minor changes) and the manufacturer shall forward to the appropriate Aircraft Certification Office for the geographic area any revised data that are necessary for compliance with § 21.605(b).</p> <p>(b) <i>Major changes by manufacturer holding a TSO authorization.</i> Any design change by the manufacturer that is extensive enough to require a substantially complete investigation to determine compliance with a TSO is a major change. Before making such a change, the manufacturer shall assign a new type or model designation to the article and apply for an authorization under § 21.605.</p> <p>(c) <i>Changes by person other than manufacturer.</i> No design change by any person (other than the manufacturer who submitted the statement of conformance for the article) is eligible for approval under this part unless the person seeking the approval is a manufacturer and applies under § 21.605(a) for a separate TSO authorization. Persons other than a manufacturer may obtain approval for design changes under Part 43 or under the applicable airworthiness regulations.</p>	

21.613 Recordkeeping requirements.

Requirement	Compliance
<p>(a) Keeping the records. Each manufacturer holding a TSO authorization under this part shall, for each article manufactured under that authorization, keep the following records at its factory:</p> <ul style="list-style-type: none"> (1) A complete and current technical data file for each type or model article, including design drawings and specifications. (2) Complete and current inspection records showing that all inspections and tests required to ensure compliance with this part have been properly completed and documented. <p>(b) Retention of records. The manufacturer shall retain the records described in paragraph (a)(1) of this section until it no longer manufactures the article. At that time, copies of these records shall be sent to the Administrator. The manufacturer shall retain the records described in paragraph (a)(2) of this section for a period of at least 2 years.</p>	

References	Title	Notes
Design		
Analysis		
Test		
Other		

21.615 FAA inspection.

Requirement	Compliance
<p>Upon the request of the Administrator, each manufacturer of an article under a TSO authorization shall allow the Administrator to:</p> <ul style="list-style-type: none"> (a) Inspect any article manufactured under that authorization; (b) Inspect the manufacturer’s quality control system; (c) Witness any tests; (d) Inspect the manufacturing facilities; and (e) Inspect the technical data files on that article. 	

References	Title	Notes
Design		
Analysis		
Test		
Other		

21.617 Issue of letters of TSO design approval import avionics.

Requirement	Compliance
<p>(a) A letter of TSO design approval may be issued for an avionics that is manufactured in a foreign country with which the United States has an agreement for the acceptance of these avionics for export and import and that is to be imported into the United States if—</p> <p>(1) The country in which the avionics was manufactured certifies that the avionics has been examined, tested, and found to meet the applicable TSO designated in § 21.305(b) or the applicable performance standards of the country in which the avionics was manufactured and any other performance standards the Administrator may prescribe to provide a level of safety equivalent to that provided by the TSO designated in § 21.305(b); and</p> <p>(2) The manufacturer has submitted one copy of the technical data required in the applicable performance standard through its civil aviation authority.</p> <p>(b) The letter of TSO design approval will be issued by the Administrator and must list any deviation granted to the manufacturer under § 21.609.</p> <p>(c) After the Administrator has issued a letter of TSO design approval and the country of manufacture issues a Certificate of Airworthiness for Export as specified in § 21.502(a), the manufacturer shall be authorized to identify the avionics with the TSO marking requirements described in § 21.607(d) and in the applicable TSO. Each avionics must be accompanied by a Certificate of Airworthiness for Export as specified in § 21.502(a) issued by the country of manufacture.</p>	

References	Title	Notes
Design		
Analysis		
Test		
Other		

21.619 Noncompliance.

Requirement	Compliance
<p>The Administrator may, upon notice, withdraw the TSO authorization or letter of TSO design approval of any manufacturer who identifies with a TSO marking an article not meeting the performance standards of the applicable TSO.</p>	

References	Title	Notes
Design		
Analysis		
Test		
Other		

21.621 Transferability and duration.

Requirement	Compliance
<p>A TSO authorization or letter of TSO design approval issued under this Part is not transferable and is effective until surrendered, withdrawn, or otherwise terminated by the Administrator.</p>	

References	Title	Notes
Design		
Analysis		
Test		
Other		

APPENDIX III

PROJECT SPECIFIC CERTIFICATION PLAN

For Installation or Avionics Approval
Through the Supplemental Type Certification Process

between the

FEDERAL AVIATION ADMINISTRATION

and

APPLICANT (Specify Name)

for

(List specific product here)

The material contained herein is an aid for preparing the Project Specific Certification Plan (PSCP) for installation of avionics approved through the Technical Standard Order (TSO) process or items in which a TSO does not exist. This aid is intentionally not a “boilerplate,” but allows the freedom to innovate and meet the special project needs of the applicant and the FAA. However, it is essential that the PSCP addresses the same key content areas of this aid ensuring that, as written, it captures the meaning and intent of this guide. The PSCP should include elements that were not addressed in detail in the PSP and it should incorporate by reference appropriate procedures, agreements, or other elements pertinent to the project.

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PURPOSE

The purpose of this Project Specific Certification Plan (PSCP) is to define and document a product approval plan between the Aircraft Certification Service of the Federal Aviation Administration (FAA) and the applicant. The plan should expedite the issuance of a Supplemental Type Certificate (STC) for the fabrication or installation, or both, for the applicant's (*specify LRU or system*) under standardized procedures. The applicant is (*specify applicants name*).

If a TSOA is being worked as a parallel project, it should be stated as follows: As a parallel certification project, the TSOA will be covered by a stand-alone PSCP. This PSCP will provide the foundation from which to build mutual trust, teamwork, and efficient business practices between the FAA and the applicant during approval of the product. It is the mutual goal of all team members to meet or exceed the expectations of this agreement.

It is understood that this PSCP will be executed in accordance with the PSP. However there are certain situations where a PSP is not warranted. In these situations, those applicable sections for a PSP must be incorporated into this PSCP. (*Only use the following sentence if a PSP has not been developed:*) There is no current PSP with (*specify applicant*), but specific sections have to be added in this PSCP that include the CPI principles contained in a stand-alone PSP.

In the establishment of this PSCP, it is understood that a cooperative working relationship is required for these procedures to be effective. To implement successfully the PSCP procedures, it is understood that both the applicant and FAA team members work in accordance with the established guidelines. The FAA team members will recognize and utilize the knowledge of the FAA designees to the greatest extent possible and keep the applicant's team members abreast of certification issues that may arise. The PSCP schedule will be within specified ranges agreed to in the norms of the PSP and additional milestones will be considered by the FAA and the applicant as firm commitments unless they agree to a change. It is intended that all team members facilitate review and approval of the necessary design and production data and related compliance documents in a timely manner with the objective of bettering the PSCP wherever possible.

The PSCP is a living document. This means that if both the FAA and the applicant agree that modification to the Plan is needed, an amended Plan is drafted. The Plan will be developed to the greatest extent possible as soon as the FAA and the applicant agree that the certification project is a viable one for which resources can be planned and committed for its completion. As the project progresses, the PSCP will be managed and maintained jointly by the FAA and the applicant's Project Managers.

EFFECTIVITY

This PSCP shall become effective upon approval by the Managers of the (*specify name of ACO*) Aircraft Certification Office, the appropriate Standards Office (Directorate or Aircraft Engineering Division), the (*specify name of MIDO*) Manufacturing Inspection District Office, the (*specify name of AEG*) Aircraft Evaluation Group, and the applicant's Certification or Airworthiness Manager. This PSCP may be amended by mutual agreement or terminated by

either the applicant or the FAA. This PSCP will continue in effect throughout all Phases of the product approval unless it is superseded, revised, or terminated with written notice by either the applicant or the FAA. Any change in the services furnished or other provisions of this PSCP will be formalized by an appropriate written amendment signed by effected parties, which will outline the nature of the change.

PRODUCT APPROVAL

1. Project Description

This section should contain a brief description of the project. This section should also include a brief description of the type of approval requested and a brief discussion of the equipment's intended function.

2. System Description

This section should contain a comprehensive system description. This system description should provide enough detail about the avionics system such that the certification team can evaluate the PSCP to determine if all the issues are addressed in the PSCP. Any unique design issues should be detailed in this section. A brief summary of the product as it relates to existing flight deck displays, sensors, added sensors, switches, annunciator lights, control panels, electrical components, interior arrangement, other interfaces, and so forth, should be included. A description of the installation of the product should also be contained in this section.

3. Project Schedule

A detailed project schedule should be provided as an appendix to the PSCP and it should identify all major milestones, including appropriate project management reviews and any required scheduled deliverables such as those listed below. *(Being in an appendix will facilitate schedule changes without having to revise the PSCP.)* If required, these milestones need to be established in accordance with the operating norms identified in the PSP. Every effort must be made to establish realistic schedules considering both the FAA and the applicant's total workloads and other resource commitments. Design, production, operational, and maintenance aspects as well as foreign authority validation requirements should be planned for and considered. All issue papers, if applicable, should also be included with a resolution plan and prioritization of the issues to be resolved. The schedule should adhere to the Phases and process flow identified in *The FAA and Industry Guide to Avionics Approvals*. This would include identifying in the schedule all appropriate deliverables for the project such as, but not limited to, those shown below:

Deliverables:

- Familiarization and technical meeting(s) minutes
- STC Application
- Project Acknowledgment
- Certification Project Notification (CPN)

- Draft and final PSCP
- Compliance data submittals (e.g., test plans/reports, analyses.)
- Statement of Conformance and Conformity Inspections
- Supplemental Type Certificate Issued
- Quality Control Procedures and documentation
- Production approvals
- PMA Issued
- Project Evaluation Form

4. Certification Approach

The certification approach should be outlined in the PSCP. If the applicant chooses to use the generic STC process for installation of the avionics system, the approach should be outlined in this section. The generic STC aircraft model list should be identified in this section.

a. System Safety Assessment

The criticality of the avionics system should be identified. A system safety assessment should be performed that establishes the hazards associated with the proposed installation. Based on the System Safety Assessment (SSA), the classification of the failure condition(s) should be stated.

b. Certification Basis and Means of Compliance

The Certification Basis identifies the applicable standards to which the applicant must show compliance. It also includes the need for special conditions, exemptions, and equivalent safety findings, if any. A certification matrix should be included that identifies the applicable regulations, ACs, current policies, and the procedures or methods that will be used to comply with the regulations. The certification matrix should also identify the type of documentation that will be used to show compliance. Any testing or analyses applicable to the project that has been previously approved by the FAA should be identified in this section. When identifying those approvals, the approval date, letter reference number, and reference as to how the specific approval was granted (STC, TSOA, Design Approval, etc.) should be referenced.

c. Software

A brief discussion of the software certification approach should be outlined in the PSCP. This discussion should address software criticality. Any unique design features (Commercial Off the Shelf (COTS), Windows NT™, etc.) should also be addressed and the approach used to certify the software.

d. Human Factors

A human factors plan should be outlined in the PSCP. This outline may be brief or extensive, depending on the complexity of the equipment. For new types of avionics or applications, the human factors plan should be comprehensive. For guidance on developing a human factors plan, refer to GAMA Publication 10, *Recommended Practices and Guidelines for Part 23 Cockpit/Flight Deck Design*.

e. Other (Operational Concept, Equipment Compatibility, Envisioned Safety Enhancements)

It may be useful in developing the certification approach to provide a brief discussion of some of the above topics. These discussions should provide enough detail to support the certification approach. For well-established types of avionics systems, addressing these additional topics would not be necessary.

5. Communication and Responsibilities

a. Communication

This section describes the communication responsibilities of the FAA and the applicant's certification teams and, where appropriate, co-producers, suppliers, other Civil Aviation Authorities, and so forth. The FAA and the applicant establish the appropriate communication and coordination paths by identifying the respective team members. The FAA and the applicant's PMs must be kept informed of all critical communications. Critical links should be defined to ensure that roles and responsibilities are clear to define accountable team members responsible for deliverables and to facilitate conflict resolution. This does not preclude any team member from communicating with any other member, but they need to ensure the PMs are informed. Team members typically will communicate with the PMs via email and telephone.

b. Roles and Responsibilities

This section describes the roles and responsibilities of the applicant and FAA team members. Table 1 is a sample of the typical table to show the FAA and applicant team members and their roles and responsibilities. Please note that your program may require team members with different roles and responsibilities than those listed in the sample shown in Table 1.

Table 1: FAA/ Applicant PSCP Team Members

FAA Team Member	Applicant Team Member	Roles and Responsibilities
Name Phone Number FAX Number Email address	Name Phone Number FAX Number Email address	Installation Program Manager – FAA/applicant team leader; PSCP focal point
		TSO Program Manager: provide assistance to Installation PM
		Systems and Equipment Engineer: review test plans, data, issue request for conformity inspections, delegation approval
		Project Engineer – Software Aspects: engineering review and approval of all software documents, coordination with software DER and Installation PM
		Project flight test pilot: develop flight test plan as required; review display for symbology and human factors; review of the users manual; flight test expert to the Installation PM
		Principal Inspector related to Software Quality Assurance
		Principal Inspector related to Manufacturing/Production Quality Assurance
	N/A	FAA Directorate Project Officer: 14 CFR Part 23/25/27/29 policy and guidance
	N/A	Project Nav. – FAA AIR-130: focal point regarding policy and interpretation with Nav. MOPS, ensure standardization related to Nav. issues
	N/A	Project Human Factors – FAA AIR-130: focal point related to Human Factors; policy and interpretation with MOPS and TSO technical performance standards related to Human Factors
	N/A	FAA Aircraft Evaluation Group – Maintenance: review and determine adequacy of maintenance documents including Instructions for Continued Airworthiness
	N/A	FAA Aircraft Evaluation Group – Operations: review and determine adequacy of system operational issues and documents including Users Manual
	N/A	FAA NRSs and Technical Specialists, as appropriate, and as needed: Provide technical guidance

Each member of the certification team should be listed.

6. Delegation

The oversight and documentation requirements of engineers, Aviation Safety Inspectors, and flight test pilot designees requirements should be identified and agreed to in this section. This should also include reliance on existing delegation authorization agreements or working procedures generated between the FAA, the applicant, and other authorities, as appropriate, that should already be specified in the PSP.

The PSCP should be specific as to what aspects of the project are delegated and what, if any, stipulations, coordination, or limitations are placed upon that delegation. Delegation should be applied to the maximum extent practicable with appropriate safeguards and oversight as defined

in the FAA's delegation management process policy and this PSCP. Because of the close integration of the design, production, and continued airworthiness processes, it is necessary to have all stakeholders agree on the procedures and degree of delegation and oversight to be used in the project.

To facilitate certification, the FAA designee system will be utilized to the greatest extent possible. Both the FAA and the applicant agree to foster an environment where open communication between the designees and company management and between the designees and their FAA counterparts is standard practice. The applicant agrees to create a working environment where designees can make compliance and conformity findings free from undue pressure and with the support and knowledge of the FAA. It is understood that the FAA's objective is to find compliance and conformity with the regulations and not to dictate design. The FAA and the applicant agree to manage all designee activity within the regulations and policy regarding designee appointment, procedures, and oversight.

7. Testing Plan

a. General

This section should contain the requirements for the planning, preparation, and conduct of FAA required testing. The applicant's product development tests do not require FAA involvement. However, FAA certification credit will not be granted for development tests unless arrangements are made and agreed upon prior to testing. These pretest arrangements must be coordinated with appropriate FAA engineers, flight test pilots, and Aviation Safety Inspectors with sufficient lead-time to ensure all aspects necessary for the desired FAA credit toward certification are achieved. This is particularly important for critical parts and components or when new technology, new materials or new processes are involved, which should necessitate a greater depth of review and conformity inspection. FAA personnel will witness all ground and flight tests intended for certification credit that are not specifically delegated to designees prior to testing. Delegation should be used wherever possible. Who will witness which tests should be planned for and documented in advance in the delegation section of the PSCP and the compliance checklist. When the FAA does witness, they will meet the project schedule as agreed upon to the greatest extent possible. The applicant should keep the FAA informed of test schedules, and changes should be negotiated with affected team members.

The following items are required prior to testing:

- Drawings and specifications that sufficiently describe the design and production of the test article;
- FAA approved test plan, including either a description or drawing, or both, of the test set-up, instrumentation, calibration requirements, etc.;
- The applicant's completed inspections and Statement of Conformity, FAA Form 8130-9;
- FAA Form 8120-10, Conformity Request; and
- FAA Form 8100-1, Conformity Report, indicating the results of the Conformity Inspection, including disposition of deviations by FAA engineering or their designee if so delegated. (A copy must be available for the official test witnessing.)

When specifically delegated as identified in the delegation section of the PSCP, designees can submit fully approved test plans with FAA Form 8110-3 and FAA Form 8120-10 requests for conformity inspection, where needed, and disposition conformity deviations. All instrumentation that is required for an FAA certification test will require calibration criteria to be agreed upon with the accountable FAA engineering team members or their designee, if so delegated, and to be documented in each test plan or in a generic calibration procedures document as appropriate.

b. Flight Test/Human Factors Evaluations

This section should contain any unique requirements for the planning, preparation, and conduct of FAA required flight testing. Flight tests are conducted in accordance with the requirements of the Type Inspection Authorization (TIA). The TIA also authorizes conformity and airworthiness inspections and flight tests to determine compliance with the certification requirements. It is important to ensure close pre-flight test coordination with the FAA, including FAA discipline managers, Aviation Safety Inspectors, and the flight test pilots, in accordance with FAA policy. The PSCP will provide the clarity to:

- Conduct conformity inspections early in the project.
- Ensure timely, high-quality documentation.
- Complete pertinent applicant flight tests and report results prior to FAA flight test.
- Coordinate within the FAA for concurrent Product Certification and AEG flight testing.
- Ensure aircraft conformity, airworthiness certification, and identify operating limitations.
- Detail scheduling.
- Specify use of delegation.
- Consider flight test risk management in conjunction with the entire team.

c. Environmental Testing

Environmental tests should be specified in the PSCP. The test requirements, as they are identified in RTCA DO-160, should be specified.

d. Conformity

14 CFR Part 21, §§ 21.33 and 21.53, require the applicant to make all inspections necessary to establish the conformity of the product being presented to the Administrator for certification and to submit a Statement of Conformity to the FAA on FAA Form 8130-9. The FAA will then determine, as far in advance as possible, which Statements of Conformity it will accept without verification and which will require FAA conformity inspections. Some factors affecting this would be the criticality of the part/component, whether there is either new material, a new process, or technology involved, or whether there is an existing quality control or inspection system that has demonstrated its ability to adequately ensure conformity, or all of these. This section of the PSCP should describe what conformities will be needed, and the FAA's and the applicant's roles in the conformity inspection process for the project. This should be consistent with the delegation section of the PSCP. It should state which conformity inspections will be conducted, which will be delegated to designees, and how deviations will be dispositioned. A system should be established to:

- Maintain custody of conformed articles destined for an official FAA test.
- Notify FAA Aviation Safety Inspector of any changes to ground/flight test articles after conformity inspection has been completed.
- Ensure requests are not duplicated and that the timely and efficient conduct of conformities and dispositioning of deviations occur.
- Identify who issues the requests, conducts the inspections, and dispositions the deviations.
- Provide for the completion of inspection, documentation, and dispositioning of deviations or changes before tests are conducted.
- Provide for timely conduct of conformity inspection at non-US suppliers.

Conformity inspections will be performed by FAA Aviation Safety Inspectors or their designees. These inspections will be performed in response to FAA Form 8120-10 (request for conformity) issued by the FAA or their designees. The applicant, FAA engineer, and FAA Aviation Safety Inspector, along with their respective designees, will agree upon and document a plan by which the designees from all disciplines can work directly together to perform conformity.

8. Compliance Documentation

This section should describe the procedures for submittal and processing of compliance documentation. The PSCP should identify what data will be submitted and by whom. It should account for all data (not just drawings) pertinent to defining the type design, including manufacturing specifications, and to conducting the showings of compliance required for FAA certification. This would include, but is not limited to, test plans, test reports, test setup schematics, test instrumentation, drawings, analyses (for example, stress, safety, damage tolerance), material or process specifications, manuals. The applicant will submit one copy of the data with each FAA Form 8110-3 (original and copy). Data submitted without an FAA Form 8110-3 will require FAA engineering review and approval, which may add to the processing time. This should be taken into account when developing the project schedule.

The FAA and the applicant will agree and document the amount of time needed for review, disposition, and approval or acceptance of the data, as appropriate. Typically, this may be up to four (4) weeks for designee recommended approval data. Some submittals, due to size or complexity, may require more time. Some examples include Instructions for Continued Airworthiness and safety analyses. The timing and process for such submittals should be agreed upon between the FAA and the applicant and documented in the PSCP. Data submittals that are designee approved are reviewed only for designee oversight purposes, whereas data that is recommended for approval must be reviewed for those aspects that the designee could not or did not evaluate. Hence, communication and pre-planning for data submittal and consideration of the level of delegation between designees and the FAA is essential and encouraged to ensure timely efficient data approval.

PRODUCTION CERTIFICATION

This section of the PSCP should outline production quality project issues and tell how they will be managed to permit early approval of the production system. The goal is to have concurrent design and production approval issuance. The primary focal points for the production approval

process are the FAA Principal Aviation Safety Inspector and the applicant's Project Quality Manager. Production approval is granted after the applicant has demonstrated, and the FAA has verified, that the applicant has developed and is capable of maintaining a quality assurance system. This system will ensure that only products and parts conforming to the design data are released for commercial service use. For existing Production Approval Holders (PAH) who will be adding a new product to an existing approved production system, issues to be considered should include the following:

- Approval of new materials, new processes, new suppliers, co-production agreements, new technologies or new applications of existing technology, etc.
- FAA undue burden assessment of either non-US suppliers or co-producers or both
- Instructions for assembly and test of the final product to ensure conformance
- Coordination with engineering on production Material Review Board requirements and integrating engineering and production Certificate Management activities
- Controls to be placed on production as a result of design Airworthiness Limitations or the criticality of parts and components
- Configuration control requirements
- Any other reviews necessary to ensure that a conforming product will be produced under the FAA approved quality inspection system

Applicants who do not hold an existing production approval for the type of product that is being certificated under this PSCP must demonstrate, to the satisfaction of the FAA, the existence of and compliance with a quality system that satisfies ALL the requirements of the applicable subparts of 14 CFR Part 21.

POST CERTIFICATION REQUIREMENTS

1. Compliance Summary Document

The applicant and FAA PMs will prepare a summary at the end of each certification project to capture and retain the corporate knowledge learned during the project. The summary should capture only unique data, precedent issues (for example, regulatory, policy, or technical), and both the applicant and FAA perspectives, feedback, and lessons learned. This document is not to be a complete history of the project but should only document those areas out of the ordinary that require process improvements, affect rule/policy making, and so forth, in order to provide continuous improvement of the FAA and the applicant's working relationship. The team should evaluate this summary, plus the project evaluation forms, and appropriate changes to the PSP or future PSCPs should be made. When the team identifies where changes to the guide would be beneficial, those should be referred to AIR-100 for consideration.

2. Instructions for Continued Airworthiness (ICA)

The process used to ensure Continued Airworthiness should be outlined in this section.

3. Continued Airworthiness Management

The details of how the FAA and the applicant will handle continued airworthiness issues will be agreed upon and documented. This will be consistent with the 14 CFR and FAA policy on certificate management, reporting, self-disclosure and the requirements for implementing corrective actions in both the type design and production systems.

CONTINUOUS IMPROVEMENT

1. General

In this section, a statement should be made that the continuous improvement processes detailed in the PSP will be followed.

2. Project Evaluation Form

The Project Evaluation Form (Appendix IV of this guide) is a tool that can be used for project management as the project moves through the six phases. The FAA and the applicant PMs should jointly prepare a Project Evaluation Form at the beginning of a project. The applicant/FAA team should continuously evaluate the project for immediate process improvement. For long duration projects, the PMs should complete the “Deliverables” portion of the form at the end of each phase. For projects with a short completion time, the form should be completed at the end. The PMs are encouraged to include the completion of the Project Evaluation Forms as milestones when preparing their PSCP schedule.

To facilitate continuous improvement, any necessary corrective actions should be implemented by the team and the Project Evaluation Form should be maintained in the FAA and applicant’s official project file for future national or local program evaluation. When the evaluation identifies the need for corrective actions or improvements, it should be included as a part of the Compliance Summary Document for future reference.

During initial CPI implementation, an FAA/AIA/GAMA Product Certification Continuous Improvement Steering Committee reviews all project evaluation feedback on current projects. The team evaluates project lessons learned and recommends guide changes for continuous improvement. This same process will be used for feedback and continuous improvement for the avionics certification process. A copy of the form should also be sent to the FAA’s Aircraft Engineering Division, AIR-100, for FAA and industry review of the CPI process.

SIGNATORIES

The FAA and the applicant agree to the provisions of this PSCP as indicated by the signature of their duly authorized representatives.

Agreed by: (This is a representative sample of possible signatories and could include others deemed appropriate to provide necessary commitments and accountability. Include Names and date)

Applicant Certification Manager

FAA ACO Manager

Applicant Project Manager

FAA Project Manager

Applicant Project Quality Manager

FAA MIDO Manager(s)

FAA Designee(s)

FAA Principal Inspector

FAA Standards Staff Manager

FAA Standards Staff Project Officer

FAA AEG Inspector(s)

Appendix I to the PSCP

Insert Project Tasks and Schedule here

APPENDIX IV

Project Evaluation Form

The Project Evaluation Form is a tool that can be used for project management as the project moves through the six phases. The FAA and the applicant PMs should jointly prepare a Project Evaluation Form at the beginning of a project. The applicant/FAA team should continuously evaluate the project for immediate process improvement. For long duration projects, the PMs should complete the “Deliverables” portion of the form at the end of each phase. For projects with a short completion time, the form should be completed at the end. The PMs are encouraged to include the completion of the Project Evaluation Forms as milestones when preparing their PSCP schedule.

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Deliverables will be adjusted according to changes in the other appendices.

Project Evaluation Form

Project Name: _____

FAA Project Number: _____

Project Managers:

Names: Applicant: _____ **FAA:** _____

Company: _____ **Office:** _____

Were the following Deliverables completed? (check where applicable):

Phase I: Partnership for Safety Plan

- Consensus driven PSP with appropriate signatures

Phase II: Conceptual Design and Standards

- Initial Safety Assessment
- Establishment of FAA and applicant project certification team
- Draft critical issues list and mitigation plans
- List of relevant software policy material and preliminary compliance plans (preliminary Plan for Software Aspects of Certification (PSAC))
- List of relevant human factors policy material and preliminary compliance plans
- Consensus regarding which PSCP(s) will be used
- Determination of need for any TSO deviations
- Draft PSCP(s)

Phase III: Refined Product Definition and Risk Management

- Safety Assessment
- Refined PSCP(s)
- Refined critical issues list and mitigation plans
- Applicant Notification of Certification Project Initiation
- FAA Acknowledgement of Project Initiation
- Certification Project Notification (in accordance with FAA Order 8110.4)

Phase IV: Certification Project Planning

- Signed PSCP
- Project schedule with established FAA/applicant milestones for completion of analyses, test plan submission, TIA, conformities, flight test, AEG evaluations
- Updated critical issues list and resolution plan
- Compliance Check List
- Defined delegations and oversight criteria
- Resource requirements
- Conformity procedures
- Refined operational and installation issues

PROJECT EVALUATION FORM
(Page 2)

Phase V: Certification Project Management

- Completed test plans/reports, conformity requests, inspections, and compliance documentation
- Compliance and conformance findings
- TSO/JTSO required data submittal
- Quality Control System Manual
- Issue Papers, Exemptions, Equivalent Safety Findings
- Technical Standard Order Authorization
- Instructions for Continued Airworthiness
- Issued Supplemental Type Certificate

Phase VI: Post Certification

- Project lessons learned
- Revisions to PSP resulting from lessons learned
- Project Evaluation Form

Answer the following questions as appropriate (attach separate sheets as needed):

	Questions
	1. Were meeting minutes and correspondence kept to document decisions, agreements, and action item assignments?
	2. Were the PSCP milestones based on the norms? <ul style="list-style-type: none"> • If not within the norms, Why?
	3. Were the milestones periodically validated and mutually readjusted by the PSCP signatories throughout the program as needed?
	4. Were the final milestones met?
	5. Was the delegation plan followed? <ul style="list-style-type: none"> • What worked well? • What didn't work well?
	6. Was the Issue Resolution Process established/applied as needed? <ul style="list-style-type: none"> • What worked well? • What didn't work well?
	7. Changes required for next Project? <ul style="list-style-type: none"> • If yes, explain action needed.
	8. Did the use of the PSCP result in a faster certification approval and/or lower cost to bring new, safe products to the aviation market? <ul style="list-style-type: none"> • What worked well? • What didn't work well?

APPENDIX V GLOSSARY AND ACRONYMS

GLOSSARY

Applicant: An individual or organization that is seeking FAA approval of a specific aircraft component or installation. The approval may be a Technical Standard Order Authorization (TSOA), Parts Manufacturer Approval (PMA) or Supplement Type Certificate (STC).

Approval: The FAA issues approvals that include certifications, authorizations, and other forms of approval. Approval may be a Technical Standard Order Authorization (TSOA), Parts Manufacturer Approval (PMA), Type Certificate (TC), or Supplemental Type Certificate (STC), as applicable. The FAA may issue an approval only after a finding has been made that all applicable requirements have been met.

Certification: A form of FAA approval where a certificate is issued, such as TC, STC, Production Certificate, or Airworthiness Certificate.

Certification Basis: The applicable airworthiness, aircraft noise, fuel venting and exhaust requirements of Title 14 of the Code of Federal Regulations as established in 14 CFR Part 21, §§ 21.17, 21.101, and 21.115, as appropriate; special conditions; equivalent level of safety findings; and, exemptions to which the applicant must show compliance.

Criteria for Success: Attributes that are expected in the successful completion of each Phase.

Deliverables: Items to be produced during any particular Phase of the Product Certification Process by either the FAA, designees, or the applicant.

Designee: For the purposes of this guide, designee includes consideration of organizational delegations as well as delegations to individuals.

FAA Form 337: Used to record major repairs or alterations to an airframe, powerplant, propeller or appliance. The form should be completed in accordance with 14 CFR Part 43, § 43.9, Part 43 Appendix B, and Advisory Circular 43.9.

First-of-Type STC: An initial Supplemental Type Certificate (major design change) issued for a particular make and model of aircraft.

Follow-on STC: A Supplemental Type Certificate (STC) subsequent to the first-of-type STC, which is issued for a like make and model of type certificated aircraft.

Installation Approval: Installation Approval is described in 14 CFR Part 43, § 43.5 and requires three specific criteria to be met. 1. A maintenance record is accomplished, 2. A repair and Alteration form has been properly executed, and 3. If the alteration results in any change in the aircraft operating limitations or flight data contained in the approved Aircraft Flight Manual (AFM), the appropriate revisions will be required.

Intended Function: The defined characteristic(s) a piece of equipment must demonstrate and achieve to meet the specific requirements.

Key Players: Accountable FAA, FAA designees, and applicant personnel required for successful completion of any particular Phase of the Product Certification Process.

Limitations: Specific criteria established during the certification process, dictating the operating parameters of avionics equipment limitations are defined during airworthiness certification such as STC, TSOA, and field approval and by operating limitations through the approved flight manual or in the form of Operations Specifications for air carriers.

Line Replaceable Unit: (LRU) A single stand-alone unit with a unique part number that can be installed or removed from an aircraft by line maintenance personnel while the aircraft is on the flight line in operational status.

Operational Approval: Operational Approval is a 5 step process that Flight Standards uses to authorize an operator to conduct operations using a specific aircraft and associated equipment in a specific operating environment. Ref. FAA Order 8400.10.

Partnership for Safety Plan: The high level standing Plan of how the FAA and the applicant will work and interact together. It sets the expectations and needs of both parties for the relationship. It is not a legally binding agreement but a mutual statement of the intent of the FAA and the applicant to hold their respective personnel accountable for building the professional working relationships and business practices upon which successful product certification projects are built.

Parts Manufacturer Approval: (PMA) Issued by the FAA to manufacture aircraft modification or replacement parts, which includes design approval by the Aircraft Certification Office (ACO) and a production system approval by the Manufacturing Inspection District Office (MIDO).

Plan for Software Aspects of Certification: (PSAC) An agreement between the applicant and the FAA describing how the applicant will satisfy the objectives of RTCA document DO-178B, Software Considerations in Airborne Systems and Equipment Certification.

Product Certification: The complete certification cycle that includes type certification (design approval), production certification (production approval), airworthiness certification (airworthiness approval) and continued airworthiness management.

Project Specific Certification Plan: A Plan that addresses the specific issues of a specific project. It sets the expectations for the project. It is not a legally binding agreement but a mutual statement of the intent of the FAA and the applicant to hold their respective personnel accountable for the success of the project.

Supplemental Type Certificate: (STC) A Supplemental Type Certificate will be issued for all major design changes to type certificated products and will be issued when an applicant has received FAA approval to modify an aircraft from its original design. The STC, which incorporates by reference the related type certificate, approves not only the modification but how the modification affects the original design. An STC is required for all major modifications done to any type certificated aircraft or aeronautical product under any part of the regulations. The STC will only be issued after all pertinent technical data have been examined, found satisfactory, and a satisfactory conformity inspection of the modified article(s) has been conducted.

Technical Standard Order: (TSO) A Technical Standard Order is a minimum performance standard issued by the Administrator for specified articles (materials, parts, processes, and appliances) used on civil aircraft.

Technical Standard Order Authorization: (TSOA) The TSO authorization is an FAA design and production approval issued to the manufacturer of an article which has been found to meet or exceed a specific TSO.

ACRONYMS

ACO -	Aircraft Certification Office
AEA -	Aircraft Electronics Association
AEG -	Aircraft Evaluation Group
AIA -	Aerospace Industries Association
AIR -	Aircraft Certification Service
AFM -	Aircraft Flight Manual
AFS -	Flight Standards Service
CEO -	Chief Executive Officer
CFR -	Code of Federal Regulations
COTS -	Commercial Off The Shelf
CPI -	Certification Process Improvement
CPN -	Certification Project Notification
DER -	Designated Engineering Representative
EMI/RFI -	Electro-magnetic Interference/ Radio Frequency Interference
FAA -	Federal Aviation Administration
FHA -	Functional Hazard Assessment
FSDO -	Flight Standards District Office
GAMA -	General Aviation Manufacturers Association
JAA -	Joint Airworthiness Authorities
JTSO -	JAA TSO
LRU -	Line Replaceable Unit
MIDO -	Manufacturing Inspection District Office

MOPS	-	Minimum Operational Performance Standard
MIO	-	Manufacturing Inspection Office
NAA	-	National Airworthiness Authority
NRS	-	National Resource Specialist
PHAC	-	Plan for Hardware Aspects of Certification
PM	-	Project Manager
PMA	-	Parts Manufacturer Approval
PSAC	-	Plan for Software Aspects of Certification
PSCP	-	Project Specific Certification Plan
PSP	-	Partnership for Safety Plan
RTCA	-	Radio Technical Commission for Aeronautics
SAS	-	Software Accomplishment Summary
SSA	-	System Safety Assessment
STC	-	Supplemental Type Certification
TCAS	-	Traffic Alert and Collision Avoidance System
TC	-	Type Certification or Type Certificate
TIA	-	Type Inspection Authorization
TSO	-	Technical Standard Order
TSOA	-	Technical Standard Order Authorization
VP	-	Vice President
V&V	-	Verification and Validation

End