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

ORDER 8110.112

Effective Date:
06/15/2010

SUBJ: Standardized Procedures for Usage of Issue Papers and Development of Equivalent Levels of Safety Memorandums

This order establishes the procedures for the standardized usage of issue papers to document the negotiation and resolution of certification issues. We also explain the procedures for the development of equivalent levels of safety (ELOS) memorandums. In this order, you will find a sample of an issue paper, the issue paper format, an issue paper template, and an ELOS memorandum template.

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Chapter 1. General Information

1-1. Purpose of this Order.

a. This order establishes procedures for the standardized usage of issue papers for type certification programs, type validation programs, in some instances for parts manufacturer approval (PMA) projects, and for other issues involving approval of data (e.g., for the engineering aspects of repair specifications when submitted to an aircraft certification office (ACO) for engineering evaluation and approval). It also sets procedures for the development of equivalent levels of safety (ELOS) memorandums.

b. Included is an issue paper process description, issue paper format (appendix A), a sample issue paper (appendix B), and an ELOS memorandum template (appendix C).

c. These procedures were previously documented in Federal Aviation Administration (FAA) Order 8110.4, *Type Certification.* They were removed from that directive to make them separate/stand alone procedures and to make them applicable to other types of FAA approvals.

1-2. Audience. We have written this order for the employees in the FAA's:

a. Aircraft Certification Service (AIR), including:

- Aircraft certification offices (ACOs),
- Aircraft certification directorates, and
- Manufacturing inspection district offices (MIDOs).

b. Flight Standards Service (AFS), including:

- Aircraft evaluation groups (AEG), and
- FAA Academy Regulatory Support Division.

1-3. Where Can I Find This Order? You can find this order at MYFAA Employee website: https://employees.faa.gov/tools_resources/orders_notices and on the Regulatory and Guidance Library (RGL) website: http://rgl.faa.gov.

1-4. Background. The original issue paper process was established to keep track of outstanding certification issues that had previously been handled through letters and verbal exchanges. The lack of a formal coordination process between the FAA and the applicant resulted in many unresolved certification issues that were not recognized until late in the program. With the development of issue papers, management and the project team have a vehicle to

document the negotiation and resolution of certification issues with the applicant while maintaining a standardized position within the FAA.

1-5. Implementation. FAA project teams (this includes ACOs and directorate staff), must use the issue paper procedures in this order to track the resolution of significant technical, regulatory, and administrative issues that occur during the type certification process, during a type validation process, or for any other types of FAA approvals where project specific directorate (accountable directorate), or policy office guidance is required.

Chapter 2. What Is An Issue Paper?

2-1. Why Use an Issue Paper?

a. Issue papers provide a structured means for accomplishing the necessary steps in the type certification and type validation processes. Type certification includes projects for type certificates (TCs), amended TCs, supplemental type certificates (STCs), amended STCs, and type design changes. They are also used for other types of approvals where directorate or policy office guidance is required, for example PMA projects. They provide a structured means for describing and tracking the resolution of significant technical, regulatory, and administrative issues that occur during a project. The issue paper process establishes a formal communication vehicle for addressing significant issues between the applicant, the FAA, and if applicable, the importing or the exporting civil aviation authority (CAA). They are also very useful in resolving novel or controversial technical issues. Issue papers form a valuable reference for future type certification programs and for development of regulatory changes. By describing significant or precedent-setting technical decisions and the rationales employed, they are ideal source documents. For example, a certification summary report (if required by the accountable directorate) may be generated by extracting the final issue resolution from the issue papers (omitting any proprietary information).

b. For type validation programs, if the FAA is the validating authority (VA), we use issue papers mainly to address differences between FAA and the certificating authority (CA) airworthiness standards and interpretations. When the CA and FAA airworthiness standards and interpretations are identical, we rely on the CA to the maximum extent possible. This reliance includes accepting the CA's issue paper or equivalent in place of an FAA issue paper. Some directorates normally require an FAA cover issue paper to apply a CA issue paper. In certain cases, even when FAA and CA airworthiness standards and interpretations are identical, we still need to write our own issue paper. For example, we write issue papers for equivalent safety findings per 14 CFR § 21.21(b)(1). We also write issue papers on the certification basis (G-1) and other unique import requirements (refer to FAA Order 8110.52, *Type Validation and Post Type Validation Procedures*, for more information).

2-2. Types of Issue Papers.

a. Method of Compliance (MoC). The most common type of issue paper defines a particular method of compliance that requires directorate or policy office coordination as a result of peculiarities in the type design or the need to define specific conditions and/or establish the environment under which substantiation must be shown.

b. Equivalent Level of Safety (ELOS). An issue paper is the vehicle for documenting the evolution and conclusion of the request for an ELOS finding. ELOS findings will be granted when literal compliance with a certification regulation cannot be shown and compensating factors exist which can be shown to provide an ELOS (see 14 CFR § 21.21(b)(1)). The ACO documents the finalized ELOS finding by preparing an ELOS memorandum containing information the

accountable directorate needs for review and approval. The development and processing of the ELOS memorandum must occur concurrently with the conclusion development stage of the issue paper process. The ACO sends the ELOS memorandum to the accountable directorate for approval and, since the issue papers must be finalized (closed) prior to the issuance of a certificate, the ELOS memorandum must also be approved by the accountable directorate prior to the issuance of the certificate. Note that the ELOS memorandum process is not intended to take the place of the issue paper process. While an issue paper may be the vehicle for initially generating an ELOS finding by the FAA, the ELOS memorandum is the way to communicate to the public the technical details that are the rationale for the FAA's determination of equivalency to the level of safety intended by the regulations. The ELOS memorandum also serves the important purpose of documenting those critical aspects of the finding that must be maintained for continued airworthiness. See appendix C in this order for an ELOS memorandum template.

> **Note:** An ELOS finding and an equivalent safety finding (ESF) have the same meaning.

c. Proposed Special Conditions. The basis for issuing and amending special conditions is found in 14 CFR § 21.16. Under the provisions of 14 CFR § 21.16, a special condition is issued only if the existing applicable airworthiness standards do not contain adequate or appropriate safety standards for an aircraft, aircraft engine, or propeller, because of novel or unusual design features of the product to be type certificated.

(1) The phrase "novel or unusual" applies to design features of the product to be certificated when compared to the applicable airworthiness standards. Special conditions are not used to upgrade the applicable airworthiness standards when novel or unusual design features are not involved.

(2) The FAA develops issue papers to address novel design features for which there are no regulations or the regulations are inadequate. We use these issue papers to develop the basis, need, and wording of special conditions. A special condition contains only such airworthiness standards as are necessary to establish a level of safety equivalent to that established by the intent of the applicable regulations. Special conditions are unique to the specific certification program for which they are issued. The FAA has delegated authority for issuing special conditions to the directorates, or to the Aircraft Engineering Division (AIR-100) for areas of responsibility not assigned to a directorate.

d. Certification Basis (G-1) designates the applicable airworthiness and environmental (i.e., noise, fuel venting and exhaust emissions) regulations, including special conditions, that must be met for certification as stated in 14 CFR §§ 21.17, 21.21, 21.25, 21.27, 21.29, or 21.101, as applicable. It also designates the applicable Special Federal Aviation Regulations (SFARs) and records any exemptions granted (Ref. 14 CFR § 11.25). This issue paper must provide the definitive justification for selecting the certification basis, including specific amendment levels. An exemption is a temporary or permanent allowable noncompliance with a particular regulation for a specific product.

e. Determination of Compliance (G-2) provides a statement of the FAA procedural requirements, including those that define the applicant's responsibilities for showing compliance. This issue paper is designated to capture the "compliance checklist" which shows the regulatory requirement and the method of compliance proposed by the applicant for each regulation identified in the certification basis. For foreign-manufactured products to be eligible for an import type certificate (TC), the applicant shows, and the FAA finds, that the type design complies with the U.S. type certification basis established in the G-1 issue paper. Under certain bilateral agreements, the exporting CAA may be authorized to approve data used for showing compliance to the requirements in the G-1 issue paper. Therefore, the G-2 issue paper will also outline the responsibilities of the applicable exporting CAAs. The G-2 issue paper is also used on type validation projects involving the importing CAA.

f. Environmental Consideration (G-3) designates the applicable environmental regulations, that is, the regulations establishing standards for aircraft noise and, for turbine-engine powered airplanes, fuel venting, and exhaust emissions.

> **Note:** It is acceptable to combine the contents of issue papers G-1 thru G-3 into a single master issue paper G-1.

g. Export (Import) Country Requirements (G-4). For products exported from the U.S., the G-4 issue paper cites the extent of FAA findings of compliance with the importing country's airworthiness requirements on the importing CAA's behalf. For products imported to the U.S., the G-4 issue paper serves to establish the exporting CAA's function for airworthiness certification, operating matters, and additional compliance findings relative to those defined in the G-1 issue paper.

h. New Information. It is conceivable that an issue paper might be required to examine issues that arise from a better understanding of environmental or other hazards that were not well-understood in the past or that did not exist previously. Such items could include new scientific information on weather threats, such as the quantification of microbursts that occurred in the last 30 years, the substantiation of super-cooled liquid droplets environment, cabin ozone hazards, and other potential circumstances where the applicable regulations were developed unaware of the threats.

i. Type Validation. When the FAA is the validating authority (VA), the FAA validation team writes an issue paper for each validation item (VI). A VI is a certification item or airworthiness standard of particular interest to the VA. VIs identify aspects of the design or proposed method of compliance (MoC) that warrant further technical involvement (beyond familiarization) by the VA. VIs are primarily used to define and explain VA airworthiness standards and interpretations that are distinct from the certificating authority (CA) airworthiness standards. We also write issue papers on the certification basis (G-1) and other import requirements (Refer to FAA Order 8110.52 for more information).

j. Other Types of FAA Approvals (Optional). For other FAA approvals (e.g., PMA and 14 CFR § 21.305(d) or § 21.8 (effective 04/16/2011)) projects, use discretion in order to document

k. Administrative Issue Papers. May be used to define policy, to interpret policy or to document the resolution of issues when adherence to policy becomes controversial.

Chapter 3. Significant Issues.

3-1. Determination of Significant Issues.

a. FAA technical personnel work closely with the applicant to achieve the earliest feasible identification of significant issues that may require special emphasis for resolution. This step usually requires more-detailed technical discussions, correspondence, and review of design data and hardware. We encourage the applicant to raise questions or issues that may require time or special study for resolution so all significant issues are identified as soon as possible.

b. Simple documentation of a particular method of compliance that is consistent with existing directives, advisory circulars, or other written FAA policy, or that does not fall into one of the categories listed in paragraph 3-2, does not require an issue paper. Nevertheless, document the method of compliance in the compliance checklist as part of the certification plan and retain it in the project file. It is important to emphasize that the accountable directorate ultimately makes the determination of what projects will require the use of issue papers such as the G series described previously in chapter 2, paragraph 2-2.

c. Advise the applicant that routine items relative to showing compliance and work relationships do not need to be raised as significant issues unless some special problems are anticipated or develop during the course of the project. The project team can handle routine items with the applicant. Decisions and actions are documented in correspondence, data submittals, and file records of meetings, conversations, and events. In this regard, the FAA recognizes that what may be routine with an experienced applicant may need to be treated as a significant issue with an applicant who has limited or no current FAA type certification experience.

3-2. Items Considered Significant Issues.

a. Type Certification Basis (G-1) as described in chapter 2, paragraph 2-2.d. of this order.

b. Determination of Compliance (G-2) as described in chapter 2, paragraph 2-2.e. of this order.

c. Environmental Consideration (G-3) as described in chapter 2, paragraph 2-2.f. of this order. The FAA must obtain certain information for compliance with U.S. statutory environmental requirements in addition to the 14 CFR requirements listed in the certification basis (see G-1 issue paper).

(1) For new TCs, the aircraft proposed for certification are required to comply with the appropriate provisions of 14 CFR parts 34 and 36 as part of the certification basis. If this is accomplished with no exemptions granted, the FAA does not require the additional requirements of an environmental assessment, a finding of no significant impact (FONSI), or an environmental impact statement (EIS), under FAA Order 1050.1, *Environmental Impacts: Policies and*

Procedures. If exemptions to either 14 CFR part 34 or part 36 are granted, an environmental assessment is required under the provisions of Order 1050.1.

(2) For new type certificates, the FAA must also issue a finding of regulatory adequacy per the Noise Control Act of 1972 (Public Law 92-574), section 611. This finding is in addition to required compliance with the applicable 14 CFR part 36 noise limit levels.

d. Export (Import) Country Requirements (G-4) – as described in chapter 2, paragraph 2-2.g in this order.

e. Special Conditions as required by the accountable directorate. They include the issuance of special conditions per either 14 CFR §§ 21.16 or 21.101(d), as applicable. Note that the wording in the issue paper for a proposed special condition will become the foundation for the wording of the notice to be published in the Federal Register.

(1) An ACO drafts proposed special conditions in conjunction with an application for a TC, an amended TC, or a supplemental type certificate (STC). Formulate the proposal with full participation by the accountable directorate and with an invitation to participate to any other interested FAA offices deemed appropriate. Forward the proposals, with full particulars and justification for each special condition, to the accountable directorate.

(2) In cases where the FAA determines a special condition is appropriate, and applicants indicate that they have or will voluntarily comply; continue with the special condition proposal. This is included in the certification basis and forms an exact record of the airworthiness regulations applicable to the product or modification.

f. Proposed Equivalent Levels of Safety Findings (proposed or made under the authority of 14 CFR § 21.21(b)(1)), as described in appendix C.

g. Unsafe Features or Characteristics that could preclude certification as defined in 14 CFR § 21.21(b)(2).

h. Areas of New Technology or novel design that do not require a special condition, but might require the development of an acceptable means of compliance with existing regulations that would set a national precedent.

i. Changes in Interpretation. Include new interpretation/policy of existing regulations using precedent-setting new technology in an issue paper at the early stages of the certification project.

j. All other issues during type certification projects that become controversial or might otherwise require Type Certification Board (TCB) action to resolve (refer to paragraph 4-1. a.(13) below for the description of duties of a TCB). An example of this is a non-standard method/means of compliance proposed by an applicant.

k. For PMA Projects in order to document and resolve compliance issues where

directorate or policy office guidance is required.

l. For Type Validation Programs, for each validation item (VI). A validation item is a certification item or airworthiness standard of particular interest to the VA. VIs identify aspects of the design or proposed method of compliance that warrant further technical involvement (beyond familiarization) by the VA. VIs are primarily used to define and explain VA airworthiness standards and interpretations distinct from CA airworthiness standards.

Chapter 4. Issue Paper Process.

4-1. Issue Paper Development. This chapter covers the development process for issue papers related to type certification projects. This chapter also applies to type validation programs, but using different terminology. For more information regarding the use of issue papers in type validation programs refer to FAA Order 8110.52. Please see figure 1 in this order for a flow chart of the issue paper process. See the issue paper format in appendix A of this order. A sample issue paper illustrating the evolution through numerous stages appears in appendix B of this order.

a. Roles and Responsibilities:

(1) **Accountable Directorate.** Directorate team coordination and standards staff manager sign-off on the issue paper is required at any stage of the issue paper that will be released to the applicant. In the case of an ELOS finding, the accountable directorate approves the ELOS memorandum prior to the issuance of the design approval. The accountable directorate must inform the certification office of their evaluation and concurrence of the ELOS separate from the issue paper using the ELOS memorandum. In general, the primary purpose of accountable directorate review is to do the following:

(a) Be the lead for and ensure standardization of the issue paper by comparing it with similar issue papers from other projects, and

(b) Provide current policy related to the significant issue.

(2) **ACO Manager.** For major type certification projects the ACO manager will be a member of the TCB. In the event of an impasse, the ACO manager may assist in the resolution after considering the views of all affected parties. Also, in the case of an ELOS finding, the ACO manager will sign the memo containing the ACO recommendation to the accountable directorate for approving an ELOS.

(3) **Aircraft Engineering Division (AIR-100)**. When a significant issue pertains to technical policy or procedural policy overseen by the AIR-100 branches, (Certification Procedures Branch (AIR-110), Technical Programs and Continued Airworthiness Branch (AIR-120), Avionic Systems Branch (AIR-130), Delegation and Airworthiness Programs Branch (AIR-140) or Unmanned Aircraft Program Office (AIR-150)); they must be coordinated with when formulating the “FAA POSITION” and “CONCLUSION”.

(4) **AEG (Aircraft Evaluation Group).** When a significant issue pertains to operational and maintenance aspects, the AEG must be coordinated with when formulating the FAA Position and the Conclusion stages.

(5) **CMACO (Certificate Management ACO).** Since this is the ACO managing a product’s TC and the continued airworthiness, the project ACO must coordinate the issue paper with the CMACO.

(6) **CSTAs (Chief Scientific Technical Advisors).** The program/project manager must include the appropriate CSTAs in the issue paper coordination process when significant technical issues arise involving practices to certify state-of-the-art technology.

(7) **Importing/Exporting Civil Aviation Authority (FCAA).** We must use issue papers mainly to address differences between FAA and the certificating authority (CA) airworthiness standards and interpretations. We will also write issue papers on other unique import requirements. In these cases, the program/project manager must incorporate the importing/exporting CAA's position, verbatim, if possible in the issue paper.

(8) **Manufacturing Inspection District Office (MIDO).** When a significant issue pertains to manufacturing processes, production certification, or airworthiness certification, the program/project manager must include the MIDO in the issue paper coordination.

(9) **Project ACO (PACO).** The PACO is the ACO working the project. The PACO must coordinate the issue paper with the accountable directorate, AIR-100, the CMACO (if a follow on project such as an STC or PMA), and other AFS offices, as appropriate.

(10) **Program/Project Manager (Originator).** The program/project manager makes the decision to generate an issue paper for significant technical, regulatory, or administrative issues. The program/project manager:

- Obtains concurrence from the ACO;
- Transmits issue paper to the accountable directorate through the project officer;
- Coordinates with the applicant and obtains applicant position (when necessary, discusses and clarifies the FAA position with the applicant);
- Obtains concurrence from AEG, MIDO, AIR-100, and CSTA's as needed;
- Obtains accountable directorate concurrence and approval of the issue paper;
- Develops conclusion and transmits it to the applicant; and
- Places results in official project file.

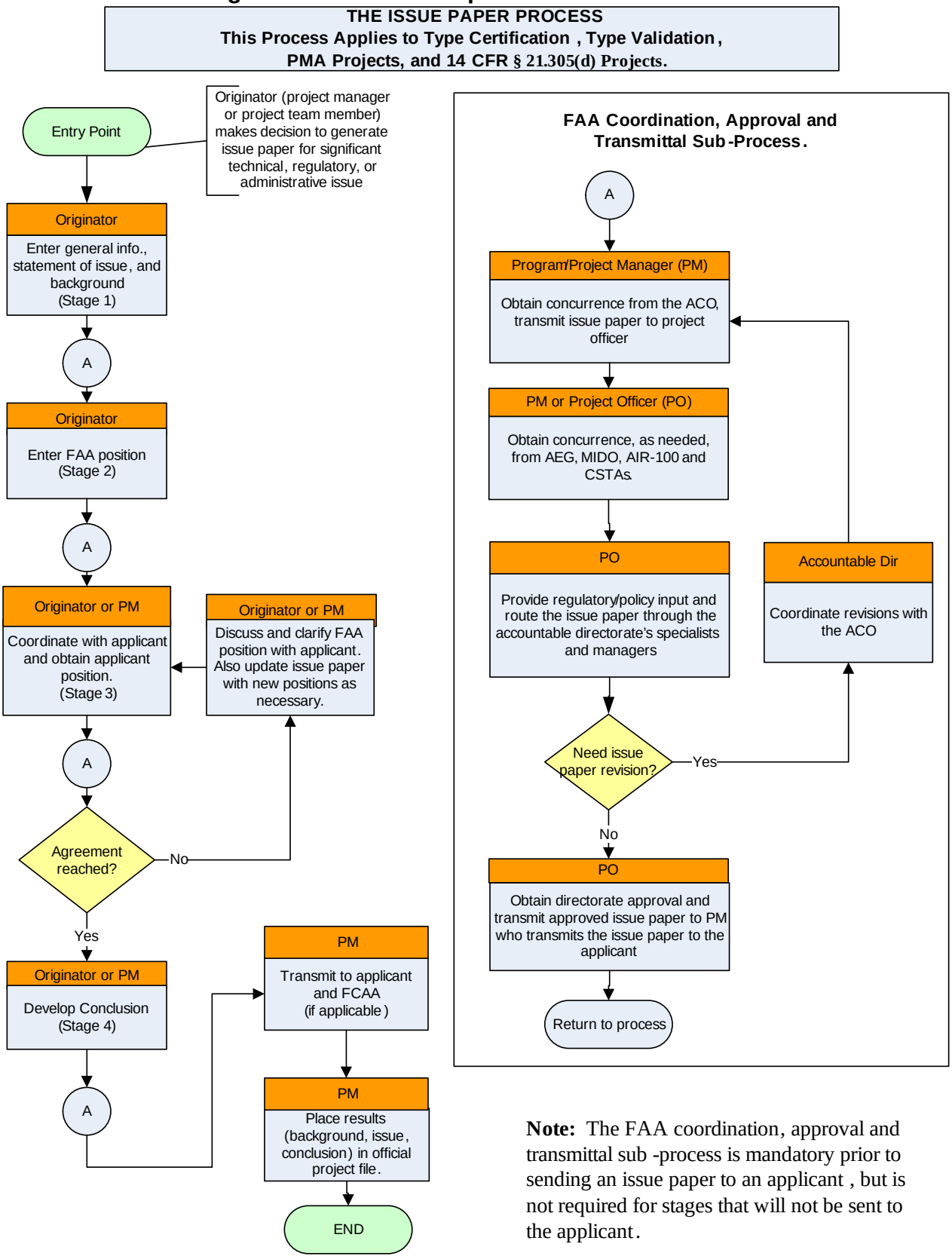
(11**) Project Officer.** The project officer provides regulatory/policy input to the project team or TCB through the program manager and routes the issue paper through the accountable directorate's specialists and manager in order to keep them apprised of the issue and to obtain their concurrence.

(12) **Technical Specialist.** For type certification projects, new issue papers can be proposed to the TCB by technical specialists for technical issues in their areas, through the program/project manager at any time during the process before final type certification. When an

issue paper is first presented to the type certification board (TCB), identify each branch/technical specialist that might be involved in the resolution of the issue (by means of their FAA mail routing codes). TCB grid coordination need only include the involved branches specified in the "Branch Action," the accountable directorate, and the chairman.

(13) **Type Certification Board or Project Team.** The TCB is the FAA management team responsible for acquainting the applicant with the certification process, resolving significant problems, processing and coordinating issue papers, and establishing a schedule for the overall accomplishment of the type certification project. A TCB is established only for projects of a certain magnitude. When a TCB is not necessary, the certification team manages the project and performs any functions of the TCB to the degree necessary.

Figure 1. The Issue Paper Process Flow Chart.



Note: The FAA coordination, approval and transmittal sub -process is mandatory prior to sending an issue paper to an applicant , but is not required for stages that will not be sent to the applicant.

Note 1: This process can be applied to other types of FAA approvals by omitting the usage of TCB or TCBM since PMA projects do not require the creation of a TCB.

Note 2: For 14 CFR part 21 issues consider AIR-100 as the accountable directorate.

Note 3: The ACO program/project manager conducts MIDO/AEG coordination as well as CSTA's coordination, as appropriate.

Note 4: There are certain cases where a Stage 2 issue paper will include an "APPLICANT POSITION" statement prior to the "FAA POSITION" Statement. These cases would include an applicant's request for an equivalent level of safety where the FAA does not have a position until the applicant has made their request. This may also apply when an applicant proposes a new method of compliance that is outside of written FAA policy.

b. For type certification projects, new issue papers can be proposed to the TCB by the program/project manager, or by technical specialists for technical issues in their areas, through the program/project manager at any time during the process before final type certification. See appendix A for issue paper format and instructions in detail. When a significant issue pertains to technical policy overseen by AIR-120 or AIR-130, or a significant issue pertains to operational/maintenance suitability requirements overseen by the Flight Standards Service - Aircraft Evaluation Group (AEG) offices; they must be coordinated with when formulating the "FAA POSITION" and "CONCLUSION". For significant issues pertaining to policy overseen by AIR-110, AIR-140, or AIR-150, they must be coordinated with when formulating the "FAA POSITION" and "CONCLUSION". Draft issue papers are developed by the project team members for each significant issue as early in the program as feasible.

(1) Ideally, issue papers are proposed at the preliminary TCBM and the "STATEMENT OF ISSUE" section of the issue paper is developed. However, the major emphasis at Stage 1 of each issue paper is to raise the issue to the FAA's and applicant's attention as early as feasible, providing concise "STATEMENT OF ISSUE" language that is clearly understood by all parties concerned with resolution. (Before releasing an issue paper at Stage 1, present the "BACKGROUND" information).

(2) Overall, the first priority is identifying, rather than resolving, significant issues. It is not expected that all significant issues will be identified or resolved before the preliminary TCBM. Quite often identification of issue papers does not occur until the significant features of the type design are discovered later in the certification process. These issue papers are generally issued at Stage 2, which includes the "FAA POSITION" statement. Issue papers must be developed, revised, and concluded as a concerted effort between the FAA, exporting or importing CAA (if applicable), and the applicant.

Note: There are certain cases where a Stage 2 issue paper will include an "APPLICANT POSITION" statement prior to the "FAA POSITION" Statement. These cases would include an applicant's request for an equivalent level of safety where the FAA does not have a position until the applicant has made their request. This may also apply when an applicant proposes a new method of compliance that is outside of written FAA policy.

(3) If the applicant has been made aware of the need for an issue paper, it is recommended that the issue paper first introduced to the applicant also contain the "FAA POSITION" statement that will be initially released at Stage 2. However, if controversial aspects and/or the nature of the issue require immediate and formal notification of the issue, release the issue paper at Stage 1.

(4) The bulk of the type certification work is accomplished through ongoing technical assessment activities by the project team members and other technical participants outside the framework of formal TCBMs. Progress on all items is documented by normal entries in the official type certification project file. Progress on significant issues is indicated by updating existing issue papers or, if new significant issues are raised, by developing new issue papers.

Note: Issue papers are considered "draft issue papers" until they are coordinated through the appropriate TCB members and the accountable directorate, their initials appear on the board coordination grid, and the accountable directorate has signed the issue paper.

(5) Program/project managers are expected to keep the accountable directorate, AIR-100, MIDO, AEG, and the CSTAs, when needed, fully apprised of the technical issues encountered throughout the evaluation process. Project officers are expected to keep the specialists and managers at the accountable directorate apprised of the technical issues. The program/project manager should obtain accountable directorate assistance in formulating the "FAA POSITION" and "CONCLUSION" before the issue paper is submitted to the project team members for coordination. Directorate team coordination and standards staff manager sign-off on the issue paper is required at any stage of the issue paper that will be released to the applicant. The primary purpose of accountable directorate review is to do the following:

(a) Be the lead for and ensure standardization of the issue paper by comparing it with similar issue papers from other projects, and

(b) Provide current policy related to the significant issue.

(6) All new or revised issue papers are coordinated with the applicant, the project team members, and the accountable directorate. If coordination with both the applicant and project team members happens without impasse, the issue papers can be closed by revising the issue paper without holding a formal TCBM. Refer to paragraph 6-2 for procedures to follow in the event of an impasse.

(7) Before completing the "CONCLUSION" of the issue paper, try to reach an agreement with the applicant on the issue paper's final requirements, which is in the "CONCLUSION". If further discussions require the applicant to revise their position, revise the issue paper and the conclusion accordingly.

(8) Approval by the accountable directorate manager, or as otherwise delegated, of the "CONCLUSION" statement constitutes definition of the FAA requirement. The issue paper will be sent to the applicant directly or through the exporting CAA, for foreign projects. Further discussions, correspondence, or appeals must focus on new information or proposals. Responses to such efforts must refer to the current stage and date of the issue paper. They also must indicate whether:

(a) The new effort is considered to provide new information warranting a reconsideration of, and revision to, the issue paper, or

(b) The issue paper conclusion stands as written.

(9) Do not send draft copies of issue papers to the applicant or to the importing or exporting CAA (if applicable), unless help in developing the issue paper is needed. For example, the applicant's help may be requested to confirm the technical correctness of the "BACKGROUND." Also, it may be necessary for applicants to review their position as written in the issue paper to determine if it was conveyed properly. If it is unavoidable to send a draft issue paper, ensure that the accountable directorate has reviewed the contents of the draft issue paper, mark the issue paper as a draft and ensure that the applicant is aware that the issue paper is subject to change until final signature by the accountable directorate. Do not provide a draft copy of the FAA Position to the applicant without the consent of the accountable directorate project officer.

c. Issue papers that are closed and signed by the accountable directorate are subject to review and may be released to the public because they document a final position, action, or decision taken by the FAA. In response to a request under the Freedom of Information Act (FOIA) concerning an FAA certification program, these issues papers must be reviewed according to procedures applicable to the office receiving the request. Conversely, the author of an issue paper may refer to official project file documents in the body of the issue paper to reduce the number of details.

d. Issue papers that are not closed by the accountable directorate will be considered documents prepared by government employees for use in effecting project management containing opinions, advice, deliberations, and recommendations made in the course of developing official action by the government. These will not be considered part of the official action. Therefore, these open issue papers will be considered as material exempt from public disclosure to the fullest extent possible under FOIA, section 552(b)(5) as implemented by Department of Transportation regulations, 49 CFR § 7.13. Open issue papers may be retained by the certificate-issuing ACO as working papers for corporate memory.

Chapter 5. Equivalent Level of Safety Memorandum Process.

5-1. Process Steps:

a. Applicants are responsible for making the request for an ELOS finding. They submit to the ACO the proposed ELOS with all necessary data required for the FAA to develop the issue paper and to make the finding of equivalent safety.

b. The project ACO then submits the issue paper to the accountable directorate that includes the proposed ELOS in the "APPLICANT POSITION" including proposed wording in the "FAA POSITION" in response to the applicant's proposal. An issue paper is the vehicle for documenting the evolution and conclusion of the request for an ELOS finding.

c. The development and processing of the ELOS memorandum must occur concurrently with the conclusion development stage of the issue paper process. The certification office sends the ELOS memorandum to the accountable directorate for approval and, since the issue papers must be finalized (closed) prior to the issuance of a design approval, the ELOS memorandum must also be approved by the accountable directorate prior to the issuance of the design approval. The accountable directorate must inform the certification office of their evaluation and concurrence of the ELOS separate from the issue paper using the ELOS memorandum. The contents of the memorandum will be kept as part of the permanent records of the project files and published on the FAA RGL.

> **Note:** The ELOS memorandum process is not intended to take the place of the issue paper process.

d. The ELOS memorandum is addressed from the accountable directorate to the certification office.

e. The issue paper originator or the project manager constructs the ELOS memorandum on behalf of the accountable directorate from the issue paper, ensuring that the memorandum contains the information called for in paragraphs 5-1.f.(1) through f.(6) below.

> **Note:** See appendix C for the standard ELOS memorandum template. Also**,** refer to the RGL ELOS section for examples of ELOS memorandum documents.

f. When preparing the ELOS memorandum it must contain:

(1) An introduction of the background information including an explanation of the need for the ELOS,

(2) A listing of the applicable regulation(s),

(3) A description of the features of the design or other program elements that require the ELOS finding,

(4) A description of any design changes, limitations, or equipment imposed that are the compensating features that allow granting the equivalency,

(5) An explanation of how the actions taken provide an ELOS to that intended by the regulation, and

(6) The ACO recommendation to the accountable directorate for approving the ELOS.

> **Note:** Because the content of this memorandum will be kept as part of the permanent records of the project files, ensure that any sensitive or proprietary information is kept out of the memorandum.

g. After their review and concurrence of the ELOS memorandum, the accountable directorate must then sign the memorandum that was prepared by the certification office.

> **Note:** The accountable directorate staff will assign a reference number to the ELOS memorandum to allow its access from the FAA's RGL electronic database. This ELOS memorandum number is listed in the TCDS under the certification basis section (TCs and ATCs) or in the limitations and conditions section of the STC certificate.

Chapter 6. Project Coordination.

6-1. Technical Assessment Activities and Follow-on Type Certification Board Meeting (TCBM).

a. After the initial type certification board meeting (TCBM), new or updated draft issue papers are coordinated with the applicant and the TCB members.

b. Participant (TCB member or applicant) coordination on a new or updated issue paper means only:

- The participant understands all statements and agrees that the "branch action"(see appendix A, paragraph 1.b.9.) involvement is correct, and
- The resolution status is accurately reflected by the paper.

c. Obtain the accountable directorate's assistance (as well as AIR-100's and other FAA organizations assistance when appropriate) when formulating the "FAA POSITION" and "CONCLUSION" before the issue paper is submitted to the TCB members for coordination.

d. Accountable directorate's concurrence with an issue paper at any stage is indicated by the initials and dates of the specialists and their managers, the project officer's initials and date, and by the signature of the accountable directorate designated representative at the last page of the issue paper. When appropriate, AIR-100 and other FAA organizations' concurrence is indicated by a branch manager's initials and date being inserted in the coordination grid by the project manager or project officer after telephonic, electronic or written authorization.

6-2. Impasse.

a. If an impasse is reached between TCB members, the ACO manager and/or directorate management should resolve it after considering the views of all affected parties. The resulting decision becomes the basis for the FAA position in the issue paper, which is signed by the designated representative of the accountable directorate.

b. A formal interim TCBM may be called by the TCB chairman to hear conflicting views and to resolve the issue. Either a TCB member or the applicant may make a request for a formal TCBM. If the chairman agrees that a formal TCBM is necessary, an agenda will be developed and discussions limited to the agenda items, to ensure that all participants have an opportunity to be fully prepared and adequately represented. Interim TCBMs must be scheduled to group together a number of agenda items unless resolution of a major issue is essential to avoid an unacceptable delay in the project.

c. Most issues may be resolved by coordinating issue papers among the TCB members without a meeting.

d. Approval by the accountable directorate of the conclusion stated in an issue paper following concurrence from TCB chairman, AIR-100, and other FAA organizations when

appropriate, constitutes definition of the FAA requirement. Further discussions, correspondence, or appeals must focus on new information or proposals. Responses to such efforts must refer to the current stage of the issue paper, and indicate whether the new effort is considered to provide new information warranting a reconsideration and revision to the issue paper, or whether the issue paper conclusion stands as written.

e. If the applicant does not comply with the criteria of the issue paper, the project will not be closed and the approval will not be issued. An issue paper may be reopened if a new issue is identified, or at the applicant's request with the concurrence of the project ACO.

Appendix A. Issue Paper Format and Template

1. PURPOSE: The format used in drafting issue papers is shown in figure 3 of this appendix. Instructions for completing the issue paper format are below, using the same item numbers as indicated in figure 2.

a. The coordination grid is included in figure 2 of this appendix. The complete coordination grid can be inserted as the first sheet or at the end of the electronic file of the issue paper. The program/project manager will sign off on the coordination grid and the routing of the issue paper will be done electronically or by hardcopy, as appropriate. Do not forward the completed coordination grid sheet to the applicant as part of the issue paper.

> **Note:** Use the coordination grid to get management's initials. The contact list will only contain the initials of the FAA program/project manager, project officer, and the originator. In some cases, the contact list will also contain the initials of the technical specialist.

b. Use the format and coordination grid presented in this section for all certification projects. Contact the applicable project officer if the issue paper template or coordination grid is not available to you.

(1) **Project:** Project, model designation, and project number or identifier.

Example: Acme Aircraft Company
Model AC-850
Project No. TCXXXXSE-T

(2) **Reg. Ref:** List relevant regulations, including any special conditions issued on the model.

Examples: 14 CFR Examples: 14 CFR §§ 25.1309; or §§ 25.1309, 25.1453; or
Special Condition P-3 (25-78-NW-55/Aircraft Model)

(a) The following related information must be shown, as appropriate:

1. If a special condition has been, or will be, proposed.

Example: 14 CFR § 29.1318
Special Condition Proposed

2. If an exemption petition has been filed by the applicant.

Example: 14 CFR § 27.954
Exemption Petition Pending (Granted or Denied)

3. If an equivalent safety finding is an issue.

Example: 14 CFR § 25.789
Equivalent Safety Finding Requested (Granted or Denied)

(3) **NATIONAL POLICY REF.** List national policy documents relevant to the issue, such as advisory circulars, national directives, and precedent-setting special conditions issued for a similar situation, or policy letters. If there are no known established national policy statements on the issue, state "None."

Examples: Advisory Circular 20-XX
Order 8110.XX
Notice N8110.XX
Special Condition 23-ACE-XX/Aircraft Model

(4) **SUBJECT:** Identify the issue by a short, concise, descriptive subject title.
Example: Predictive Windshear System, or
Unwanted Automatic Thrust Lever Movement

(5) **ITEM:** Use an alphanumeric issue identifier, for example, G-1, A-2, P-5, and so forth.

(a) The first digit is an alphabetic identification of the technical area – of prime concern using:

G – General

A – Airframe

S – Systems and Equipment

P – Propulsion

E – External Environmental Threats

N – Noise

F – Flight Test

C – Crashworthiness/Interiors

Q – Quality assurance or article conformity

O – Operational

M – Maintenance

(b) The numeric character will indicate the sequential number of the issue paper. When performing an amended TC project, we suggest that the sequence of issue papers for the derivative model start with next available number from the baseline project. The General G series issue papers do not follow the typical numbering convention for the character following the

identifier. For example, the certification basis will always be identified as G-1.

(c) For large certification programs, we consider it useful to utilize additional technical subject identifiers (e.g., SA for systems avionics, SE for systems electrical, SW for systems software, ES for environmental systems, EE for ETOPS, etc.). The use of these additional identifiers can make the tracking and the identification of the issue paper easier.

(6) **STAGE:** The stage, plus the date, indicates the level of development and content of the issue paper:

Stage 1 – Indicates that the "STATEMENT OF ISSUE" has been defined and that corollary discussion and "BACKGROUND" information has been included.

Stage 2 – Indicates that the "FAA POSITION" has been defined. In certain cases, an "APPLICANT POSITION" may precede the "FAA POSITION" at Stage 2. These cases would include an applicant's request for an equivalent level of safety where the FAA does not have a position until the applicant has made their request. There may also apply when an applicant proposes a new method of compliance that is outside of written FAA policy.

Stage 3 – Incorporates the "APPLICANT'S POSITION" and/or " THE Importing/Exporting CAA POSITION," if applicable. May also include a revised applicant's position in response to the FAA's position.

Stage 4 – Includes the "CONCLUSION" of the issue.

(a) Issue papers need not always start with Stage 1. Most issue papers will start as Stage 2 with the "FAA POSITION" defined. If the applicant's position is available and included in the initial release of an issue paper, identify the issue paper as Stage 3. In this case, include a note at the end of the applicant's position. The note identifies that the applicant has not formally seen the FAA's position and that a response is required before the issue paper can be closed.

(b) Each stage of the issue paper may have more than one revision, which is tracked by the stage and date. For example, if the FAA's position needs to be modified for clarity based on the information contained in the "APPLICANT'S POSITION," an additional FAA statement must be made during development of Stage 3. The modified FAA position will be titled as "FAA POSITION" (dated month, day, and year) while keeping the original "FAA POSITION" statement intact. The corresponding revised applicant's position, if required, will be incorporated in the same fashion, including the date of the subsequent "APPLICANT POSITION" statement. Follow this process for minor changes to the issue paper.

(c) If one party to a controversy significantly changes its position, retain only the most current position statement to avoid confusion. Do not retain the record of earlier abandoned arguments or positions, which have no remaining relevance to the resolution. Add a statement to the new position that the previous position has been superseded and where the previous position can

be found.

(7) **DATE:** The date, along with the stage, indicates the revision status of the issue paper. Following incorporation of proposed changes, the originator will insert the date reflecting the latest revision. The stage and date of an issue paper define its revision level. Document minor variances in the FAA requirements for which the applicant would have no response in the "CONCLUSION" statement. When revising an issue paper without changing the stage, it is important to document why the issue has been revised.

(8) **ISSUE STATUS:** The Issue Status block indicates the current resolution status of the issue, that is, "OPEN," "CLOSED," or "REOPEN." The issue status must indicate "CLOSED" after the FAA and the applicant have reached an agreement on the resolution of the issue. If an agreement is not reached, the issue paper can be closed when the FAA reaches a final conclusion. If the issue paper has been closed and circumstances warrant reopening the issue paper, then the Issue Status block must indicate "REOPEN." After closing the issue paper and after the type certificate has been issued the publication of the final special condition is documented in the TCDS.

> **Note:** The "ISSUE STATUS" does not indicate compliance status. TCB team should verify that compliance is shown by the applicant in accordance with the issue paper conclusion.

(9) **BRANCH ACTION:** When an issue paper is first presented to the type certification board (TCB), each branch that believes it may be involved in the resolution of the issue will be identified under this item by means of their FAA mail routing codes. For example, the FAA mail routing code for the AIR-100 branches AIR-120 and 130 would indicate a need to coordinate with AIR-120 and AIR-130 for technical policy overseen by them. TCB grid coordination need only include the involved branches specified in the "Branch Action," the accountable directorate, and the chairman.

(10) **COMPLIANCE TARGET:** The compliance target (for example, pre-TC, pre-TIA, pre-STC, and so forth) indicates the milestone when the applicant must have completed the required tasks and have the data submitted and approved to demonstrate compliance to the applicable requirements.

(11) **TYPE OF ISSUE PAPER:** The issue paper "Subheader" indicates the type of issue paper. Insert one of the following titles in this area:

- "Means of Compliance,"
- "Equivalent Safety Finding,"
- " Proposed Special Condition,"
- "Certification Basis,"
- "Determination of Compliance,"
- "Environmental Conditions,"
- " Unsafe Features or Characteristics that could preclude certification as defined in 14 CFR § 21.21(b)(2)," or
- "Import (Export) Requirements."

Note: If none of the previous titles adequately describe the type of issue paper, the title in the subheader may state "issue paper."

(12) **STATEMENT OF ISSUE:** The "STATEMENT OF ISSUE" must be a clear and concise statement that is easily understood by all concerned parties. It must identify and summarize the significant or contentious issue and state why the issue paper is needed. The language in the "STATEMENT OF ISSUE" must be factual and not carry inflammatory references.

Example: "The airplane design has exits located relatively close to the engine inlets. Safe slide operation and passenger evacuation may be adversely affected during emergency deployment of escape slides/rafts with engines operating. The current regulations do not address this situation."

(13) **BACKGROUND:** In the "BACKGROUND" section, describe the issue in detail and develop both sides of the issue. However, make every effort to keep it as concise as possible without compromising understanding for resolution. Reference to letters or other documents is encouraged to cover details. At each subsequent revision or stage, this section may be sufficiently complete so that reference to previous stages/revisions is not necessary to understand the status of resolution.

(14) **FAA POSITION:** In the "FAA POSITION" indicate the FAA's concerns, opinions, and actions the applicant is required to accomplish to resolve the issue. Give the applicant direction that will enable compliance to the requirements without dictating design.

(15) **Importing/Exporting CAA POSITION:** Incorporate the importing/exporting CAA's position, if applicable, into this section, verbatim, if possible.

(16) **APPLICANT POSITION:** The FAA must incorporate the applicant's statements, usually verbatim, when submitted in writing. If the applicant's position is submitted in writing, reference the letter number and date at the beginning of the section. If the applicant does not elect to provide a statement for inclusion in the issue paper, include a statement to that effect.

(17) **PAGE:** Identify the page numbers of the issue paper. The first page and coordination grid do not have page numbers.

(18) **CONCLUSION:** The "CONCLUSION" statement must document the resolution of the issue. If agreement cannot be reached, the FAA may write its final conclusion. Develop the "CONCLUSION" statement only after the applicant and exporting CAA, as applicable, has had opportunity to comment on the entire FAA position or any revisions to the FAA position.

(a) The "CONCLUSION" statement must contain the final requirements required of the applicant. For bilateral certification projects, the conclusion must also state the requirements for the exporting CAA and whether the exporting CAA is required to find compliance to the requirements of the issue paper.

(b) It is not necessary to restate the FAA position if the requirements in the "FAA POSITION" section have not changed. A reference to the requirements contained in the "FAA POSITION" in this case will suffice.

(c) The wording of a "proposed special condition" will be provided as the tentative conclusion until the Notice of Special Condition is issued in the Federal Register. If the special condition has been issued on another project, repeat the **exact** words here. Reference the NPRM docket number in this paragraph when it is available.

(d) When an issue paper has been released and then it is determined that is no longer needed, conclude the issue paper at Stage 4 stating that the issue paper is withdrawn.

(19) **SIGNATURE:** The signature line must be the office title only (NO name), and includes the date of signature. The date in the first page header must correspond to the date signed.

(20) **CONTACTS:** Contacts must be the originator (technical specialist), the program/project manager, and project officer, as applicable.

(21) **FILE NAME:** Indicate the current file name of the document.

Figure 2. Issue Paper Coordination Grid

DO NOT REMOVE FROM ISSUE PAPERS (ATTACHED)

ISSUE PAPER

COORDINATION GRID

APPLICANT NAME_____
MODEL_____ **PROJECT NO.**_____
ISSUE PAPER NUMBER:_____ **STAGE**_____ **DATE**_____
SUBJECT:_____
PROJECT/PROGRAM MANAGER:_____

SPECIALISTS

	ACO	ACO	ACO	ACO	DIR	DIR
Branch/Org Name						
Initials Date						

SPECIALISTS

	DIR	PM	PO	AEG	CSTA	MIDO
Branch/Org Name						
Initials Date						

ACO BRANCH MANAGEMENT

Branch/Org Name						
Initials Date						

ACCOUNTABLE DIRECTORATE STANDARDS STAFF MANAGEMENT

	111	**112**	**113**	**114**	**110**	
Branch/Org Name						
Initials Date						

For technical and procedural policy overseen by the Aircraft Engineering Division branches (AIR-110, AIR-120, AIR-130, AIR-140 or AIR-150), add them to the grid below, as appropriate.

ENGINEERING DIVISION STANDARDS STAFF MANAGEMENT

	110	**120**	**130**	**140**	**150**	**AIR-100**
Branch/Org Name						
Initials Date						

Figure 3. Issue Paper Format

ISSUE PAPER

PROJECT: (1)

ITEM: (5)

STAGE: (6)

REG. REF.: §§ (2)

DATE: (7)

NATIONAL POLICY REF.: (3)

ISSUE STATUS: (8)

SUBJECT: (4)

BRANCH ACTION: (9)

COMPLIANCE TARGET: (10)

TYPE OF ISSUE PAPER (11)

STATEMENT OF ISSUE: (12)

BACKGROUND: (13)

FAA POSITION: (14)

IMPORTING/ EXPORTING CAA POSITION: (15)

APPLICANT POSITION: (16)

(Header information)

\- -

PROJECT: (1)

ITEM: (5)

STAGE: (6)

DATE: (7)

PAGE: (17)

\- -

CONCLUSION: (18)

(19)

Accountable Directorate

Date

Aircraft Certification Service

CONTACTS:

(20)

TITLE	**NAME**	**PHONE**
Originator		
Project Manager		
Project Officer		

FILE NAME: (21)

Appendix B. Sample Issue Paper

ISSUE PAPER

PROJECT: GENERIC AIRPLANE COMPANY
Model XYZ

ITEM: (5)

STAGE: (6)

REG. REF.: 14 CFR § 25.865

DATE: (7)

NATIONAL POLICY REF.: AC 20-135, Aviation Safety Release No. 415

ISSUE STATUS: Open

SUBJECT: Fire Protection of Structure and Systems in Fire Zones

BRANCH ACTION: Airframe

COMPLIANCE TARGET: Pre-TIA

1. Statement of Issue:
Engine mounts, flight controls, and other flight structure in, or adjacent to, designated fire zones must be fireproof or shielded so that they are capable of withstanding the effects of fire. Fireproof is defined in 14 CFR part 1 as "equivalent to steel." The engine mount structures on the Generic model airplanes are made of titanium, which may not be equivalent to steel in terms of load-carrying capability at elevated temperatures. Also, some structural components are composed of elastomerics.

2. Background:
Title 14 CFR § 25.865 was added to part 25 by amendment 23 in 1970, although the same requirement had already existed for rotorcraft for many years. Aviation Safety Release No. 415 dated November 9, 1961 states that the component must sustain the loads and perform the function for which it was designed when subjected to a test flame of 2,000 degrees for 15 minutes. This document formed the basis of the current advisory material for transport and utility helicopters (advisory circular (AC) 29-2A, *Certification of Transport Category Rotorcraft,* and AC 27-1, *Certification of Normal Category Rotorcraft*) and has been used for transport category airplane certification.
Although AC 20-135, *Powerplant Installation and Propulsion System Component Fire Protection Test Methods, Standards and Criteria,* contains fire protection criteria for powerplants, it does not contain any means of compliance with 14 CFR § 25.865. Past programs have generally relied on the criteria in Aviation Safety Release No. 415 although the criteria stated in it are general and subject to varied interpretations. The certification program for the generic model XYZ was delayed because of controversy concerning the means of compliance with 14 CFR § 25.865. The following FAA position is developed from the criteria provided in AC 29-2A for transport category rotorcraft, with some modifications appropriate to transport airplanes.

3. FAA Position:
The titanium and elastomeric structures must be able to sustain the appropriate loads with a positive margin of safety for any foreseeable powerplant fire condition. A test must be performed in which the structures are subjected to a test flame of 2,000 ± 50 degrees for a period of 15 minutes. The heat flux must be as described in AC 20-135, and loads appropriate to the fire condition must be imposed during the test.

In the absence of a more rational determination of the expected flight loads, the structure must be able to support limit flight loads without failure for at least 5 minutes. After 5 minutes and until the end of 15 minutes, the engine may be assumed to be shut down, and the structure must be able to support the discrete source damage loads described in AC 25.571-1A. Freedom from flutter and whirlmode must also be established.

The fail-safe features of the design may be taken into account if it can be shown that foreseeable fire conditions could not affect the integrity of the alternate load paths.
Validated analyses may be used to represent the transient temperature conditions and strength under the applied loads.

IMPORTING/EXPORTING CAA POSITION:

APPLICANT POSITION:

CONCLUSION:

_____ _____

Transport Airplane Directorate Date

Airplane Certification Service

CONTACTS:

TITLE	NAME	INITIALS DATE	PHONE
Originator			
Project Manager:			
Project Officer:			

Filename:

Appendix C. ELOS Memorandum Template

Federal Aviation
Administration

Memorandum

Date: [Type date here]

To: Manager, _____ACO, [Routing Symbol]

From: Manager, Accountable Directorate, AXX-100

Prepared by: [Originating ACO Engineer, Routing Symbol]

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Company X's project on a Model Y, FAA Project # LLXXXXCC-X

ELOS Memo#: LLXXXXCC-X-Z-Z

Regulatory Ref: 14 CFR § XX.XXX

This memorandum informs the certificate management aircraft certification office of an evaluation made by the Accountable Directorate on the establishment of an equivalent level of safety finding for the *[enter aircraft designations]*.

Background

Top level description of project, and the need for an equivalent safety finding.

Applicable regulation(s)

14 CFR §§ XX.YYY, XX.ZZZ.

Regulation(s) requiring an ELOS finding

14 CFR § XX.YYY

Description of compensating design features or alternative Methods of Compliance (MoC) which allow the granting of the ELOS (including design changes, limitations or equipment need for equivalency)

As noted, describe the design features which related to granting of the ELOS removing any proprietary information. Note that the Method of Compliance (MoC) may be subject of an ELOS finding.

Explanation of how design features or alternative Methods of Compliance (MoC) provide an equivalent level of safety to the level of safety intended by the regulation

This section discusses how said compensating features previously discussed meet the level of safety intended by the regulation. Note that the Method of Compliance (MoC) may be subject of an ELOS finding.

FAA approval and documentation of the ELOS finding:

The FAA has approved the aforementioned equivalent level of safety finding in project issue paper Z-Z. This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The Accountable Directorate has assigned a unique ELOS Memorandum number (see front page) to facilitate archiving and retrieval of this ELOS. This ELOS Memorandum number must be listed in the Type Certificate Data Sheet under the Certification Basis section (TCs & ATCs) or in the Limitations and Conditions section of the STC. An example of an appropriate statement is provided below.

Equivalent Level of Safety Findings have been made for the following regulation(s):

14 CFR § XX.YYY section Title (documented in ELOS Memo LLXXXXCC-X-Z-Z)]

Manager, Accountable Directorate,
Aircraft Certification Service

Date

ELOS Originated by ACO:	ACO Manager	Routine Symbol

Appendix D. Definitions

a. Accountable Directorate – the aircraft certification directorate with final authority, accountability, and responsibility for type certification programs, the development of airworthiness standards, and development and standardization of technical policy for an assigned product and a specific part of Title 14 of the Code of Federal Regulations (14 CFR).

b. Aircraft Certification Office (ACO) - the aircraft certification directorate's engineering operational element. This office administers and secures compliance with agency regulations, programs, standards, and procedures governing the type design of aircraft, aircraft engines, or propellers. The term "ACO" also refers to the Engine Certification Office (ECO), the Rotorcraft Certification Office (RCO), the Special Certification Office (SCO), and the Military Certification Office (MCO).

c. Aircraft Engineering Division (AIR-100) - responsible for the development and standardization of regulations, national directives, policy, procedures, and advisory material for continued operational safety, type certification, design approval, and for authorization and oversight of representatives of the Administrator for civil aeronautical products. The following branches carry out AIR-100 responsibilities:

(1) Certification Procedures Branch (AIR-110):

(a) Develop regulations and standardize national regulatory policy and guidance for 14 CFR part 21, subparts A (except as indicated in AIR-140 responsibilities), B, C, D, E, and K, as they relate to design certification.

(b) Develop and coordinate national directives, including standards, policy, and procedures for type certification and design approvals.

(c) Evaluate and respond to petitions for exemption and rulemaking.

(d) Coordinate directorate actions on national type certification issues.

(e) Coordinate AIR's regulatory program.

(f) Reviews certification procedures of other countries to support the Service's BASA activities.

(g) Lead and work with international authorities to promote aviation safety and improve air commerce.

(2) Technical Programs Branch (AIR-120):

(a) Develop regulations and standardize national policy and guidance on airworthiness technology, operational equipment, and the technical standard order (TSO) process for 14 CFR part 21, subpart O.

(b) Develop and revise TSOs (other than electronic and system technologies), and harmonize these standards with other CAAs.

(c) Evaluate and respond to petitions for exemption and rulemaking.

(d) Coordinate directorate action on national technical standards.

(e) Coordinate applied research and development, technical analyses, and regulatory feasibility for developing aviation products throughout government and industry.

(f) Coordinate with other CAAs and the international aviation community on TSO regulations, policy, process, and product standard specifics.

(g) Serve as the Service process and quality focal point for responses to both National Transportation Safety Board (NTSB) and FAA safety recommendations.

(3) Avionics Systems Branch (AIR-130):

(a) Develop regulations and standardize national regulatory policy on approval of airborne communications, navigation, and surveillance equipment and their integration into the National Airspace System (NAS).

(b) Work with other aviation authorities harmonizing aircraft certification standards and practices for avionics.

(c) Help CAAs and directorates comply with avionics regulations.

(d) Coordinate applied research and development, technical analyses, and regulatory feasibility assessments of developing avionics throughout government and industry.

(e) Stipulate and assess safety standards for design and airworthiness of avionics installations and equipment.

(f) Identify and support new and emerging avionics technologies.

(g) Develop TSOs, orders, and advisory circulars (AC) for electronic and system technologies.

(h) Evaluate and respond to petitions for exemption and rulemaking.

(4) Delegation and Airworthiness Programs Branch (AIR-140):

(a) Develop regulations, policy, and standardize national guidance on continued airworthiness and continued operational safety for 14 CFR part 39 and 14 CFR §§ 21.3, 21.50, 21.99, and 183.29, as they relate to engineering.

(b) Develop, coordinate, and recommend national standards, policy, and procedures for delegation and continued airworthiness for 14 CFR part 21, subparts J, M, and Special Federal Aviation Regulation (SFAR) 36.

(c) Coordinate directorate actions in engineering delegation and continued airworthiness issues.

(d) Maintain and update the Regulatory and Guidance Library (RGL), a set of searchable electronic databases containing regulatory, guidance, and aviation product information.

(e) Distribute airworthiness directives (AD) and special airworthiness information bulletins (SAIB) to owners, operators, and foreign authorities.

(f) Maintain databases and distribute lists of supplemental type certificates (STC), parts manufacturer approvals (PMA), and TSO authorizations.

d. Aircraft Evaluation Group (AEG) - assigned to each Aircraft Certification Directorate, address Flight Standards considerations during type certification, evaluate operational and maintenance aspects of certification, and evaluate continuing airworthiness requirements of newly certificated or modified products and parts.

e. Amended TC – an approval for a change to a TC, made by the TC holder. Only the holder of the TC may apply for an amended TC.

f. Certificating Authority (CA) – the aviation authority responsible for the original type certificate or supplemental type certificate. Certificating authority means the FAA for applicants/certificate holders located in the United States, EASA for applicants/certificate holders located in the European Community and in JAA member states, for products under JAA procedures. The certificating authority may also be referred to as the exporting authority.

g. Certificate Management ACO (CMACO) – the ACO managing the product's TC. The CMACO also manages the continued airworthiness for all products it approves for as long as the products are in service.

h. Certification Plan – the applicant's intended means for showing that a product complies with the applicable regulations.

i. Chief Scientific and Technical Advisors (CSTA) - technical consultants in specific, specialized topics, use their technical expertise to help AIR apply regulatory policies and practices to certify state-of-the-art technology, influence the research agendas of U.S. and foreign aviation industries, military, academia, and other research institutions, and interact with and assist other U.S. Government agencies and foreign CAAs in technology-related issues.

j. Methods of Compliance (MoC) - analyses, tests, or inspections used by the applicant to demonstrate compliance with the certification and validation airworthiness standards. MoC include descriptions of methodologies employed, assumptions used in applying the methodologies, and discussions of the procedures used to verify the methodologies.

k. Manufacturing Inspection Office (MIO) – oversees the manufacturing inspection district offices (MIDO) and manufacturing inspection satellite offices (MISO) in its geographic area and provides organizational leadership and technical guidance to these offices. The MIO

manages all geographically located production facilities and designees. They administer the airworthiness certification policies, office staffing, and internal budget allocation.

l. MIDO – subordinate offices to the MIO (see MIO above) in its geographical area. This office oversees production certification, airworthiness certification, approval holders (manufacturing facilities), and designees, in its geographical area. MIDOs support ACOs during type certification programs; they investigate and submit enforcement reports on noncompliance with 14 CFR parts. MIDOs investigate and ensure corrective measures, for service difficulties, are implemented as identified in the quality system.

m. MISO – a subordinate, geographically remote, office that reports to a MIDO and is responsible for the same activities as the MIDO.

n. Parts Manufacturer Approval (PMA) – an FAA design and production approval to manufacture replacement and modification parts that comply with the regulations. See Order 8110.42, Parts Manufacturer Approval Procedures.

o. Product – for type certification, an aircraft, an aircraft engine, or a propeller. The word product has other meanings in different contexts, such as export airworthiness approvals (see 14 CFR § 21.1(b)).

p. Project ACO (PACO) – the ACO working a certification project. The PACO may need to coordinate with the CMACO, if the project is a follow-up certification activity, such as an STC or PMA.

q. Project Team - The project team normally consists of the following:

(1) A program/project manager,

(2) Engineers or technical specialists,

(3) Flight test pilots and flight test engineers,

(4) Manufacturing inspectors,

(5) AEG operations and airworthiness inspectors, and

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

Note: The certification project team is comprised of the individuals needed to conduct a certification project. A TCB is an FAA management team.

r. Significant Change – as defined in Order 8110.48, How to Establish the Certification Basis for Changed Aeronautical Products, a change to the TC is significant to the extent it changes one or more of the following: general configuration, principles of construction, or the assumptions used for certification. The change is not extensive enough to be considered a substantial change. See FAA Order 8110.48 for more information.

s. Supplemental Type Certificate (STC) – a type certificate that the FAA issues to an applicant who alters a product by introducing **a major change** in type design (as defined by 14 CFR § 21.93(a)). The STC process is essentially the same as the TC process.

t. Technical Specialist - for this document, "technical specialist" means any specialist involved in certification activities **(this term is not restricted to an engineer with that job title).**

u. Type Certificate (TC) – a design approval issued by the FAA when the applicant demonstrates that a product complies with the applicable regulations. As defined by 14 CFR § 21.41, the TC includes the type design, the operating limitations, the Type Certificate Data Sheet(TCDS), the applicable regulations, and other conditions or limitations prescribed by the Administrator. The TC is the foundation for other FAA approvals, including STCs, PMAs, and production and airworthiness approvals.

v. Type Certification Board (TCB) – an FAA management team responsible for acquainting the applicant with the certification process, resolving significant problems, and establishing a schedule for the overall accomplishment of the type certification project. A TCB is established only for projects of a certain magnitude. When a TCB is not necessary, the certification team or project team manages the project and performs any functions of the TCB to the degree necessary.

(1) The members of a TCB include:

(a) The ACO manager (or representative),

(b) Directorate project officer (for significant projects),

(c) Project manager, and

(d) Other members including the managers, supervisors, or senior personnel from the appropriate engineering disciplines; and flight test, manufacturing inspection, and assigned AEG personnel.

(2) **Additional TCB Participants.** The TCB may request other participants, such as those listed below, to join the certification team or participate on an advisory basis in the TCB meetings.

(a) ACO engineers, flight-test pilots, and manufacturing inspectors,

(b) Washington Headquarters specialists,

(c) CSTAs,

(d) Additional AEG and FSDO personnel,

(e) The project officer from the accountable directorate (if not serving as a board member),

(f) Representatives of the CMACO, other ACOs, and directorates, and

(g) The applicant and its representatives.

w. Type Certification Board Meeting (TCBM) – any formal meeting between the TCB and the applicant to coordinate the move to the next project phase or resolve issues preventing progress to the next phase. Examples include preliminary, interim, pre-flight, and final TCBMs.

x. Type Design – the engineering definition of a particular product. The type design consists of the following (see 14 CFR § 21.31):

(1) Drawings and specifications,

(2) Dimensions, materials, and processes,

(3) Airworthiness limitations,

(4) (for primary category aircraft, if desired) A special inspection and preventive maintenance program designed to be accomplished by an appropriately rated and trained pilot- owner, and

(5) Any other data necessary to allow, by comparison, the determination of the airworthiness, noise characteristics, fuel venting, and exhaust emissions (where applicable) of later products of the same type.

y. Type Validation - type certification of an imported product to the importing country's applicable requirements or airworthiness standards. Process leads to issuance of new and amended type certificates when FAA is the VA. When EASA is VA, type validation leads to issuance of an EASA type certificate valid in all EASA member states. When an NAA of a non-EU JAA member state is VA, type validation leads to a letter of recommendation for type certificate from the JAA to the NAAs. Term also describes the general principles adopted by FAA and EASA/ JAA for determining appropriate VA involvement in validations, whether they are new or amended type certifications, or major level 1 design changes.

z. Validating Authority, (VA) – the aviation authority responsible for validating the CA type certificate or supplemental type certificate. Validating authority means EASA for applicants/approval holders located in the United States, and FAA for applicants/approval holders in the European Community and JAA member states. Validating authority may also be called the importing authority.

aa. Validation Authority Certification Basis – it comprises the applicable airworthiness standards identified by the VA plus any exemptions, special conditions, and equivalent level of safety findings declared by VA to establish design acceptance of an imported product or to certify the design change.

bb. Validation Item, (VI) – the certification item or airworthiness standard of particular interest to the VA. Three types of VI are: a Significant Standards Difference (SSD), a project validation item, and generic validation item.

Appendix E. Administrative Information

1. Distribution. Distribute this order to Washington headquarters branch levels of the Aircraft Certification Service, Flight Standards Service, and to branch level of the regional aircraft certification directorates and regional flight standards divisions; to all aircraft certification field offices (ACOs), all manufacturing field offices (MIOs, MIDOs, and MISOs), the International Policy Office (AIR-40), and to the FAA Academy Regulatory Support Division.

2. Authority to Change This Order. The issuance, revision, or cancellation of the material in this order is the responsibility of the AIR Engineering Division (AIR-100). The Certification Procedures Branch (AIR–110) makes changes, as required, to carry out the FAA's responsibility to provide guidance on the standardized usage of issue papers.

3. Suggestions for Improvement. If you find deficiencies, need clarification or want to suggest improvements to this order, send FAA Form 1320-19, Directive Feedback Information, (written or electronically) to the Aircraft Certification Service, Administrative Services Branch, AIR-510, Attention: Directives Management Officer. You can also send a copy to the Aircraft Engineering Division, AIR-100, Attention: Comments to Order 8110.112. If you urgently need an interpretation, you can contact the Certification Procedures Branch (AIR-110) at 202-385-6311. Always use Form 1320-19, in appendix E, to follow up each verbal conversation.

4. Records Management. Refer to Orders 0000.1, FAA Standard Subject Classification System; 1350.14, Records Management; and 1350.15, Records, Organization, Transfer, and Destruction Standards; or your office Records Management Officer or Directives Management Officer for guidance regarding retention or disposition of records.

Appendix F. FAA Form 1320-19 Directives Feedback Information

U.S. Department
of Transportation

**Federal Aviation
Administration**

Directive Feedback Information

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

Subject: Order 8110.112

To: Directive Management Officer, 510

(*Please check all appropriate line items)*

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

☐ Recommend paragraph _____ on page _____ be changed as follows:
(attach separate sheet if necessary)

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

☐ Other comments:

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

Submitted by: _____ Date: _____

FTS Telephone Number: _____ Routing Symbol: _____

FAA Form 1320–19 (dated 10/98)