Supporting Statement
**Enhanced Airworthiness Program for Airplane Systems/Fuel Tank Safety (EAPAS/FTS) Final Rule**

## A. Justification

**1. Explain the circumstances that make the collection of information necessary. Identify any legal or administrative requirements that necessitate the collection. Attach a copy of the appropriate section of each statute and regulation mandating and authorizing the collection of information.**

(1) Section § 25.1711 requires that electrical wiring interconnection systems (EWIS) components be labeled to identify the component, its function, and its design limitations, if any. If the EWIS is part of a system that requires redundancy, the labeling must also include component part number, function, and separation requirements for bundles. This specificity of labeling is required to ensure that wiring systems are properly maintained and treated with the appropriate cautions for preserving the safety features built into their designs. See APPENDIX A.

(2) Section § 26.11 requires that existing type certificate (TC) holders develop Instructions for Continued Airworthiness (ICA) for EWIS. Applicants for approval of design changes will be required to develop revisions to those EWIS ICA for any modifications to the airplane that might affect them. Section § 25.1729 and Appendix H apply the EWIS ICA requirement to future applicants for TCs. EWIS ICA will be used by operators to prepare their maintenance programs. This requirement is necessary to ensure that wiring is properly maintained and inspected to avoid problems that could affect safety. See APPENDIX B.

(3) Section 26.11 also requires that TC holders submit to the FAA a plan detailing how they intend to comply with its requirements. This information will be used by the FAA to assist the TC holder with compliance. The compliance plan is necessary to ensure that TC holders

fully understand the requirements and are able to provide the information needed by the operators for the operators' timely compliance with the rule. See APPENDIX B.

(4) Anyone operating an airplane under part 121 will be required to revise their existing maintenance program to incorporate the maintenance and inspection tasks for EWIS contained in the EWIS ICA developed in accordance with Appendix H. This requirement is necessary to ensure that wiring is properly maintained and inspected to avoid problems that could affect safety. See APPENDIX C.

(5) As a result of the revised maintenance programs that will be required for airplanes operating under part 121, maintenance personnel will be performing inspections and maintenance procedures to address safety issues specific to wiring systems. Although this rule does not specifically require new training, existing § 121.375 requires that certificate holders or persons performing maintenance have a training program to ensure that persons determining the adequacy of such work (including inspectors) are fully informed about the procedures and techniques involved and are competent to perform them. In order to comply with this requirement in relation to requirements for revised maintenance programs for EWIS included in this rule, certificate holders will be required to develop any additional training program needed to ensure that the appropriate personnel are adequately prepared to carry out the revised maintenance programs. See APPENDIX C.

(6) The revision to part 25 Appendix H requires that future manufacturers include acceptable EWIS practices in their ICA, presented in a standard format. This information will be used by maintenance personnel for wiring maintenance and repairs. The requirement is necessary because maintenance personnel need information about cautionary tasks during maintenance that can prevent situations that could compromise safety.

Each of these rules has at its core the goal of enhancing public health and safety by working toward the elimination of transportation-related deaths and injuries.

**2. Indicate how, by whom, and for what purpose the information is to be used. Except for a new collection, indicate the actual use the agency has made of the information received from the current collection.**

(1) The EWIS wire identification information to be marked on wires required by § 25.1711 will be used by maintenance personnel for repair and cautionary tasks, and by airplane modifiers so that original safety features of the wiring system are retained during modifications. Airplane wiring is required to be labeled now, and existing information indicated on wiring is used for these same purposes. The new requirement will only enhance existing information requirements, making the wire labeling more effective as an informational tool for maintenance personnel and modifiers.

(2) The EWIS ICA required by §§ 26.11, 25.1729, and Appendix H will be used by operators to prepare their maintenance programs. This requirement is necessary to ensure that wiring is properly maintained and inspected to avoid problems that could affect safety. ICA information is currently used by operators in the development of maintenance programs. The additional information required by this rule will ensure that the safety checks implicit in all maintenance and inspections are extended to the wiring systems within the airplane.

(3) The compliance plan required by § 26.11 will be used by the FAA to assist the TC holder in complying with its requirements. This requirement is modeled substantially on "The FAA and Industry Guide to Product Certification," which is currently used for developing project-specific certification plans for type certification programs to ensure that the project proceeds in a timely manner and reaches its original goal. It is necessary in this instance because the rule also contains requirements for operators to incorporate EWIS ICA into their maintenance and inspection programs. The rule specifies a date by which the TC holder must make EWIS ICA available to operators. Beginning with that date, each operator will have 15

months to incorporate that information into its maintenance and inspection program. The operators' compliance date, 15 months after the TC holders' compliance date, is also specified in the rule. The TC holder must first produce the ICA. Then the operators must incorporate tasks based on those or other approved ICA into their maintenance programs. If the TC holder has not produced the ICA by the specified compliance date, operators will not have the information they need. If the TC holder produces the ICA 6 months late, then the operators will have only 9 months, instead of 15 months, until their specified compliance date. So the compliance plan is necessary to ensure that the TC holder is progressing towards successful completion of the ICA and that there will be no unexpected delays to prevent their timely completion.

(4) The EWIS ICA information incorporated into operators' maintenance programs will be used by maintenance personnel to maintain the integrity of airplane wiring systems. This requirement is necessary to ensure that wiring is properly maintained and inspected to avoid problems that could affect safety.

(5) The training developed for EWIS maintenance procedures will be used by operators to train their maintenance personnel and those performing maintenance for them to ensure that they are adequately prepared with cautionary information and information about hazardous situations to inspect for while performing maintenance on wiring.

(6) Standard wiring practices manuals (SWPM), which contain the specifics of wiring maintenance requirements for each particular airplane, often differ from manufacturer to manufacturer and so are difficult for maintenance personnel to find specific information in. The requirement for a standard format is meant to correct this. Because of this rule, manufacturers will change their standard wiring practices manuals. The manuals will be used by maintenance personnel to find specific maintenance information for the airplane they are working on.

**3. Describe whether, and to what extent, the collection of information involves the use of automated, electronic, mechanical or other technological collection techniques or other forms of information technology, e.g. permitting electronic submission of responses, and the basis for the decision for adopting this means of collection.**

Government Paperwork Elimination Act efforts are ongoing to improve information technology through internal automation systems designed to collect, organize, store, and transmit diverse information. We have worked with industry to develop systems for allowing automated data entry of safety reporting data to reduce the burden to industry.

This rule does not impose any new requirements for means of submitting information, either to the FAA or to operators. With the exception of the wire labeling required by § 25.1711, which is simply an extension of wire labeling procedures already performed by industry, nothing in this rule would preclude electronic submission of required information.

**4. Describe efforts to identify duplication. Show specifically why any similar information already available can be used for the purpose described in Item 2 above.**

The EWIS information requested by §§ 25.1711, 25.1729, 26.11, and revised Appendix H is essential data available only from TC holders and applicants seeking changes to those TCs. It does not duplicate existing data. The maintenance and inspection program revisions will be particular to each operator's own maintenance program, and therefore not a duplication of any other available. Similarly, the training developed by operators to support EWIS maintenance and inspection programs will be specifically applicable to their existing training programs, and therefore not available elsewhere.

The FAA has made a concerted effort to avoid duplication of effort and collection of information for this rule. Because a previously issued rule requires the preparation of ICA maintenance and inspection tasks for fuel tank wiring, and therefore some wiring covered by this rule will also be covered by that requirement, this rule requires TC holders and applicants for

changes to TCs to compare those fuel tank ICA with the EWIS ICA required here, and eliminate duplication and redundancy as much as possible. Elimination of duplication and redundancy in the two sets of ICA should also make them easier to understand and easier to incorporate into maintenance procedures.

**5. If the collection of information impacts small businesses or other small entities, describe any methods used to minimize burden.**

This rule will not have a significant economic impact on a substantial number of small entities for the following reasons.

Entities potentially affected by this rule include part 25 manufacturers, applicants for future amended and supplemental type certificates, and part 121 operators of large transport category airplanes.

The FAA uses the size standards from the Small Business Administration for Air Transportation and Aircraft Manufacturing, which specifies companies having less than 1,500 employees as small entities.

The current United States part 25 airplane manufacturers include: Boeing, Cessna Aircraft, Gulfstream Aerospace, Learjet (owned by Bombardier), Lockheed Martin, McDonnell Douglas (a wholly-owned subsidiary of The Boeing Company), Raytheon Aircraft, and Sabreliner Corporation. These manufacturers will incur type certificate (TC) and amended TC costs. Because all U.S. transport-aircraft category manufacturers have more than 1,500 employees, none are considered small entities.

Future supplemental type certificate (STC) applicants will incur additional compliance costs. These applicants will incur the cost only if the applicant believes the expected revenue from additional sales will exceed the expected cost. While future STC costs will be passed on to

airplane operators, it is not possible to determine which operator will buy and install such STCs. Because expected revenue will be greater than the expected cost, the FAA believes there will not be a significant impact on a substantial number of STC applicants.

The FAA measured the economic impact on small operators by dividing the compliance cost by the firm's annual revenue. The impact of this final rule is below ½ of one percent for eighteen small entities where data was available. For the remaining 3 where data was available, the cost impact is 0.83%, 1.08% and 1.68% of revenues. Therefore, the FAA believes that this final rule will not have a significant economic impact on a substantial number of small-business part 121 operators.

The FAA has determined that: No part 25 manufacturers are small entities, there will not be a significant impact on a substantial number of ATC or STC applicants, and the estimated operator compliance cost as a percent of annual revenue will not be significant.

**6. Describe the consequence to Federal program or policy activities if the collection is not conducted or is conducted less frequently, as well as any technical or legal obstacles to reducing burden.**

If the information requested in this rule is not collected, airplane wiring systems will not display the additional information detailing design limitations, functions, separation requirements, and other data that will allow those systems to be maintained appropriately, treated with the proper precautions, and protected from modifications that might jeopardize the safety features they were designed with. Wiring systems will not be singled out in the regular maintenance program for the special inspection and maintenance procedures necessary to maintain those safety features. Maintenance personnel will not be equipped with the specialized knowledge pertinent to wiring that will allow them to perform their procedures properly. If the information called for in this rule is not collected and applied, electrical wiring incidents leading

to smoke, fire, and fatal accidents in transport category airplanes will continue to occur, and the safety improvements developed from the years of research and investigation into airplane wiring failures that went into this final rule will never be applied.

**7. Explain any special circumstances that would cause an information collection to be conducted in a manner inconsistent with 1320.5(d)(2)(i)(viii).**

This collection of information is consistent with the guidelines in 5 CFR 1320.5(d)(2).

**8. Describe efforts to consult with persons outside the agency to obtain their views on the availability of data, frequency of collection, the clarity of instructions and recordkeeping, disclosure, or reporting format (if any) and on data elements to be recorded, disclosed, or reported.**

Manufacturers, operators, foreign civil aviation authorities, and other groups representing industry and the public were active participants in the development of this rule through their representatives in the Aging Transport Systems Rulemaking Advisory Committee (ATSRAC). This rule was published as an NPRM on October 6, 2005, vol. 70, no. 193, pgs. 58507-58561. Information describing the collection requirements proposed therein was included in the NPRM and comments were requested at that time. We received 39 comment submissions about the proposed rules from 34 commenters. We did receive comments on the development of ICA by design approval holders, the compliance plan, training programs, revision of standard wiring practices manuals, the labeling of wiring, and FAA approval of the ICA, the compliance plan, and the maintenance program changes. These comments, and our responses, are discussed in the final rule. They are also attached as APPENDIX D.

**9. Explain any decision to provide any payment or gift to respondents, other than remuneration of contractors or grantees.**

This rule includes no payment or gift of any kind to any respondent.

**10. Describe any assurance of confidentiality provided to respondents and the basis for the assurance in statute, regulation, or agency policy.**

No assurance of confidentiality is provided or needed by this rule, except for practices currently in place to prevent publication of proprietary information.

**11. Provide additional justification for any questions of a sensitive nature.**

There are no sensitive questions in this collection of information.

**12. Provide estimates of hour burden of the collection information. This information should provide number of respondents, frequency of response, annual burden, and an explanation of how the burden was estimated.**

To provide estimates of the burden to collect information, the FAA developed categories. The summary table below contains the impacted entities, average annual hours, and the corresponding average annual cost. Details of the estimates are in the paragraphs below.

| | Requirement/Entities Affected | Annual Hours | Annual Cost |
|---|---|---|---|
| 1a | TC Labeling-Labor | 1,788 | $89,400 |
| 1b | STC Labeling- Labor | 6,953 | $347,634 |

| | | | |
|---|---|---|---|
| 2a | EZAP - Existing TC Holders | 11,450 | $858,720 |
| 2b | EZAP - Future TC Applicants | 7,156 | $536,700 |
| 2c | EZAP - Future STC Applicants | 6,283 | $471,225 |
| 2d | ICA Approval | 96 | $7,200 |
| 3 | Compliance Plan Development and Approval | 128 | $9,600 |
| 4 | Operators Revise Maintenance Program | 2,550 | $191,268 |
| 5 | Training Development | 2,208 | $165,600 |
| 6 | SWPM | 734 | $55,040 |
| | **Total** | **39,346** | **$2,732,387** |

1a. With 3,500 labels installed in 123 affected aircraft (respondents) annually, we estimate a total of 430,500 labels (responses). The total estimated annual average hours are 1,788. Using the burdened hourly cost for a mechanic ($50), the annual labor cost burden for TC identification is $89,400.

1b. For the STC identification labor costs, we estimate roughly 1,673,750 additional labels (responses) will be installed annually (103 STCs (respondents) X 250 labels X 65 aircraft). Thus the identification requirements for STCs will require an annual burden of approximately 6,953 hours. Using the burdened hourly cost of a mechanic ($50), the annual labor cost for the identification requirement to airplane modifiers is $347,634.

2a. TC holders (20 respondents) will develop Instructions for Continued Airworthiness (ICA) for EWIS. Over the period of analysis, the FAA estimates that this rule will require roughly

11,450 average annual engineering hours resulting in an average annual cost of $858,720 (using the fully burdened hourly rate of $75 for an engineer).

2b. Future TC applicants will develop ICA for EWIS. The FAA estimates one part 25 type certificate per year (1 respondent), with the average annual labor hours to perform the analysis estimated at 7,156. This will result in average annual costs of $536,700.

2c. Future applicants for supplemental type certificates will also perform EZAP. The total annual number of affected STCs is 103 (respondents). The annual burden of 6,283 hours is calculated by multiplying the annual number of STCs (103) by the hourly estimate of time required to perform EZAP on an STC (61). Using the estimate of 61 hours per STC and the burdened hourly cost of $75, the corresponding costs to perform EZAP on 103 STCs annually will be $471,225.

2d. The FAA estimates 60 labor hours per airplane model to develop plans and submit data to the FAA for approval of the ICA. The FAA estimates 2,400 hours for roughly 40 models (responses). The average annual hours are 96, with corresponding average annual costs of $7,200 (using the burdened hourly cost of $75).

3. Manufacturers will present for approval a plan describing how they intend to comply with the requirements in the final rule. Over the period of analysis, the average annual estimated cost to the manufacturer to develop the compliance plan and have it approved is $9,600, with annual hours of 128 (40 responses).

4. Operators will revise their existing maintenance program to incorporate the maintenance and inspection tasks for EWIS contained in the ICA. Over the period of analysis, the FAA estimates 63,756 total hours, or 2,550 average annual hours required to revise existing maintenance programs. Using the burdened labor cost for an engineer, the average estimated annual planning cost is $191,268 (92 respondents, 92 responses).

5. The estimated cost to develop training considers the industry's standard training factor of 200 hours per one hour of prepared training material. 600 hours is the estimated training development time for the 3-hour training course for each operator. When combined with 92 operators, the total hours would be 55,200 or 2,208 annually. Combined with the burdened hourly cost of $75, the average estimated annual cost for training development is $165,600 (92 responses).

6. Manufacturers will change their standard wiring practices manual (SWPM). The FAA calculates 734 as the average annual hours required to update manuals, resulting in an average annual burden of roughly $55,040 (5 respondents – 8 responses).

**13. Provide estimates of the total annual cost burden to respondents or recordkeepers resulting from the collection of information.**

The FAA estimates that an additional 3,500 labels might be installed in each newly certificated part 25 airplane. We calculate hardware costs by multiplying 3,500 labels per airplane by 5 cents per label, and then by the total annual estimated deliveries (123) of affected aircraft. Thus, the annual cost for TC hardware identification is estimated at $21,525.

The requirements contained in this final rule will also affect airplane modifiers when electrical wiring supplemental type certificates (STC) are installed on airplanes. Approximately 103 STCs will affect wiring and require additional identification with roughly 250 additional labels (5 cents per label) per STC installation. Since we estimate 250 labels at 5 cents per label, each STC installation will cost an additional $12.50. The annual hardware cost of $83,688 is estimated by multiplying the number of STCs (103) by the number of airplane installations (65) for each STC and finally by the additional hardware cost of $12.50.

14. **Provide estimates of annualized cost to the Federal government.**

This final rule will require FAA approval for compliance plans and for EWIS ICA for TCs and STCs. In addition, operators will obtain approval when they incorporate the ICA into their maintenance and inspection program. Summarized below are the approval costs.

| Description | Nominal Cost | Present Value Cost |
|---|---|---|
| Approve EWIS ICA for Future TCs | $126,000 | $64,429 |
| Approve EWIS ICA for Existing TCs | $156,000 | $150,897 |
| Approve EWIS ICA for Future STCs | $556,200 | $284,408 |
| Approve Inspection & Maintenance Program Revisions | $828,000 | $800,916 |
| Approve Compliance Plan | $240,000 | $232,150 |
| Total Information Collection Cost to Federal Government | $1,906,200 | $1,532,800 |

The FAA estimates 70 work hours to approve the EWIS ICA for one new TC. With one new TC approved annually and an hourly rate of $75, the total annual cost to the government is $5,250. Over the period of analysis, the estimated cost of approval for new TCs is $126,000 ($64,429).

Existing TC holders will perform an analysis and prepare EWIS ICA for operators of affected aircraft. We estimate 52 hours of FAA approval time per existing TC. Roughly 40 approvals will be required over a two-year period, with an hourly cost of $75. The corresponding cost for existing TC approval is $156,000 ($150,897 present value).

Affected STCs will take between 1 and 6 hours for an approval; as such we use 3 hours as the estimate of total hours to approve ICA for affected STCs. With roughly 103 affected STCs annually, the annual cost for STC ICA approval is $23,175. Over the period of analysis, we estimate these approvals will cost $556,200 ($284,408 present value).

The FAA will approve revised inspection and maintenance programs for part 121 operators. The approval process will take roughly 60 hours per fleet type per operator. On average, there are two fleet types for each operator, requiring 120 hours. Over a two-year period, each of the 92 operators will require approval. Thus, the total estimated government cost to approve EWIS inspection and maintenance programs is $828,000 ($800,916 present value).

Manufacturers will provide a compliance plan proposal to the FAA. One commenter indicates additional ongoing coordination will be necessary to ensure that the compliance plan is submitted. Between the manufacturer and the FAA, we estimate that there will be a total of 80 hours of ongoing communication and cooperation for compliance plan development and

approval (multiplied by 40 models). The total cost for approving the compliance plan is estimated at $240,000 ($232,150 present value).

**15. Explain reasons for program changes or adjustments reported in Items 13 or 14 of OMB Form 83-1.**

There has not been a change in the hourly estimates on a per requirement basis. The change in the number of respondents causes a change in the annual responses and subsequently in the total annual hours requested. The following table summarizes the number of respondents in the NPRM, the number of respondents in the final rule, and the reasons for the changes to the answers to question number 13 on form 83-I.

| Requirement | NPRM Number Of Respondents | Final Rule Number Of Respondents | Reason For Change |
|---|---|---|---|
| TC Labeling | 123 | 123 | No change |
| STC Labeling | 170 | 103 | In the final rule we have modified our annual estimate for the number of STC labeling respondents. The final rule estimates only wiring related STCs instead of all STCs. |
| EZAP Existing TC Holders | 20 | 20 | No change |
| EZAP Future TCs | 1 | 1 | No change |
| EZAP Future STCs | 38 | 103 | We have updated the estimated number of respondents who will be required to perform EZAP. |

| | | | |
|---|---|---|---|
| ICA Approval | 0 | 40 | Our preliminary estimates did not include approvals of ICA. |
| Compliance Plan Development and Approval | 40 | 40 | No change |
| Operators Revise Maintenance Program | 93 | 92 | We have updated the number of affected operators based upon more recent data. |
| Training Development | 93 | 92 | We have updated the number of affected operators based on more recent data. |
| SWPM | 5 | 5 | No change |

The annual estimated cost given for question 14 of form 83-I for the NPRM (labeling hardware) was $182,775 ($72,275 for TC labeling and $110,500 for STC labeling). The final rule's corresponding estimate is $105,213 ($21,525 for TC labeling and $83,688 for STC labeling). The changes have occurred because we have modified our estimate of the number of TCs and STCs that will require labeling since the NPRM.

**16. For collections of information whose results will be published, outline plans for tabulation and publication. Address any complex analytical techniques that will be used.**

There are no plans for statistical publications.

**17. If seeking approval to not display the expiration date for OMB approval of the information collection, explain the reasons that display would be inappropriate.**

No such approval is sought.

**18. Explain each exception to the certification statement identified in Item 19, "Certification for Paperwork Reduction Act Submissions," of OMB Form 83-1.**

There are no exceptions to the certification statement in Item 19, OMB Form 83-1.

# APPENDIX A - § 25.1711

**§ 25.1711 Component identification: EWIS.**

(a) EWIS components must be labeled or otherwise identified using a consistent method that facilitates identification of the EWIS component, its function, and its design limitations, if any.

(b) For systems for which redundancy is required, by certification rules, by operating rules, or as a result of the assessment required by § 25.1709, EWIS components associated with those systems must be specifically identified with component part number, function, and separation requirement for bundles.

(1) The identification must be placed along the wire, cable, or wire bundle at appropriate intervals and in areas of the airplane where it is readily visible to maintenance, repair, or alteration personnel.

(2) If an EWIS component cannot be marked physically, then other means of identification must be provided.

(c) The identifying markings required by paragraphs (a) and (b) of this section must remain legible throughout the expected service life of the EWIS component.

(d) The means used for identifying each EWIS component as required by this section must not have an adverse effect on the performance of that component throughout its expected service life.

(e) Identification for EWIS modifications to the type design must be consistent with the identification scheme of the original type design.

# APPENDIX B. –§§ 26.11, 25.1729, and Appendix H

## § 26.11 Electrical wiring interconnection systems (EWIS) maintenance program

(a) Except as provided in paragraph (g) of this section, this section applies to transport category, turbine-powered airplanes with a type certificate issued after January 1, 1958, that, as a result of the original certification, or later increase in capacity, have -

(1) A maximum type-certificated passenger capacity of 30 or more or

(2) A maximum payload capacity of 7,500 pounds or more.

(b) Holders of, and applicants for, type certificates, as identified in paragraph (d) of this section must develop Instructions for Continued Airworthiness (ICA) for the representative airplane's EWIS in accordance with part 25, Appendix H paragraphs H25.5(a)(1) and (b) of this subchapter in effect on [effective date of this final rule] for each affected type design, and submit those ICA for review and approval by the FAA Oversight Office. For purposes of this section, the "representative airplane" is the configuration of each model series airplane that incorporates all variations of EWIS used in production on that series airplane, and all TC-holder-designed modifications mandated by airworthiness directive as of the effective date of this rule. Each person specified in paragraph (d) of this section must also review any fuel tank system ICA developed by that person to comply with SFAR 88 to ensure compatibility with the EWIS ICA, including minimizing redundant requirements.

(c) Applicants for amendments to type certificates and supplemental type certificates, as identified in paragraph (d) of this section, must:

(1) Evaluate whether the design change for which approval is sought necessitates a revision to the ICA required by paragraph (b) of this section to comply with the requirements of Appendix H, paragraphs H25.5(a)(1) and (b). If so, the applicant must develop and submit the necessary revisions for review and approval by the FAA Oversight Office.

(2) Ensure that any revised EWIS ICA remain compatible with any fuel tank system ICA previously developed to comply with SFAR 88 and any redundant requirements between them are minimized.

(d) The following persons must comply with the requirements of paragraph (b) or (c) of this section, as applicable, before the dates specified.

(1) Holders of type certificates (TC): [insert date 24 months after effective date]

(2) Applicants for TCs, and amendments to TCs (including service bulletins describing design changes), if the date of application was before [effective date of final rule] and the certificate was issued on or after [effective date of final rule]: [insert date 24 months after effective date], or the date the certificate is issued, whichever occurs later.

(3) Unless compliance with § 25.1729 of this subchapter is required or elected, applicants for amendments to TCs, if the application was filed on or after [effective date of final rule]: [insert date 24 months after effective date], or the date of approval of the certificate, whichever occurs later.

(4) Applicants for supplemental type certificates (STC), including changes to existing STCs, if the date of application was before [effective date of final rule] and the certificate was issued on or after [effective date of final rule]: [insert date 30 months after effective date], or the date of approval of the certificate, whichever occurs later.

(5) Unless compliance with § 25.1729 of this subchapter is required or elected, applicants for STCs, including changes to existing STCs, if the application was filed on or after [effective date of final rule], [insert date 30 months after effective date], or the date of approval of the certificate, whichever occurs later.

(e) Each person identified in paragraphs (d)(1), (d)(2), and (d)(4) of this section must submit to the FAA Oversight Office for approval a compliance plan by [insert date 90 days after effective date of final rule]. The compliance plan must include the following information:

(1) A proposed project schedule, identifying all major milestones, for meeting the compliance dates specified in paragraph (d) of this section.

(2) A proposed means of compliance with this section, identifying all required submissions, including all compliance items as mandated in part 25, Appendix H paragraphs H25.5(a)(1) and (b) of this subchapter in effect on [effective date of this final rule], and all data to be developed to substantiate compliance.

(3) A proposal for submitting a draft of all compliance items required by paragraph (e)(2) of this section for review by the FAA Oversight Office not less than 60 days before the compliance time specified in paragraph (d) of this section.

(4) A proposal for how the approved ICA will be made available to affected persons.

(f) Each affected person must implement the compliance plan, or later approved revisions, as approved in compliance with paragraph (e) of this section.

(g) This section does not apply to the following airplane models:

(1) Lockheed L-188

(2) Bombardier CL-44

(3) Mitsubishi YS-11

(4) British Aerospace BAC 1-11

(5) Concorde

(6) deHavilland D.H. 106 Comet 4C

(7) VFW-Vereinigte Flugtechnische Werk VFW-614

(8) Illyushin Aviation IL 96T

(9) Bristol Aircraft Britannia 305

(10) Handley Page Herald Type 300

(11) Avions Marcel Dassault - Breguet Aviation Mercure 100C

(12) Airbus Caravelle

(13) Lockheed L-300

## § 25.1729 Instructions for Continued Airworthiness: EWIS.

The applicant must prepare Instructions for Continued Airworthiness applicable to EWIS in accordance with Appendix H sections H25.4 and H25.5 to this part that are approved by the FAA.

## Appendix H to Part 25—Instructions for Continued Airworthiness

Amend H25.1 by revising paragraph (a) to read as follows:

*H25.1 General.*

(a) This appendix specifies requirements for preparation of Instructions for Continued Airworthiness as required by §§ 25.1529, 25.1729, and applicable provisions of parts 21 and 26.

* * * * *

Amend H25.4 by revising paragraph (a)(1) and adding new paragraph (a)(3) to read as follows:

*H25.4 Airworthiness Limitations section.*

(a) * * *

(1) Each mandatory replacement time, structural inspection interval, and related structural inspection procedures approved under §25.571.

(2) * * *

(3) Any mandatory replacement time of EWIS components as defined in section 25.1701.

* * * * *

Amend Appendix H to part 25 by adding new paragraph H25.5 to read as follows:

*H25.5 Electrical Wiring Interconnection System (EWIS) Instructions for Continued Airworthiness.*

(a) The applicant must prepare Instructions for Continued Airworthiness (ICA) applicable to EWIS as defined by § 25.1701 that are approved by the FAA and include the following:

(1) Maintenance and inspection requirements for the EWIS developed with the use of an enhanced zonal analysis procedure that includes:

(i) Identification of each zone of the airplane.

(ii) Identification of each zone that contains EWIS.

(iii) Identification of each zone containing EWIS that also contains combustible materials.

(iv) Identification of each zone in which EWIS is in close proximity to both primary and back-up hydraulic, mechanical, or electrical flight controls and lines.

(v) Identification of -

(A) tasks, and the intervals for performing those tasks, that will reduce the likelihood of ignition sources and accumulation of combustible material, and

(B) procedures, and the intervals for performing those procedures, that will effectively clean the EWIS components of combustible material if there is not an effective task to reduce the likelihood of combustible material accumulation.

(vi) Instructions for protections and caution information that will minimize contamination and accidental damage to EWIS, as applicable, during performance of maintenance, alteration, or repairs.

(2) Acceptable EWIS maintenance practices in a standard format.

(3) Wire separation requirements as determined under § 25.1707.

(4) Information explaining the EWIS identification method and requirements for identifying any changes to EWIS under § 25.1711.

(5) Electrical load data and instructions for updating that data.

(b) The EWIS ICA developed in accordance with the requirements of H25.5(a)(1) must be in the form of a document appropriate for the information to be provided, and they must be easily recognizable as EWIS ICA. This document must either contain the required EWIS ICA or specifically reference other portions of the ICA that contain this information.

# APPENDIX C - § 121.1111

## § 121.1111 Electrical wiring interconnection systems (EWIS) maintenance program.

(a) Except as provided in paragraph (f) of this section, this section applies to transport category, turbine-powered airplanes with a type certificate issued after January 1, 1958, that, as a result of original type certification or later increase in capacity, have –

(1) a maximum type-certificated passenger capacity of 30 or more, or

(2) a maximum payload capacity of 7500 pounds or more.

(b) After [insert date 39 months after effective date], no certificate holder may operate an airplane identified in paragraph (a) of this section unless the maintenance program for that airplane includes inspections and procedures for electrical wiring interconnection systems (EWIS).

(c) The proposed EWIS maintenance program changes must be based on EWIS Instructions for Continued Airworthiness (ICA) that have been developed in accordance with the provisions of Appendix H of part 25 of this chapter applicable to each affected airplane (including those ICA developed for supplemental type certificates installed on each airplane) and that have been approved by the FAA Oversight Office.

(1) For airplanes subject to § 26.11 of this chapter, the EWIS ICA must comply with paragraphs H25.5(a)(1) and (b).

(2) For airplanes subject to § 25.1729 of this chapter, the EWIS ICA must comply with paragraph H25.4 and all of paragraph H25.5.

(d) After [insert date 39 months after effective date], before returning an airplane to service after any alterations for which EWIS ICA are developed, the certificate holder must

include in the airplane's maintenance program inspections and procedures for EWIS based on those ICA.

(e) The EWIS maintenance program changes identified in paragraphs (c) and (d) of this section and any later EWIS revisions must be submitted to the Principal Inspector for review and approval.

(f) This section does not apply to the following airplane models:

(1) Lockheed L-188

(2) Bombardier CL-44

(3) Mitsubishi YS-11

(4) British Aerospace BAC 1-11

(5) Concorde

(6) deHavilland D.H. 106 Comet 4C

(7) VFW-Vereinigte Flugtechnische Werk VFW-614

(8) Illyushin Aviation IL 96T

(9) Bristol Aircraft Britannia 305

(10) Handley Page Herald Type 300

(11) Avions Marcel Dassault - Breguet Aviation Mercure 100C

(12) Airbus Caravelle

(13) Lockheed L-300

# APPENDIX D - COMMENTS RECEIVED ABOUT REPORTING REQUIREMENTS
# Excerpts from EAPAS/FTS Final Rule

## Labeling

**Component Identification: EWIS (§ 25.1711)**

This rule requires applicants to identify EWIS components using consistent methods that facilitate easy identification of the component, its function, and its design limitations. For EWIS associated with flight-essential functions, identification of the EWIS separation requirement is also required.

The number of this rule remains unchanged from its number as proposed. In response to comment, we have revised wording to clarify its intent, as discussed below.

Boeing requested that we clarify § 25.1711(a) by revising it as follows:

> EWIS components must be labeled or otherwise identified using a consistent method that facilitates identification of the wire <u>EWIS component,</u> its function, and its design limitations, if any.

GE requested we revise the same paragraph to read as follows:

> EWIS components must be labeled or otherwise identified using a consistent method that facilitates identification.

Boeing and GE also requested that we remove the requirement in §25.1711(b) that, for systems requiring redundancy, components must be identified with component part number, function, and separation requirement for bundles. They stated that all wiring should be treated with the same level of care. The commenters contended that as the proposed requirement was written, the regulation was impractical to implement, since there are many redundancy

separation categories in the aircraft. A given bundle might have different separation requirements from multiple other bundles, from hydraulic systems, and from air ducts, and the requirement could vary with axial distance along the fuselage. There would not be room to add all this data to the bundle label.

We have clarified § 25.1711(a) as requested by Boeing. It is the intent of this rule to require identification of all EWIS components and not just the wire (which is one component of an EWIS). We have revised that section by replacing the word "wire" with the phrase "EWIS component."

We have decided against deleting the phrase "of the wire, its function, and its design limitations, if any" from § 25.1711(a). It is important that the EWIS component's function and design limitation information be easily and readily available to maintainers and future modifiers. Labeling components with this information will help ensure that the level of safety provided by the original design is not degraded. It will also prevent potential safety hazards from improper maintenance and from replacement of original parts with parts not designed or intended for that particular use.

We have also decided against deleting §25.1711(b). We agree that all wiring must be treated with care. But we are especially concerned that wires and other EWIS components associated with flight-essential or flight-critical systems be easily identifiable by those designing and installing modifications, as well as by technicians performing maintenance or repair. If a wire bundle has different separation requirements as it is routed throughout the airplane, then those varying separation requirements must be identified on the bundle at the appropriate location where a particular separation requirement is applicable. It would not be necessary to have each label on the bundle contain all the differing separation requirements.

IASA suggested that using a color-coding approach to identifying critical systems would help post-TC modifiers easily identify critical airplane systems. We agree with the need to help

ensure easy identification of these systems so that post-TC modifications and repairs do not inadvertently introduce unintended failure modes. However, the EWIS identification requirements of § 25.1711 do not prescribe the means by which EWIS is identified. It only requires that the identification scheme be consistent throughout the airplane and that modifications follow the same scheme. Color coding of EWIS may be an acceptable means to comply with the requirements. We made no changes because of this comment.

US Airways stated that mandating identification for all terminals, switches, connectors, or any component mounted in an area with limited space could cause tags or something similar to be used. These would in turn become contaminants.

We agree that some EWIS components may be so small that it would be impractical to label the component directly with textual data, and that excessive use of tags could become a source of future contamination. However, § 25.1711 states that other means of identification can be used if the component cannot be physically marked. For example, the manufacturer's consistent marking scheme may be such that a color code is used to mark these types of components. Applicants will have to collaborate with their FAA Aircraft Certification Office to work out the details. The method of identification is not mandated by the rule. It is left up to the applicant to propose a method of identification. We made no changes based on this comment.

**Wire Labeling Costs**

GE commented that the cost estimate for the labeling requirements of § 25.1711 appears based on mechanics adding labels during final assembly. GE stated that identifying wires at 15-inch intervals requires many more than the estimated 3,500 labels per airplane. Since fly-by-wire aircraft typically contain 100 miles of wiring, a label at 15-inch intervals equals over 422,000 labels per aircraft. GE stated that manufacturing wire with labels is more practical but would require that manufacturers invest in more tooling, plus drawing changes to harnesses and

cables. GE estimated its cost at $9,300,000 over 25 years or $370,000 per year. Spectrum Technologies contended that the burden for wire identification labeling was significantly underestimated, particularly in relation to heat shrink labels and probably other types. The NPRM estimates a wire identification time of 30 seconds per label. Spectrum said that, based on industry practice, the time for heat shrink labeling is more like 240 seconds per sleeve.

In response to the estimated cost of $0.05 per label, Spectrum contended that the typical figure for industry brand name heat shrink labels is more like $1.50, depending on size. It said that the total cost of adding just one heat shrink sleeve can be calculated as $2.88.

The new rule does not require that additional labels be manually added to wiring. It only requires additional information to be included in the wire labeling that already exists. It appears that the commenter assumes that there are no labeling requirements in effect today. Section 25.1301 already requires that components be identified. The requirement contained in this final rule expands on those requirements by imposing additional labeling requirements. Complying with § 25.1711 will be a matter of providing additions to, or changing the type of, information already on the EWIS labels that exist today. Based upon existing practices, our analysis estimates this additional cost.

Spectrum Technologies commented on the technical and economic advantages of a specific prescriptive means of compliance. Based on comments since the NPRM, we have verified our estimates. While we disagree with the specific estimates in the illustrative comment, we believe that manufacturers will demonstrate compliance using the most efficient and cost effective technology available.

## Requirements to Develop ICA

As discussed above, this rule introduces requirements for design approval holders (DAH) to assess their airplanes in relation to wiring. The assessment must be performed with an enhanced zonal analysis procedure (EZAP), which is outlined in an advisory circular accompanying this rule entitled "AC 120-XX Program to Enhance Aircraft Electrical Wiring Interconnection System Maintenance." For each zone on the airplane that contains wiring, DAHs must develop maintenance and inspection tasks to prevent contaminant buildup on that wiring and maintain safety. They must then make those tasks available to operators in the form of ICA readily identifiable as pertaining to wiring. They must also assess those wiring ICA in relation to ICA for fuel tank systems to make sure there are no conflicts or redundancies between the two. The rule includes requirements for the DAH to submit a compliance plan to the FAA outlining how it intends to meet these requirements.

**Compliance Dates**

Several commenters proposed changes to the DAH compliance dates for subpart I (now part 26) requirements. The proposal would have required DAHs of existing airplanes to submit ICA for approval to the FAA Oversight Office by December 16, 2007. This was based on an expected effective date of June 30, 2006 for the final rule, and would have allowed DAHs 18 months to complete compliance. The proposed operator requirements would have allowed operators 12 months from the date DAHs completed their ICA to incorporate EWIS tasks into their maintenance program. The compliance date for operators (again based on an expected final rule effective date of June 2006) was December 16, 2008.

ATR, AIA/GAMA, GE, and Boeing requested a longer compliance time for the DAH requirements. ATR specifically proposed 30 months because it said it will need to review and

update all of its maintenance documentation. GE requested 36 months. Boeing and AIA/GAMA requested the compliance time for DAHs be increased to 24 months. Boeing and AIA/GAMA noted that industry, through ATSRAC, originally identified 24 months as the time needed to conduct the EZAP analysis for their existing airplane configurations. But the FAA has now proposed additional requirements, such as evaluating TC holder changes mandated by airworthiness directives (AD) and compliance plan activities. The commenters noted that the original schedule and resource analysis did not account for these additional activities.

Additionally, Boeing and FedEx requested that the rule include required time periods for FAA review and approval activities involved in the compliance plans. Boeing and Airbus noted that the rules do not currently limit the amount of time the FAA will take to review and approve documents, which will negatively impact their compliance time. Boeing stated that most DAHs will require the full 90 days for developing a compliance plan, and will not initiate that plan until they obtain FAA approval. So to ensure that they have an appropriate time for compliance activities, they'll need FAA approval immediately, which is impractical.

Boeing and AIA/GAMA also said that the hard compliance dates and an expected final rule issuance in early 2007 will leave DAHs with less than 12 months to comply with the subpart I requirements. Along with Airbus and GE, they requested that we revise the compliance dates to represent a number of months after the effective date of the rule, rather than a hard date. AIA/GAMA noted that this approach would prevent our process and schedule for issuing the final rule from impacting DAH compliance dates.

We agree with the commenters that additional time should be allowed for DAH compliance with 26.11. While we understand that ICA for EWIS have already been developed for a number of affected airplanes, we also understand that not all DAHs have begun this activity. In addition, as discussed later, DAHs that have already developed EWIS ICA may not have addressed the "representative airplane" configurations, as required by this rule. However,

because DAHs would need to plan and coordinate with the FAA anyway, we do not believe the requirements to do so will significantly increase the amount of time needed to comply. In consideration of these factors, we believe that 24 months will allow sufficient time for DAHs to develop and submit the necessary compliance plan, draft data and documents, and final data and documents to show compliance with today's rule.

We have made a minor revision to sections 26.11(d)(3), (d)(4) and (d)(5). This is to clarify that the affected pending or future applicants must comply either by a date based on the effective date of the rule, or by the date of approval of the related certificate. Even though we specifically discussed the intent of these dates in the NPRM preamble, we believe that using the term "approval of the application," which appeared in the proposal (in proposed § 25.1805(c)(3), (c)(4), and (c)(5)) indicating dates for compliance, may have caused confusion. So, we have replaced the term "application" with the term "certificate" in 26.11(d)(3), (d)(4) and (d)(5).

We are not including FAA-required time periods for review and approval of the required compliance plans. Instead, expectations for FAA personnel have been defined in a new FAA order that directs the Aircraft Certification and Flight Standards Services in their roles and responsibilities for implementing these initiatives. The order includes expected times (6 weeks) for reviewing and approving DAH compliance plans, plans to correct deficiencies, and draft and final compliance data and documents. To facilitate implementation, we will also train affected personnel in their roles and responsibilities and provide in-depth familiarization with requirements of the regulations and associated guidance. The FAA's Aviation Safety organization's recent registration as an ISO-9001-compliant organization will also facilitate standardized and timely implementation of the review and approval process.

Several operators also requested revisions to the DAH compliance dates, noting the potential adverse impact on them because of the time it could take for FAA review and approval. ATA recommended that § 25.1805(c)(1) (now 26.11(d)(1)) be rewritten to provide a reasonable

period of time (90 days) for the necessary FAA review and approval activities. ATA noted that the amount of time the FAA will take to review and approve TC holders' EWIS/FTS ICA could reduce operator compliance time significantly. FedEx made similar comments and noted that compliance dates should acknowledge time for approval of compliance documents, distribution of those documents, operator planning for addressing the requirements, and final release of the changes in the operator's program. KLM was also concerned about FAA review and approval impacting operators' compliance time and requested that the operator compliance date be one year after ICA are approved. Boeing, ATR and US Airways also stated that the compliance time for the operational rules should be based on availability of needed data.

Continental requested that operators be allowed 18 months rather than 12 months to comply. It said a thorough training program would be needed for maintenance personnel not familiar with wiring and its components. This would require additional effort by the operator not contemplated by simply having ICA incorporated into a maintenance task or inspection program. Additionally, Continental stated that contract maintenance personnel must also be trained for systems they maintain.

NACA requested that operators have two years for compliance, dependent on DAHs complying with their requirements on time.

Based on rationale the ATA provided for requesting the change, we infer that ATA would like additional time (90 days) added to the operator's compliance time rather than to the DAH's compliance time. While it is inappropriate to put requirements for the FAA in a rule applicable to DAHs, we have, as discussed previously, identified expectations for FAA review and approval (including timeframes) in an internal FAA order. The length of time to review plans, data, and documents depends largely on the quality of the submittals. Acceptable documents will take less time to review.

We have structured the requirements of the DAH rule and developed complementary guidance to facilitate timely review and approval of DAH submittals (compliance planning, draft document reviews, etc.). We do agree, however, that a modest increase in operator compliance time would help ensure that operators are not impacted by the FAA review and approval process. We have revised the EAPAS compliance date for operators from 12 months to 15 months.

Regarding the NACA request for a two-year compliance time, in the past we have imposed numerous maintenance program revision requirements through operational rules and ADs. Twelve months has been the typical compliance time for these changes and has been sufficient for operators to comply. The maintenance actions described in the maintenance program changes would be accomplished sometime later, as specified in the maintenance program. So operators will have sufficient time to plan and conduct the necessary EWIS training.

On July 30, 2004, (69 FR 45936), we extended the Fuel Tank Safety Operational Rule compliance dates to December 16, 2008, for reasons outlined in that final rule. Because of the similar timelines for operator incorporation of the FTS and EAPAS maintenance actions into their programs, we had determined that aligning the compliance dates for the FTS and EAPAS maintenance program changes would allow operators to revise their maintenance program once to address both safety initiatives. However, given delays in issuing the EAPAS rulemaking proposal and the expectation for industry to have the FTS ICA developed for compliance with the EASA rule (December 2007) and the FAA rule (December 2008), we have determined that the benefits of aligning the FTS and EAPAS compliance dates are not substantial enough to justify further delay in implementing FTS maintenance actions. As previously discussed, we are not extending the FTS operational rule compliance date in this final rule.

**EZAPs Already Completed**

Boeing asked that we include a statement in the final rule indicating that EZAP analyses conducted prior to the effective date of the final rule, and resultant ICA, comply with subpart I (now part 26) requirements. Boeing questioned the statement that the proposed time frames are supported by experience gained by EZAPs already performed, when the NPRM did not discuss the acceptability of those analyses. It noted that several EZAP analyses were conducted using MSG-3 methods, which differ slightly from those contained in proposed AC 120-XX. Boeing noted that, for those cases, it must show the FAA Oversight Office how the previous analyses were conducted, make any necessary changes, obtain industry agreement, and have the FAA approve the resulting ICA.

We believe that work done before adoption of the rule will reduce the level of effort required for DAHs to comply with the rule. But we also recognize that some additional work may be necessary for DAHs to show compliance. For example, EWIS ICA may not have been aligned with FTS ICA or may not have been developed for the "representative airplane" as defined in the rule. Therefore previous work cannot automatically be considered compliant. Because we cannot say with any confidence that no more work will be required, we are not adopting Boeing's recommendation.

**Protections and Cautions**

Boeing requested that we remove from subpart I (now part 26) the requirement to include ICA instructions for protection and caution information to minimize contamination and accidental damage during maintenance activities. It suggested this language should be added to the operating rule. Boeing considers the methods of protecting wiring during maintenance to be best determined by the maintenance provider and dependent on the type of maintenance activity underway. Boeing also noted that operators who have already developed protection schemes based on their experience will be required by the operational rules to replace this with the one

provided by the TC holder. Boeing does not believe this is a positive step towards increased protection of EWIS.

United Airlines stated its support for requiring airplane manufacturers to include specific recommendations for when and how to protect wire bundles from damage during different phases of maintenance.

We infer that Boeing is referring to the requirement in H25.5(a)(1)(vi). That requirement applies both to new type certificates complying with § 25.1729 (proposed as § 25.1739) and existing type certificates complying with part 26. The requirement is consistent with ATSRAC's recommendations. These recommendations were based on recognition that the TC holder will have the best understanding of EWIS material properties and vulnerabilities, and will be in the best position to identify what protection and caution measures are needed. If operators have developed their own instructions, they may be used as alternatives or as supplements to those provided by the TC holder, if approved by their Principal Inspector (PI). We have provided guidance to the FAA field offices to allow for consideration of an operator's alternative to that approved by the FAA Oversight Office. We made no rule change based on this comment.

**Alignment of EWIS and Fuel Tank ICA**

AIA/GAMA and GE requested that the last sentence of proposed § 25.1805(b) (now § 26.11(b)), requiring minimization of redundant requirements between EWIS and fuel tank ICA, be deleted. The commenters stated that this is an economic and customer service issue beyond the scope of the FAA's safety interest.

Boeing requested we include, within proposed § 25.1805(b), the levels of alignment of FTS and EWIS maintenance actions that will be acceptable for compliance. While Boeing sees the benefit of eliminating redundant maintenance activities, it considers itself unable to determine how to show compliance with this requirement.

Minimizing redundant requirements is not just an economic issue for operators. One of ATSRAC's findings is that repeated disturbance of EWIS during maintenance is itself a source of safety problems. Therefore, while ensuring that all necessary maintenance is performed, it is also our objective to minimize disturbance by eliminating redundant requirements.

As discussed earlier, Boeing and other TC holders have been required to develop ICA since 1981, and maintenance manuals even before that. In developing ICA, TC holders routinely review individual tasks to align them with other tasks being developed. This is done both to avoid redundancy and to eliminate confusing or conflicting instructions that could inadvertently lead to improper maintenance with unsafe consequences. The purpose of the requirement to align the ICA is no different. The intended "levels of alignment" are the same as would be expected for ICA developed in connection with original type certification. The MSG-3 and Maintenance Review Board (MRB) processes, with which Boeing and other affected TC holders are familiar, have the same objectives. AC 120-XX "Program to Enhance Aircraft Electrical Wiring Interconnection System Maintenance" describes means of compliance that will achieve these objectives. No change to the final rule is necessary.

**Approval of ICA**

Boeing and AIA/GAMA requested further clarification of proposed §§ 25.1739 (now § 25.1729) and 25.1805(b) (now § 26.11(b)) requirements that ICA prepared in accordance with paragraph H 25.5 of Appendix H be submitted to the FAA Oversight Office for approval. AIA/GAMA, Airbus, and FedEx recommended that EWIS ICA be accepted by the FAA, rather than approved, with the exception of any applicable airworthiness limitation items (ALI), which should be approved. The commenters were concerned that the proposed requirements are not consistent with the current requirement in § 25.1529 that ICA be found acceptable to the FAA (except for ALI, which must be approved). FedEx also stated that creation of separate "FAA-

approved" ICA will lead to confusion and fragmentation of what should be an integrated inspection program.

As discussed earlier, one of the primary objectives of these DAH rules is to ensure that operators have at least one source of FAA-approved data and documents that they can use to comply with operational requirements. This objective would be defeated if the required data and documents were not, in fact, approved. Only by retaining authority to approve these materials can we ensure that they comply with applicable requirements and can be relied upon by operators to comply with operational rules. We believe that there are differences between EWIS ICA and other ICA that necessitate approval of EWIS ICA:

- EWIS ICA are the means for compliance with some of the technical requirements of new subpart H (§ 25.1707 relating to system separation and § 25.1711, component identification).
- EWIS ICA contain highly technical information such as electrical loads data and wiring practices standards that are more complex than typical maintenance instructions.
- EWIS ICA require a degree of consistency and standardization that may not be necessary for other ICA.

We agree that further clarification is needed regarding FAA Oversight Office approval of EWIS ICA. We do not intend to approve all documents that contain EWIS ICA details, such as the airplane maintenance manual. We do intend to review references in all documents that are referred to in the EWIS ICA source documents. We have made changes to the AC guidance information (AC 25.17XX) to clarify exactly what documents the FAA Oversight Office will approve. No change to the final rule is necessary.

**Rule Applicability**

Today's rule is applicable to airplanes with a passenger capacity of 30 or more passengers or a payload capacity of at least 7,500 pounds operating in parts 121 and 129.

NATCA requested that we consider revising the rule applicability to address all transport airplanes regardless of size or type of operation. It stated that all transport airplanes are subject to the same aging safety concerns, and passengers should have one level of safety.

The FAA has used these size criteria for the applicability of other rulemakings because they capture the airplanes carrying the vast majority of passengers and cargo. Similarly, by limiting applicability of the EAPAS operational rules to parts 121 and 129, we focus these requirements on the airplanes that transport most passengers and cargo. Based on our analysis, the additional safety benefit of extending the operational requirements to all transport airplanes would not justify the additional costs of doing so. We will continue to review this issue and, as this rule is implemented, if we can demonstrate that it can be applied cost effectively to smaller airplanes or other operators, we may consider further rulemaking.

Several commenters requested revisions and clarification of applicability with respect to STCs. EASA requested we revise the applicability of § 25.1805 (now § 26.11(d)) to include STCs that significantly affect EWIS.[1] British Airways stated its support for the existing applicability, agreeing that the analysis performed by the DAH would cover the EWIS they are responsible for as well as the wiring changed or added by others. FedEx requested clarification on means of compliance for STCs.

Additionally, the ATA requested we revise proposed § 25.1805(c)(4) (now § 26.11(d)) to clarify its applicability only to new STCs issued after the effective date of the final rule and not to existing STCs that may be modified after the effective date of the rule. The ATA noted that some STCs are modified to expand the STC effectivity as an operator's fleet grows and should not be evaluated for compliance with § 25.1805(c)(4).

Section 26.11 will apply to future applicants for STCs and to existing TCs. As explained in the NPRM, we decided not to include existing STCs in this section for two reasons. First, most existing STCs do not provide detailed instructions for wiring installation, relying on the

[1] EASA plans to address STCs in its NPA.

judgment and expertise of the individual installer. In most cases it would not be possible for the current STC holder to evaluate these wiring installations. Second, in most cases, installers have followed the TC holder's wire routing and installed STC wiring in or adjacent to existing wiring. In these cases, implementing the maintenance programs developed by the TC holder should adequately address the safety issues identified in this rule that may exist in the STC wiring. Our conclusion here is consistent with ATSRAC's recommendations.

However, we will not revise § 26.11 to exclude modifications to existing STCs. As discussed, one reason we are not applying this rule to existing STCs is that in many cases existing STCs do not include data for EWIS that can be evaluated. As discussed in the NPRM, we believe it is important that EWIS ICA be provided for all future STCs, including changes to existing STCs. We have revised § 26.11(d) to clarify that "if an existing STC is amended, this section would apply to the amendment."

The extent of the review required for changes to existing STCs would be limited to the newly proposed changes. Applicants would not be required to evaluate the entire design change approved under their existing STC. For example, if an applicant proposed to add additional monitors to an existing in-flight entertainment STC, only the EWIS supporting the additional monitors would need to be evaluated for the impact to the ICA. If an applicant were merely adding airplane models of the same configuration to an existing STC, they would not need to evaluate their STC.

Boeing Wichita asked whether it would be required to evaluate EWIS for an entire airplane in order to comply with requirements of § 25.1805 (now § 26.11) when applying for an STC.

We do not intend to require applicants for design changes approval to evaluate the EWIS of the entire airplane. Rather, these applicants must evaluate whether their proposed design change would require revision of the ICA developed by the TC holder (and any previous STC

applicants) in compliance with § 26.11 to correctly address the design change. An example would be if an STC applicant proposed to add EWIS to a zone that did not previously have EWIS. The applicant would need to develop an ICA revision providing for any maintenance actions within that zone that may be necessary to comply with Appendix H to part 25. We have revised § 26.11 by adding a new paragraph (c) to clarify this requirement.

**General Comments about Design Approval Holder Requirements**

We received a number of general comments responding to the concept of DAH requirements rather than to the DAH requirements in this specific rulemaking. We responded to these types of comments in the comment disposition document accompanying our policy statement titled "Safety—A Shared Responsibility—New Direction for Addressing Airworthiness Issues for Transport Airplanes." Both were published in the Federal Register on July 12, 2005. As a result, we will not respond to such comments again here. We have included them, and our responses, in a separate document in the docket. That document is titled "General Comments about DAH Requirements Sent to Docket Number 18379"

Boeing and AIA/GAMA did not agree with our assessment that DAH rules are necessary to support this initiative. They requested we remove proposed § 25.1805 (now § 26.11) from the rule. They contended that

- the required material is neither complex nor limited to the DAH,
- operators have the option of developing an enhanced zonal inspection program without participation of the DAH, and
- operators will not be required to adopt maintenance programs developed by the DAH.

Both commenters stated that developing EWIS ICA is not complex. They noted the EZAP process is based on MSG-3 maintenance program development procedures, which are neither complex nor limited to the DAH. They believe that the DAH type design data needed for development of maintenance tasks is also available to operators.

Boeing and AIA/GAMA also said that use of the MSG-3 process by the DAH alone will only account for airplane configurations certified by the DAH and some, but not all, AD-mandated modifications. Unique configurations that evolved after delivery will not be considered by the DAH. Boeing contended that operators are capable of assessing their airplane configurations using proposed AC 120-XX and developing an enhanced zonal inspection program without DAH involvement. Additionally, Boeing stated that operators could develop ICA more efficiently because they could concurrently address the baseline configuration and any configuration changes made in service.

As discussed previously, the policy statement provides criteria for deciding when DAH regulations are necessary.

Appendix H paragraph H25.5(a)(1) identifies information required to perform the analysis and develop maintenance tasks. While some of this information may be available to operators without assistance from the DAH, operators would not have access to all of it.

Also, the methodology described in the AC may appear to be relatively simple, but applying it properly requires considerable expertise and judgment and can be quite complex. DAH involvement is necessary to ensure it is applied properly. We believe that DAH regulations are necessary for this safety initiative to ensure all of the representative type design configurations are addressed in a timely manner. The "representative" airplane is defined as the configuration of each model series airplane that incorporates all the variations of EWIS used on that model, and that includes all TC-holder-designed modifications mandated by AD, as of the effective date of this rule.

Existing regulations regarding ICA as adopted in Amendments 21-50 and 25-54 require DAHs to provide ICA for the airplane as a whole. This rule simply applies that same policy to EWIS, which were not specifically addressed by those amendments.

We note that in the form in which the rules were proposed, operators would be required to implement EWIS ICA based on those "developed by the type certificate holder." That statement did not clearly articulate our intent and we have corrected that language in the final rule to reference "in accordance with the provisions of Appendix H of part 25 of this chapter applicable to each affected airplane…."

Both Boeing and AIA/GAMA requested that we establish, within the final rule, all requirements for the DAHs regarding consistency, standardization of process and requirements, and technical guidelines. They do not believe the rule or guidance material is comprehensive enough to enable DAHs to comply. Boeing stated that the root cause of past difficulties with voluntary compliance lies with unclear regulatory requirements and lack of appropriate guidance. Boeing noted that the FAA attempted to address this problem in the proposed rule, but said those attempts have fallen short of what is needed. It quoted draft AC 25-XX: "…the Compliance Team, as soon as possible after issuance of the safety initiative rule, will provide the DAHs with our expectations for the required analysis content [and] describe to the DAHs our expectations for the content and format of their data…." Boeing contends that visibility of requirements, expectations, and technical requirements would ensure uniformity of application and inform operators of what information they would receive from DAHs.

We partially agree. The program plan for the aging airplane rules was to release associated guidance and policy for public comment upon release of the NPRMs. We believe this approach should have helped clarify our expectations of what is considered an acceptable approach to compliance.

For this initiative, both the performance standards and guidance materials were developed by ATSRAC, which had representatives from the affected industry. We must presume that industry, in helping to develop these materials, understood what would be expected for new TCs. We consider these same materials to be sufficient for application to existing TCs.

The comprehensiveness and level of detail of requirements and related advisory material is at least equivalent to that for other ICA currently in Appendix H, which DAHs have successfully complied with for 25 years. The purpose of compliance planning provisions is to ensure that DAHs work closely with the FAA, as they do for initial certification, in developing compliant data and documents. We made no change to the rule due to this comment. However, we will clarify in AC 25-XX that the compliance team will meet with DAHs as soon as possible after issuance of the final rule to ensure that guidance materials and expectations related to rule implementation are clear.

**ICA as a Single Document**

Boeing and AIA/GAMA requested we delete paragraph H25.5(b) of Appendix H. This paragraph requires that EWIS ICA be contained in a single document, easily recognizable as EWIS ICA. They said their current approach is to produce several documents, including the maintenance planning data document, airplane maintenance manual, and standard wiring practices manual, with appropriate cross-references. These documents may not be EWIS specific. Boeing and AIA/GAMA believe separating EZAP-generated maintenance activities from those required by SFAR 88 defeats the intent of the rule and is impractical.

Additionally, Airbus, and GE suggested we revise H25.5(b) to say "the ICA must be provided in a manner acceptable to the Administrator, where instructions specific to EWIS are easily recognizable."

They believe there is no safety benefit in uniquely identifying ICA related to, but not specific to, EWIS. They also requested that proposed § 25.1739 (now § 25.1729) be revised with a reference back to § 25.1529 or deleted in its entirety. They stated that § 25.1529 already

requires Instructions for Continued Airworthiness to be developed in accordance with Appendix H.

We do not agree that paragraph H25.5 (b) should be deleted or revised as requested. The requirements of paragraph (b) do not preclude incorporation by reference of detailed information. However, we expect the DAH to provide a document appropriate for the information provided, in other words, a single or source document that either includes the EZAP-generated EWIS ICA or specifies where those EWIS ICA can be located. This also means that, if incorporation by reference is the approach taken by the DAH, all referenced documents are available at the same time as the EWIS ICA source document. We have revised the text of final H25.5(b) to clarify that the requirement only applies to EWIS ICA developed in accordance with requirements of H25.5(a)(1) and that the "document must either contain the required EWIS ICA or specifically reference other portions of the ICA that contain this information." This does not change the meaning of the requirement, but clarifies it.

We also do not agree with the request to delete or revise § 25.1729. Having a separate requirement for EWIS ICA located within subpart H is consistent with the purpose of creating the new subpart. The goal was to collect existing part 25 wire-related requirements and develop new requirements, make them easy to locate, ensure their application to EWIS, and highlight the importance of considering wiring and its associated component as an airplane system. We made no changes due to this comment.

**Mandatory Replacement Times**

Airbus requested that the requirement in section H25.4 to include mandatory replacement times for EWIS in Airworthiness Limitations of ICA be deleted because it is not related to any requirements to define mandatory EWIS replacement times.

We are retaining H25.4. The intent of this requirement is not to mandate life limits for EWIS components, but to ensure that the designer consider whether EWIS life limitations are applicable to a particular design and identify those limits in the Airworthiness Limitations section of the ICA. Such limitations, if any, would be identified when demonstrating compliance with § 25.1703. That rule requires that EWIS be installed according to limitations specified for that EWIS component, and this might include life limits under certain circumstances. For example, a given EWIS component may be well suited for a particular environment, but because of technological limitations, the material it is made of may degrade over time when exposed to certain environmental stresses. The component manufacturer may recommend that certain tests be performed at given intervals to ensure that its material properties are still within its qualification limits, and if they are not, recommend that the component be replaced. Life limits might also be identified when demonstrating compliance with the EWIS safety assessment requirements of § 25.1705, as part of identifying acceptable mitigation strategies to prevent hazardous or catastrophic failures. We made no changes due to this comment.

**Wire Identification Method Information**

Airbus, AIA/GAMA, and GE suggested we delete the requirement in proposed H25.5 for information explaining wire identification methods and requirements for identifying changes to EWIS. They stated that changes to EWIS, including future identification, are the modifier's responsibility, and a DAH cannot anticipate all possible future changes and give instructions for identification methods for changed components.

This requirement is intended to ensure that EWIS components added or changed due to post-TC modifications retain the same identification scheme used by the design approval holder. It is not necessary for the original DAH to anticipate future changes to EWIS. The original DAH is only required to describe the original identification scheme used. An example could be a particular color used to identify EWIS components associated with a fly-by-wire system. It is the responsibility of the future modifier to follow that EWIS identification scheme as required by § 25.1711.

**Electrical Load Data**

GE requested confirmation that H25.5(a)(2), (3), (4), and (5) do not apply to the existing fleet. Also, AIA/GAMA and GE contended that electrical load data is a certification issue, not a continued airworthiness issue, and future changes or updates to that information is the modifier's responsibility. They requested that paragraph H25.5(a)(5) be deleted.

The requirements of H25.5(a)(2), (3), (4), and (5) do not apply to the existing fleet unless a modification is introduced that would require that these requirements be part of the type certification basis of the modification, in accordance with 14 CFR 21.101.

We agree that it is the responsibility of modifiers (e.g., STC applicants) to ensure that they update the actual load data of the airplane they are modifying and document the electrical load data as required by H25.5(a)(5). However, we have decided against deleting paragraph H25.5(a)(5). We are using this requirement as a means to ensure that accurate electrical load data is available to those who need it. Accurate electrical load data is necessary to help ensure continued airworthiness. It is important that the load demand of an airplane's systems not exceed the generation and distribution capacity of its electrical power system. By ensuring this, the necessary levels of electrical power will always be available for those airplane systems needed for safe operation. We made no changes due to this comment.

**Costs for EZAP Analysis and Inspection of Engines**

GE commented that reviewing an engine manual to identify tasks that touch or approach wiring is estimated at 160 hours. Checking a manual for the 41 items listed on pages 10-11 of proposed AC120-XX, for each of the 14 harnesses per engine, is estimated at 40 hours. It estimated compliance costs to GE at $438,000. GE stated that incorporating all 41 elements on pages 10-11 of proposed AC120-XX into a C-check would increase C-check time by a minimum of 1 day, resulting in 15,000 extra days of maintenance a year for operators, at a cost of $150 million annually.

Our final regulatory evaluation accounts for additional cost estimates in part due to the comments received from the engine manufacturer. Since we are not making any changes to part 33, engine manufacturers will not be required to perform an EZAP. The FAA disagrees with GE's estimate because airplane manufacturers have already completed EZAP analyses on existing airplanes without support from engine manufacturers.

We do not concur with GE's statement that performing an EZAP on engine-mounted EWIS components will result in an additional day being added to the length of a C-check (assuming that the frequency of the maintenance tasks require them to be completed on a C-check cycle). Based on data provided by one airplane manufacturer, we estimate that an additional 1 to 3 inspection tasks per engine will be necessary based on the results of applying EZAP to the engine zone. Since we anticipate that these additional tasks will be incorporated into scheduled maintenance down-times, no additional time for gaining access to the engines will be required. We expect that these additional tasks will be performed during scheduled maintenance visits and the corresponding costs are contained in the cleaning, inspection, and downtime sections of the regulatory evaluation.

GE contended that supporting manufacturer compliance with proposed subpart I (now part 26) will involve an estimated 240 work days, or $140,000, plus travel expenses of $100,000,

per program. Even with cost savings for technically similar engines, GE said its costs for the DAH requirements would be $3,600,000.

Airplane manufacturers have already completed EZAP analyses on several different models of aircraft, and engine manufacturers have not provided support for these activities. We are not making any changes to part 33. Engine manufacturers are not required to support airframe manufacturers in complying with this final rule for either existing or future certification programs.

**Additional Certification and Operator Costs**

Boeing and AIA/GAMA commented that we failed to account for additional certification costs in complying with the new requirements in subpart H and supporting all subpart H requirements for amendments to existing type certificates. Boeing maintained that the FAA should account for these costs, as well as:

- Additional "ongoing coordination necessary to ensure ongoing communication and cooperation between the applicants and the FAA" described in draft Advisory Circular 25-XX
- Costs borne by DAHs to perform the EZAP process detailed in draft Advisory Circular 120-XX.
- Most importantly, increased costs associated with enhanced maintenance of wiring on all in-service airplanes.

Boeing asked that we include these costs in the analysis to get a true understanding of the burden associated with the projected benefits of the proposed rule. AIA/GAMA requested we include costs to operators for enhanced EWIS maintenance and updated labor rates for engineers as well as these additional items:

- Additional DAH manufacturing costs for future part 25 TC and STC products that include new subpart H (regardless of seating capacity).
- Training for maintenance personnel. This should include existing airplanes subject to new §121.911 (now §121.1111), §125.507, and §129.111 EWIS ICA requirements as well as future airplanes that include new subpart H and associated EWIS ICA requirements.
- Additional general aviation operator (part 91/135) costs associated with enhanced maintenance of EWIS on all future airplanes that include new part 25 subpart H and associated EWIS ICA requirements. This should consider additional airplane down time and necessary training for maintenance personnel.
- Additional repair station costs to update FAA-approved maintenance training manuals and provide training to their maintenance personnel.

In response to these comments, the FAA estimates the costs for ongoing coordination necessary to ensure ongoing communication and cooperation between the applicants and the FAA. Neither the preliminary nor final regulatory evaluation includes cleaning and inspection costs for deliveries of future aircraft operated in parts 91 and 135 because there is no operational requirement to do so. Other than the increased cost of EWIS component identification addressed in the regulatory evaluation, we believe that there will be minimal additional manufacturing costs associated with complying with the new EWIS certification requirements.

As in the preliminary regulatory evaluation, we continue to estimate the following costs:

- Subpart H TC certification costs.
- Subpart H STC certification costs.
- EZAP costs for existing TCs, future TCs, and future STCs.
- SWPM update costs.
- EWIS identification costs for TCs and STCs.

- Training costs for maintenance personnel.
- Planning costs to Part 121 operators.
- Cleaning /inspection costs to part 121 operators.
- Downtime costs to part 121 operators.

## The Design Approval Holder Compliance Plan

As noted above, in the NPRM we contemplated submission of a proposed means of compliance, identifying all required submissions to the FAA. The NPRM proposed submission of -

- A project schedule identifying all major milestones.
- A detailed explanation of how the proposed means of compliance would be shown to comply if it differed from that described in advisory material.
- A proposal for submitting a draft of all compliance items no less than 60 days before the compliance due date.
- A proposal for how the approved ICA would be made available to affected persons (operators and others required to comply with this rule).

The proposal stated that if the FAA notified the DAH of deficiencies in its proposed compliance plan or in its implementation of that plan, the DAH must submit a corrected plan to the FAA Oversight Office within 30 days. All of these compliance plan requirements were contained in proposed § 25.1805(d) and (e).

Airbus requested that § 25.1805(d) and (e) be removed because, it said, these requirements are unnecessary. Airbus believes the only important compliance date is the final date for DAHs to submit the data and documents necessary to support operator compliance. Boeing recommended we remove the § 25.1805(d)(3) requirement to identify deviations to methods of compliance identified in FAA advisory material because it does not agree that proposed methods of compliance should be compared to other methods. Instead, it said, they should be evaluated on their own merits.

The FAA agrees that some provisions of proposed § 25.1803(d) and (e) could be removed without adversely affecting our ability to facilitate TC holder compliance. Specifically,

proposed paragraph (d)(3) would require TC holders to identify intended means of compliance that differ from those described in FAA advisory materials. While this is still a desirable element of any compliance plan, we have concluded that an explicit requirement is unnecessary and it is not included in this final rule. As with normal type certification planning, we expect that TC holders will identify differences and fully discuss them with the Oversight Office early in the compliance period to ensure that these differences will ultimately not jeopardize full and timely compliance. Because we believe that timely review and approval is beneficial and will save both DAH and FAA resources, the advisory material recommends that if the DAH proposes a compliance means differing from that described in the advisory material, the DAH should provide a detailed explanation of how it will demonstrate compliance with this section. The Oversight Office will evaluate these differences on their merits, and not by comparison with FAA advisory material.

Similarly, proposed paragraph (e) contains provisions that would have authorized the Oversight Office to identify deficiencies in a compliance plan or the TC holder's implementation of the plan and require specific corrective actions to remedy those deficiencies. While we anticipate that this process will still occur in the event of a potential non-compliance, we have concluded that it is unnecessary to adopt explicit requirements to correct deficiencies and have removed them from the final rule. Ultimately, TC holders are responsible for submitting compliant EWIS ICA by the specified date. This section retains the requirements to submit a compliance plan and to implement the approved plan. If the Oversight Office determines that the TC holder is at risk of not submitting compliant EWIS ICA by the compliance date because of deficiencies in either the compliance plan or the TC holder's implementation of the plan, the Oversight Office will document the deficiencies and request TC holder corrective action. Failure to implement proper corrective action under these circumstances, while not constituting a

separate violation, will be considered in determining appropriate enforcement action if the TC holder ultimately fails to meet the requirements of this section.

Additionally, in reviewing the comment, we realized that the rule text could more clearly state our intent to allow DAHs flexibility to modify their approved plan if necessary. So the final text of proposed § 26.11(f) has been modified to read "each affected person must implement the compliance plan, or later approved revisions …" In response to Airbus' comment that the only important compliance date is the final date for DAHs to submit the data and documents, we must reiterate that we believe a compliance plan is important. The purpose of a 90-day compliance date for the compliance plan is to allow all parties to be informed about how the DAH will be meeting its requirements and to ensure that the all necessary data will be provided to the operators on time. Early development of a compliance plan will give assurance of development of all the necessary data in time for the operators to comply with their requirements.

## Operator Requirements

**ICA Developed by Design Approval Holders**

Boeing noted that the proposed operational regulations would require that the maintenance program revisions be based on ICA developed by the DAH. Boeing would like clarification of the interpretation of the term "based on." It asked whether certificate holders are expected to adopt, without change, the ICA provided by the DAHs.

As discussed previously, it was not our intent to require operators to use ICA developed by TC holders. While we think it is very likely that operators will use those ICA, we intend that they be able either to develop their own or to contract with third parties for ICA, as long as they meet the applicable requirements. We have revised the operational rules to clarify this flexibility. Deviations from the EWIS or fuel tank system maintenance programs that have been developed in accordance with the requirements of SFAR 88 or Appendix H must be approved by the operator's Principal Inspector, who will coordinate the changes with the FAA Oversight Office as appropriate. Similarly, later changes to either the EWIS maintenance program or the fuel tank system maintenance program must be approved by the operator's Principal Inspector, who will coordinate the changes with the FAA Oversight Office, as appropriate. In some cases, coordination with the Oversight Office will be necessary to ensure that the program's original objectives are still met. Details of these coordination procedures are defined in an FAA order and described in an advisory circular.

**Different Requirements for Existing and Future Designs**

RAA requested that proposed § 121.911 (now § 121.1111) be revised so the performance objective of the "retrofit" requirements may be distinguished from the design changes that may be considered for newly manufactured fleet types. The commenter assumed that each OEM will

be required to re-certify to the new standards provided in the part 25 proposal, and that carriers would be subjected to a massive retrofit program. NACA requested that we clarify requirements by being more specific about differences between new production aircraft and retrofitting aircraft. They ask if all the part 25 enhancements will become ICA and fall under these requirements.

At the outset, § 121.1111 requires neither "retrofit" nor "design changes." It simply imposes requirements for operators' maintenance programs. We agree that some clarification is appropriate. As explained in the NPRM, the purpose of § 26.11 is to require type certificate holders to develop ICA for existing airplanes that would enable operators to comply with this section. For those airplanes, only certain provisions of new paragraph H25.5 (H25.5(a)(1) and (b)) are required. But for all future airplane designs subject to new § 25.1729, type certificate applicants must show compliance with all provisions of paragraphs H25.4(a)(3) and H25.5. Our intent in the operational rules is to require operators to incorporate into their maintenance programs all of the EWIS ICA developed for each of their airplanes. For existing airplanes, this would be limited to ICA meeting paragraphs H25.5(a)(1) and (b). For future airplanes, this would also include ICA meeting the remaining requirements of paragraphs H25.4(a)(3) and H25.5. We have revised § 121.1111 (and § 129.111) to clarify these differences.

KLM disagreed with the requirement for operators of all airplanes, regardless of the airplane’s age, to implement maintenance program inspections and procedures for EWIS. The commenter contended that the amount of exposure to deteriorating factors on new aircraft is limited, so there is negligible benefit to performing additional maintenance tasks on wiring. The commenter also pointed out that checking wiring on a new aircraft may even cause more wiring failures due to maintenance near the wiring. KLM suggested we consider a threshold for starting the first inspections

Although older airplanes have been exposed to more stressors that can accelerate the degradation of wire and other EWIS components, age is not the sole factor in degradation. We do not want to specify a threshold for starting the first EWIS inspections. The intervals for performing the inspections, including the first ones, are determined by performing the EZAP analysis. Factors to be considered in establishing intervals are the hostility of the environment in which the EWIS is located and the likelihood of accidental damage. Neither of these factors is necessarily dependent on age, and EWIS failures can occur on newer airplanes. So the "threshold" for the first EWIS inspection would normally be the same as the interval, measured from the issuance of the first certificate of airworthiness. The results of the analysis are reviewed by industry working groups (as part of the MSG-3 process) and approved by the FAA Oversight Office. It is during the industry working group review that the final inspection intervals are set and subsequently approved by the FAA. We made no changes due to this comment.

**ICA for Alterations**

British Airways requested that proposed § 121.911 (now § 121.1111) be revised to state that if changes to the ICA are required after alterations, incorporation of these changes into the maintenance program may be delayed until after the airplane has resumed service, but before it reaches the " relevant age or flight hours." The commenter expressed concern that the current wording would result in extended operational delays and grounded aircraft after minor alterations or repairs. British Airways also expressed concerns about SFAR 88-related alterations/component changes conducted while the airplane is in a normal operating environment (e.g., at the ramp). It asked whether inspections or incorporation of ICA changes to the maintenance program must be completed before resuming operations and, if so, requests a rule change allowing ICA incorporation into maintenance programs after the airplane returns to service but before it reaches the "relevant age or flight hours."

The only alterations for which EWIS ICA will be developed are those for which compliance with either §§ 26.11 or 25.1729 must be shown—in other words, major alterations approved under STCs or amended TCs. The only alterations for which fuel tank system ICA will be developed are those for which compliance with either SFAR 88 or § 25.1529 must be shown—again, major alterations approved under STCs or amended TCs. We believe that any of these alterations would be scheduled to occur during a period of allocated downtime such as a scheduled maintenance "C Check." The maintenance planning for such modifications should include the actions necessary to incorporate additional EWIS or fuel tank ICA into the approved maintenance or inspection program. No additional time would be needed for these actions. Accordingly, no changes were made due to these comments.

**Alaska Operations**

Senator Stevens of Alaska stated that this rule will have severe consequences to residents and cargo carriers operating in his state. Referencing Section 1205 of the Federal Aviation Reauthorization Act of 1996 (49 U.S.C. § 40113(f)), and the uniqueness of aviation in Alaska, Senator Stevens, Everts Air Cargo, and Alaska Senator Murkowski requested that "intrastate" operations in Alaska be exempted from this rule.

Consistent with 49 U.S.C. § 40113(f), the FAA has carefully considered the potential impact of this rulemaking on Alaska intrastate operators to determine whether intrastate service in Alaska would be adversely affected. We have determined that there would not be an adverse effect and that regulatory distinctions are inappropriate.

Under both EAPAS and the Fuel Tank Safety Rule, manufacturers are required to develop maintenance program revisions and make them available to operators to support their compliance with the operational rules. We have concluded that in the case of both the EAPAS and FTS operations rules, any burden on affected operators in implementing these changes would not have a significant impact. Under EAPAS, the changes would be integrated into

existing inspections that are currently performed during heavy maintenance checks. The fuel tank tasks, which would be aligned with the EAPAS inspections, would also be performed during these checks. Because these additional inspections would be only a small additional piece of a much more extensive maintenance visit, we concluded that they would have no adverse effect on intrastate service in Alaska.

Lynden Air Cargo requested that the L-382G aircraft be excluded from requirements of proposed §§ 121.911 and 121.913 (now §§ 121.1111 and 121.1113). Senator Stevens asked that Lynden Air Cargo's six L-382G airplanes in interstate operation be exempted. Lynden Air Cargo said that it does not carry passengers and operates a small fleet largely outside the U.S. It stated that it is in the public interest to maintain its unique capabilities in Alaska where it supports remote communities and projects with no roads or waterways, as well as regularly supporting the U.S. military during critical campaigns and the ongoing war on terrorism. Lynden Air Cargo also asked to be excluded from § 121.909 (now § 121.1109).

We do not believe it is appropriate to exclude the L-382G from requirements of § 121.1111 and 121.1113 for those airplanes in interstate operation. The safety rationale for these rules applies equally to that airplane. Lynden Air Cargo may apply for an exemption to these rules in accordance with 14 CFR part 11. However, under § 11.81, Lynden Air Cargo must provide information stating why granting such an exemption would be in the public interest and why it would not adversely affect safety, or how it would provide a level of safety equivalent to the final rule. Also, we are not granting Lynden Air Cargo's request for an exclusion from § 121.1109. That requirement, which is not a new rule but simply a renumbering of the requirement formerly designated as § 121.370a, has been in effect since November 1, 2002 (reference 67 FR 72761, December 6, 2002), and we did not make any changes to that rule other than changing its section number.

**EWIS Inspections**

Lynden Air Cargo stated that it does not have the engineering staff to effectively analyze and comment on the myriad complexities associated with the proposed certification rule changes. However, it said that with an aircraft type certificated under CAR 4b (Lockheed L-382G Hercules), the cost to "retroactively" apply these new certification rules would require extraordinary expenditures. Lynden had the following concerns about the practical application and implementation of specific inspection criteria for EWIS under EZAP-developed methods:

- How does an inspector accomplishing a general visual inspection (GVI) or a detailed inspection (DET) of EWIS make a specific determination of airworthiness? The FAA has failed to state an objective criteria in its proposed rule (i.e., what will be the accept/reject criteria?).
- If there are no actual circuit defects, what corrective action will be required? An immediate action? Or can it be scheduled and effectively planned for a future inspection action?
- Disturbing wire bundles for inspections can induce more problems than are corrected.

The proposed operating rules do not require "retroactive" application of design requirements. They do require that operators include EWIS maintenance tasks in their maintenance programs. Any post-inspection actions are based on results of the GVI or DET. If inspections determine that EWIS components need cleaning or repairing, procedures for accomplishing these tasks are contained in the airplane manufacturer's standard wiring practices manual or equivalent procedures developed by the operator. If inspection shows that no circuit defects exist (to use the words of the commenter) then no corrective action would be required. We agree that moving, or disturbing, wire bundles does have the potential to cause damage if not done with care. Precautions for preventing such damage should be part of the operator's overall EWIS maintenance program.

**Non-U.S. Registered Airplanes**

Boeing requested that the FAA clarify whether the proposed part 129 rule would affect foreign operators operating non-U.S. registered airplanes into the United States. They noted that part 129 usually applies to these operations and it seems unusual that they have been omitted in the proposed rule.

Under ICAO Annex 8, the state of registry of an airplane is the state responsible for its airworthiness. For this reason, the airworthiness regulations of part 129, including those contained in new subpart B, apply only to U.S.-registered airplanes.

**Impact on Operators**

Boeing asked that we separate the operational rule from DAH requirements, with a separate comment period, so that defined service information and associated costs can be evaluated by the operators. Boeing contended that consolidating DAH and operational requirements into one rulemaking action with one comment period prevents the FAA from obtaining accurate cost estimates and prevents operators from determining the true impact of the proposal on their operations. NACA also expressed concern that operators cannot know the full impact of this rule until DAHs develop the required ICA.

We have decided against separating the operational rules from the DAH requirements. Separating the rules would not change the technical requirements contained in this final rule but would substantially delay implementation of the EAPAS safety initiative. Thus, it is essential to include both certification and operational requirements in the final rule to ensure maximum safety benefits to the flying public.

In addition to issues of timeliness, we note that while operators will not know the precise effects of the ICA developed by TC holders on their maintenance programs, they should have a good understanding of the nature and scope of the program from the NPRM and the guidance

material provided in AC 120-XX. As discussed, both of these were derived from ATSRAC's recommendations, which operators played a major role in developing.

**The Regional Airplane Fleet**

The Regional Airline Association (RAA) requested we revise the cost-benefit analysis because it cites no regional transport category airplane accidents or incidents to indicate that concern over wiring systems is comparable for all airplanes affected by the proposed rule. The commenter said that wiring system malfunctions are generally unique to a specific fleet type, and the review of the NTSB database, most of the EAPAS NPRM Supplemental Material, and ATSRAC's review were limited to wiring discrepancies in airplanes with passenger seating of 100 persons or more. The RAA stated that differences in the regional airline fleet would justify a less stringent design review. For example, no airplanes with 50 seats or less have in-flight entertainment systems. Regional airplane galleys generally have no more than a single coffee maker, and almost none have ovens, so the electrical loads and wiring required to support this type of service is minimal. Regional operators are less likely to revise seating or make other modifications to the cabin from their original configuration. The commenter said that inspection of regional airplanes affords fewer opportunities to disturb existing wiring, since accessibility into locations where wire bundles may be inadvertently damaged is limited. It noted that the turboprop fleet, in particular, operates at altitudes and locations where emergency landings can be readily accomplished.

The RAA said its members will incur greater costs than the larger fleet because regional operators must amortize compliance costs over a significantly smaller seat revenue base.

Smaller transport airplanes do, and will continue to, exhibit the same EWIS degradation issues found in larger transports in absence of this final rule. Since the NPRM, the NTSB has issued Safety Recommendations A-06-29 through -35 pertaining to fires on one particular model of regional jet. In the six months between October 2005 and March 2006, there were a total of

six fires on regional jets. A seventh fire occurred prior to that six month period. In addition to the danger posed by the resulting fires, the NTSB stated that two of the incident airplanes temporarily lost all flight displays. The investigation by the NTSB revealed that all of the fires originated from the same electrical component[2] and that the fires were caused by moisture-induced short circuits between the electrical terminals of the contactors. If the requirements contained in this final rule had been in effect, the type of failure that was the cause of these seven fires would not have occurred. This is because several of the new requirements directly address

the design issues that lead to the fires. The following bullets address the specific requirements and the reason the failures would have been prevented.

- § 25.1701 provides a regulatory definition of an EWIS. The portion of the electrical contactor that was the cause of the failure would have been considered an EWIS component.

- § 25.1703 requires the proper selection of EWIS components. Although the electrical contactor was qualified to perform its intended function by the current § 25.1301, the new requirements of § 25.1703 would have gone further by requiring a specific assessment of the component to ensure that it is installed correctly and operated within its limitations (§ 25.1703(a)(2)) and that if located in a known area of moisture accumulation (which it is) that it be protected to minimize any hazardous effects due to moisture (§ 25.1703(d)).

[2] An electrical contractor located in the avionics compartment beneath the floor and slightly aft of the captain's seat

- §§ 25.1707 and 25.1709 would have prevented redundant power sources for essential airplane systems from receiving power from the same electrical contactor, as was the case with this aircraft design. Section 25.1707 requires that adequate separation between power sources be provided and that they not interfere with each other. Section 25.1709 requires an EWIS safety assessment to demonstrate that failures cannot occur unless they can be shown to be either extremely remote or extremely improbable, depending on the severity of the failure.

The regional jet (RJ) fleet uses the same EWIS components, design and installation methods, and maintenance techniques as the larger transports. Although RJs typically do not have in-flight entertainment systems and the same type of galleys as the larger transports, they share many systems that have historically exhibited EWIS-related problems. Examples are the power distribution systems, cargo areas, hydraulic systems, wheel wells, and high density areas such as the cockpit and avionics racks. On average, RJs fly more cycles per day than larger transports. So while their life cycle might be shorter in years than the larger transports, because their systems are cycled on a more frequent basis, their EWIS are subjected to more exacerbating factors causing degradation in a shorter period of time. We have reviewed SDR data spanning a five year period to specifically identify EWIS failures on RJs. Although the NTSB findings alone might demonstrate the underlying necessity of this final rule, in response to comment, the FAA has evaluated the annual number of wiring SDRs specifically by aircraft category. The final regulatory evaluation demonstrates that the number of EWIS failures for regional jets and large transports should not be examined separately.

**Operational Benefits**

UPS requested that we remove the operational improvements portion of the benefits calculation and restrict cost calculations to tangible safety benefits versus direct compliance

costs. The commenter stated that this change would reduce the overall benefit calculation by $192.3 million.

The commenter contrasted the following to justify this request:

- The proposal calculates that averting a 3.5 hour delay will save airlines $35,739.
- The calculation in the proposed rule for Fuel Tank Flammability Reduction (FTFR), dated November 2005, uses a delay cost of $24.43 per minute, so a delay of 3.5 hours yields an estimated cost of $5,130 per event.

UPS stated it is notable that the FAA cites the benefit of an averted delay in one proposed rule, and the cost of a similar delay in another. Both were open for comment at the same time. The commenter contended that the value of operational improvements is highly subjective, inconsistent, doesn't yield accurate results, and is specific to each operator.

Boeing commented that it is unusual that the FAA has included averted delays, unscheduled landings, and failures of in-flight entertainment systems, which are essentially airline economic concerns, as part of the benefits accruing from the proposed rule. Boeing noted that the FAA included these benefits because, to quote the NPRM, "delays and unscheduled landings contain safety risks for passengers and crew and increase the likelihood of a more serious event." This commenter questioned the relationship between these non-normal but safe events. It disagreed with their inclusion in this analysis as a method of justifying rulemaking. Boeing stated that in past endeavors, the FAA has not permitted Boeing use of these events as benefits.

We have decided to retain the operational impacts estimated in the benefit calculations. As prescribed by the Office of Management and Budget (OMB), the regulatory evaluation should attempt to quantify all potential real incremental benefits to society in monetary terms, and this includes operational improvements that would result from adoption of these

requirements. We have clarified our terminology since the NPRM. This final rule evaluates operational impacts.

The operational impacts ("delays" in the NPRM) that are quantified in the final regulatory evaluation of EAPAS/FTS cannot be compared with delays estimated in the Fuel Tank Flammability Reduction NPRM (FTFR). The estimates contained in FTFR include crew costs, ground handling costs, and fuel costs. The operational impact benefits for EAPAS/FTS evaluate impacts from operator equipment malfunctions and failures in wiring as reported by operators in SDRs.

Operational impacts caused by EWIS failures are more serious and have a higher cost impact than the delays characterized in the FTFR NPRM. Wiring failures have an immediate impact on operations and the model estimates them accordingly. Fuel tank inerting problems, addressed in FTFR, are not necessarily fixed immediately. The operational impact estimated in the regulatory evaluation for this rule uses operator reports of failures, malfunctions, or defects of systems and components of the aircraft. The five years of data and accompanying analysis is included in the final regulatory evaluation and in its accompanying appendix C. These types of failures are more serious (in terms of cost and time) than the delay of $24.43 per minute as reported by ATA and used in that evaluation. The operational impacts (as estimated in the final regulatory evaluation) of wiring failures have safety impacts and increase the likelihood of a more serious event.

**Relevance to the Current Fleet**

The RAA requested that we revise the cost-benefit analysis to determine relevance of the ASTRAC analysis to the current fleet. It stated that the analysis and recommendations were largely based on inspections of wiring on decommissioned airplanes that at the time (1998) were older than 20 years (DC-8, DC-9, DC-10, 727, etc.). The RAA estimated that those airplane wiring systems were certified at least 50 years ago, and since then aircraft wiring systems have

improved. It further stated that the analysis estimates such airplanes represent less than 1% of the current fleet. The commenter asked how we can imply that ASTRAC's analysis has any relevance to today's fleet.

The RAA also questioned the validity of using a 25-year period for determining benefits. It questioned projecting 25 years into the future to justify benefits for a retrofit rule and stated that all other retrofit rules have projected 10 to 20 years. The RAA called it unrealistic to use an accident/incident review for older aircraft projected to be retired from service before the end of the 25-year amortization period.

We believe that ATSRAC's analysis is relevant to today's fleet. The regulatory evaluation cites ATSRAC's non-intrusive inspection report finding 3,372 total discrepancies during the non-intrusive wiring inspections of 81 airplanes The "effectiveness measure" looks at continuing failures, malfunctions, or defects in the current fleet as reported by operators, and evaluates them with respect to the Intrusive Inspection Report. This final rule will change the certification, design, installation, and maintenance practices for EWIS, which, up to this time, have changed very little since the jet age began. In addition, the physical environments in which wires are installed and the types of hazards they are exposed to are very similar regardless of airplane age. At the same time, airplane designs have become more vulnerable to EWIS safety problems because they are more dependent on electrical systems and less dependent on mechanical systems, as in the case of electronic flight control systems.

We chose the 25-year benefit period because we expect, on average, that a newly manufactured airplane would be in service for that period of time. There will also be airplanes delivered in the next 25 years that are impacted by these requirements. As stated in the preliminary regulatory evaluation the 25-year analysis parallels the expected useful life of an aircraft impacted by this proposal.

## Training

The NTSB referred to its recommendation A-00-108 of Sept. 19, 2000, in which it asked the FAA to address the need for improved training of maintenance personnel to ensure adequate recognition and repair of potentially unsafe wiring conditions. The NTSB commented that, since non-EWIS maintenance actions often compromise EWIS safety, training of all maintenance personnel on EWIS maintenance and inspection is critical. The board would like us to amend the NPRM to specifically state that all maintenance personnel must receive EWIS training.

We agree with the NTSB on the importance of training personnel not directly involved with EWIS maintenance and inspection. But the cost of training all groups identified by ATSRAC as people working directly with, indirectly with, or in the vicinity of, EWIS was not commensurate with the benefits. While not required as a result of this final rule, AC 120-YY provides a sample curriculum for a more comprehensive training program. We strongly encourage organizations to voluntarily offer this training.

**Training Costs**

GE commented that training addressed in proposed AC 120-YY is commercially available, at $60 per employee trained, to be repeated biannually. It stated that costs of having employees occupied in training rather than production were not factored into our estimate. GE said the training it investigated involves 17 modules, at an average of 30 minutes each, resulting in 8.5 hours per trained employee, biannually, in addition to the $60 /employee/year. GE said the cost to operators and service shops of providing training is therefore $308/employee/year. US Airways stated that the average annual cost of $131,108 for developing a training program seems to be significantly below actual costs. United Airlines asked if operators will be expected

to follow AC120-YY. It says "target level one" training alone takes 40 hours and the three hours quoted in the NPRM seems extremely low.

The FAA agrees that the required training might be available commercially. We base our cost estimates on module C of AC 120-YY, which requires less intensive training than the program identified by commenters. The training required by this final rule does not apply to production personnel, but to maintenance and inspection personnel only, as required by § 121.375. Therefore we did not consider the cost of having production personnel in training. We believe that the training covered by Module C is the minimum additional training required to comply with the new EWIS inspection requirements. We estimated the time to conduct this training at 3 hours for target groups 1, 2, 4, and 6, as provided by ATSRAC and stated in the initial regulatory evaluation. Training for the remaining modules and target groups is voluntary and not required for compliance with this final rule.

RAA stated that using care when working around wiring, being knowledgeable about electrical systems, and teaching technicians that a maintenance/alteration task is not complete until the area is thoroughly cleaned are simply common sense and need not be mandated. The commenter expressed confidence these maintenance practices already exist among its members, and said that specific retrofit requirements can be more efficiently mandated by Airworthiness Directives.

RAA said one member suggested it would enhance its training not on how to develop inspection programs, but as a preventative maintenance aide for technicians. The commenter suggested the FAA (with industry assistance) issue an "Electrical Systems Installation & Repair Standard Practices Hand Book" that supplements or replaces the sections in AC 43.13, along with video training modules. RAA suggested that training on concepts like proper routing of wire bundles with sufficient supports that are not so tight as to increase the possibility of chafing within the bundle would be more beneficial than inspecting after the fact. The commenter said

that availability of quality training to many technicians will result in a cultural change in the industry that can roll over to other practices.

The final regulatory evaluation clearly shows that the benefits exceed the costs of the proposed EWIS maintenance requirements. As stated in the NPRM preamble discussion, investigations of previous accidents and examinations of other airplanes shows that deteriorated wiring, corrosion, improper wire installation and repairs, and contamination of wire bundles with various contaminants are common conditions in today's transport category fleet. Current maintenance practices do not adequately address wiring components, wiring inspection criteria are too general, and unacceptable conditions, such as improper repairs and installations, are not described in enough detail in maintenance instructions. We commend the RAA member airline for volunteering to enhance its EWIS training program and we encourage other companies to do the same. A complete EWIS training course, developed by ATSRAC, is contained in AC 120-YY. Also, we have produced a course on good wiring practices which is available to the public through our Oklahoma City training center.

## Revision of the Standard Wiring Practices Manual

Airbus commented about the requirement to include acceptable maintenance practices in a standard format. Airbus made the point that electronic standard wiring practices manuals (SWPM), in which such maintenance practices can be found, are easily searchable. It requested that manufacturers who publish their SWPMs electronically be either exempt from the requirement for a standard format for SWPMs, and/or an interim master breakdown index (which was outlined in the AC as an approach to standardizing SWPM formats without rewriting them), or able to adopt a similar approach.

We are rejecting Airbus's request to exempt electronic versions of the SWPM from requirements of part 25, Appendix H, H25.5. The objective of this requirement is to ensure that maintenance personnel can readily access necessary information. They may work on many different models, so having a standard format will facilitate this. An applicant may propose an alternative "standard" format to that described in the AC, as long as it achieves the same objective (again, taking into account that maintenance personnel will be working on a range of models). The master breakdown index described in AC 25-YY was developed so that existing non-electronic SWPMs would not have to be reformatted. An electronic SWPM, by definition, can be easily indexed to align with the master breakdown index format as depicted in the AC. We made no changes due to this comment.