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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 33

[Docket No. FAA–2007–27311, Amendment No. 33–26]

RIN 2120–AI94

Airworthiness Standards; Engine Control System Requirements

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: The FAA is amending type certification standards for aircraft engine control systems. These changes reflect current industry practices and harmonize FAA standards with those recently adopted by the European Aviation Safety Agency (EASA). These changes establish uniform standards for all engine control systems for aircraft engines certificated by both U.S. and European countries and will simplify airworthiness approvals for import and export.

DATES: This amendment becomes effective October 20, 2008.

FOR FURTHER INFORMATION CONTACT: For technical questions concerning this final rule contact Gary Horan, Engine and Propeller Directorate Standards Staff, ANE–111, Federal Aviation Administration, 12 New England Executive Park, Burlington, Massachusetts 01803–5299; telephone (781) 238–7164, fax (781) 238–7199, e-mail *gary.horan@faa.gov*.

SUPPLEMENTARY INFORMATION:

Authority for This Rulemaking

The FAA's authority to issue rules on aviation safety is found in Title 49 of the United States Code. Subtitle I, Section 106 describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the agency's authority.

This rulemaking is promulgated under the authority described in Subtitle VII, part A, Subpart III, Section 44701, ''General requirements.'' Under that section, the FAA is charged with prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce, including minimum safety standards for aircraft engines. This proposed rule is within the scope of that authority because it updates existing regulations for aircraft engine control systems.

Background

U.S. and European aircraft engine regulations differ in several areas including engine controls. Certifying to a common set of requirements (harmonization) benefits industry and regulators because of the lower costs associated with a single set of regulations.

The FAA, in cooperation with the Joint Aviation Authorities (JAA), the European rulemaking authority before EASA, established an international engine certification study group to compare part 33 with the Joint Aviation Requirements—Engines (JAR–E), the European requirements for engines. As a follow-on, the Aviation Rulemaking Advisory Committee, through its Engine Harmonization Working Group (EHWG), looked at harmonizing the engine control requirements of part 33 and the JAR–E. This final rule reflects the agreed harmonization between the FAA and the JAA that was subsequently adopted by EASA as CS–E (Certification Specifications for Engines) 50.

Summary of the NPRM

A Notice of Proposed Rulemaking (NPRM) was published on April 11, 2007 (72 FR 18148) that proposed changes to §§ 33.5, 33.7, 33.27, 33.28, 33.29, 33.53, and 33.91. The comment period for the NPRM closed on July 10, 2007. These proposed changes would harmonize FAA and EASA regulations for the referenced sections.

Summary of the Final Rule

This final rule on Engine Control System requirements contains no significant changes from the NPRM published on April 11, 2007. We made minor changes to several sections to ensure clarity and better harmonization with EASA regulations. This rule harmonizes FAA and EASA regulations for portions of §§ 33.5, 33.7, 33.27, 33.28, 33.29, 33.53, and 33.91.

Summary of Comments

Five commenters, including an aircraft engine manufacturer and a manufacturer of light business jets, responded to the NPRM request for comments. The commenters supported the proposed rule while suggesting minor changes.

The FAA received comments on the following general areas of the proposal:

- Instructions for installing the engine control transitions
- Engine control system failures
- Overspeed protection
- System Safety Assessment (SSA) interfaces between engine and aircraft
- Programmable logic devices
- Instrument connection

Discussion of the Final Rule

Below is a more detailed discussion of the rule as it relates to the comments we received to the proposal.

Instructions for Installing and Operating the Engine

We revised § 33.5, Instruction manual for installing and operating the engine, to require applicants to list in the installation instructions the instruments necessary for satisfactory control of the engine. The new § 33.5 also requires that the limits of accuracy and transient response required for satisfactory engine operation be identified so the suitability of the instruments as installed can be assessed.

General Electric (GE) indicated the definition of the reliability, accuracy, and transient response requirements should not be required in part 33 and would be more appropriate for evaluation as part of compliance with part 25.

During the design, development and certification of an engine, the engine manufacturer must determine the specific information the pilot needs to control the engine. The engine manufacturer must convey this information, which includes necessary measurement data, to the installer. In addition, the FAA notes that the engine manufacturer, rather than the installer, should know the transient capability needed by the display to accurately represent the engine behavior. We did

not change the final rule due to this comment.

In the final rule, we are adding a paragraph (b)(5) that was originally proposed in the NPRM as paragraph (b)(4). We are doing this because another final rule, ''Rotorcraft Turbine Engines One-Engine-Inoperative (OEI) Ratings, Type Certification Standards'' has already added paragraph (b)(4) to this section.

Engine Ratings and Operating Limitations

The revised § 33.7 requires that the overall limits of accuracy of the engine control system and the necessary instruments, as defined in § 33.5(a)(6), be considered when determining engine performance and operating limitations.

Sino Swearingen, a business jet manufacturer, suggested any assumptions made relative to the accuracy of installer-supplied instruments should be stated as assumptions in the installation manual. The FAA believes this level of detail is excessive for a regulatory requirement. Therefore, we did not change the final rule due to this comment.

GE asserted that defining the accuracy limits for the aircraft-provided instruments should be a task for the airframe manufacturer and should be part of compliance with part 25 not part 33.

We find the engine manufacturer needs to determine the accuracy limits for aircraft-provided instruments and provide this information to the installer. Without this information, it is unclear if it is critical that a given parameter must be measured and displayed with an accuracy of 1% or as much as 20%, which is a significant difference to the installer. We did not change the final rule due to this comment.

None of the above comments to the proposed § 33.7 reflect the complexity of integration encountered during installation of an engine on an aircraft. Sections 33.7 and 33.5(a)(6) require that the engine manufacturer and the installer account for the accuracies and the documentation of these accuracies for the overall system as installed. This is to ensure the engine, as installed, can be operated within its limitations.

Engine Control Systems

We revised the title and contents of § 33.28 to apply to all types of engine control systems, including hydromechanical and reciprocating engine controls. Formerly, § 33.28 applied only to electrical and electronic engine control systems.

Engine Control Systems Validation

The revised § 33.28(b) prescribes requirements for engine control system validation. Section 33.28(b)(1) requires that applicants demonstrate their engine control system performs its intended function in the declared operating conditions, including the environmental conditions and flight envelope. Section 33.28(b)(1)(ii) also requires that the engine control system comply with §§ 33.51, 33.65, and 33.73, as appropriate, under all likely system inputs and allowable engine power or thrust demands.

GE found proposed § 33.28(b)(1)(ii) difficult to understand. GE suggested § 33.28(b)(1)(ii) be revised to read: ''Complies with the operability requirements of §§ 33.51, 33.65 and 33.73, as appropriate, under all likely system inputs and allowable engine power or thrust demands, unless it can be demonstrated that failure of the control function results in a non-dispatchable condition in the intended application.'' The FAA agrees and has revised the final rule to read as the commenter suggested.

Control Transitions

We revised § 33.28(c) to clarify the requirements for control transitions, including crew notification, when fault accommodation is implemented through alternate modes, channel changes, or changes from primary to back-up systems.

GE suggested that revised § 33.28(c)(1)(iii) requires the action of the flight crew be described in the engine operating instructions if the crew must respond to changes in control modes. GE claimed the indication of the mode change to the cockpit crew should be included in the compliance with part 33 but the action required by the crew should be reserved for compliance with part 25. GE also noted § 33.28(c)(2) requires the magnitude of a thrust change associated with a control mode change be described in the engine installation manual. GE believes it is only necessary for this information to be included in the engine installation manual if the flight crew is required to initiate, respond, or be aware of this mode change.

We note the intent of these changes to § 33.28(c) is to ensure the installer is aware of any engine or engine control operational differences and the recommended differences in procedures. We have observed this problem in some previous engine installations. The inclusion of these actions in the operating instructions draws the attention of the installer to this condition so that the crew action must be evaluated—and be found acceptable—under aircraft certification. This recommended crew action in the engine installation manual is a guideline for the installer and does not replace requirements for crew action that are normally included in the aircraft operations manual. We did not change the final rule due to this comment.

Engine Control System Failures

Revised § 33.28(d) consists of control system failure requirements formerly located in § 33.28(c). Section 33.28(d)(1) addresses integrity requirements, such as Loss of Thrust Control (LOTC)/Loss of Power Control (LOPC) requirements consistent with the intended application.

Section 33.28(d)(2) requires the engine control system be designed and constructed so that in its full-up configuration it is single fault tolerant, as determined by the Administrator, for electrical or electronic failures with respect to LOTC/LOPC events. We received no comments on proposed § 33.28(d)(2).

Sino Swearingen pointed out § 33.28(d)(1) requires the applicant to design a system that will achieve an LOTC rate compatible with intended application. However, Sino Swearingen notes that different aircraft categories (normal, commuter, transport, rotorcraft) have different levels of safety, associated reliability requirements, and software verification and validation requirements. Sino Swearingen asserted the ''intended application'' should, therefore, be specified in the engine installation instructions.

We do not believe this level of specificity is appropriate for a regulation, but we will provide appropriate LOTC/LOPC rates and levels of reliability in the advisory material that accompanies the rule.

System Safety Assessment

The revised § 33.28(e) requires a System Safety Assessment (SSA) for the engine control system. The SSA must identify faults or failures that would have harmful effects on the engine.

GE expressed concern that the conditions to be analyzed for compliance with § 33.28(e) are not clearly related to safety, as would be implied by the requirement that an SSA be done. The commenter believes the listed conditions would have a minor effect for a typical installation.

We note that under the SSA, in complying with §§ 33.28 and 33.75, applicants are required to identify faults or failures that would cause major,

hazardous and catastrophic engine effects. These types of faults would require an SSA and a reliability assessment. For example, faults that can lead to an LOTC and subsequent high thrust or an uncontrolled overspeed can cause a hazardous engine effect. Faults such as thrust in the wrong direction or excessive drag (propeller airplanes) or 'thrust failed high and not controllable' can produce a catastrophic aircraft effect. We find, therefore, that the conditions to be analyzed for an SSA under § 33.28(e) are clearly related to safety. We did not change the final rule due to this comment.

GE also claimed the phrase ''an effect on engine operability'' in § 33.28(e) is not ''bounded.'' The commenter felt this phrase should be modified to ''an effect on engine operability producing a surge or stall * * *''

The suggested phrasing is clearer and places the appropriate boundaries on the statement. We, therefore, revised § 33.28(e) in the final rule to include the suggested phrase.

GE commented that requiring an SSA addressing every single data element would impose additional costs to applicants. This final rule requires an aggregate SSA, not a separate analysis on every single data element. The SSA must identify faults or failures that would have harmful effects on the engine. It has been used in the certification process for the last several years and is already an existing requirement in Europe. Recent examples include certification of Pratt & Whitney's PW6000, Rolls-Royce's Model 250, and General Electric GEnx engines. We find that this manufacturer will not face additional cost from complying with this requirement because it already meets the existing European requirements.

Protection Systems

The new § 33.28(f) requires protective functions, such as overspeed protection systems, that preserve rotor integrity. Section 33.28(f)(2) adds a requirement that the design of electronic overspeed protection systems include a means for testing at least once per engine start/stop cycle to establish the availability of the system's function.

GE commented that the frequency at which the overspeed protection must be tested should be determined based on the application, the possible failure modes, and the potential of those failure modes.

We have found the requirement to test overspeed protection at least once per engine start/stop cycle is appropriate based on safety considerations. We note that if overspeed protection is not available, then exposure of an engine to a single failure could result in uncontrolled overspeed. We made no changes to the final rule due to this comment. We will, however, clarify in the advisory material that will accompany this rule that testing the overspeed system depends on a number of design and architecture factors. For example, the system architecture may implement a number of protection paths that have to be individually tested to confirm the system's functionality. Thus, while the test frequency is one flight cycle, it may take more than one flight cycle to complete the test of the overspeed protection system.

Aircraft-Supplied Data

The new § 33.28(h) prescribes requirements for single failures leading to loss, interruption, or corruption of aircraft-supplied data or data shared between engines. We modified the former fault accommodation requirement for loss of all aircraft-supplied data to require detection and accommodation for single failures leading to loss, interruption, or corruption of aircraft-supplied data. This accommodation must not result in an unacceptable change in thrust or power or an unacceptable change in engine operating and starting characteristics.

GE suggested the phrase ''as part of certification documentation'' be added to § 33.28(h)(2) to avoid confusion since other parts of this rule define what needs to be documented in the installation manual. FAA experience with previous engine programs has been that information on the effects of failures on engine power or thrust, engine operability, and starting characteristics is needed in the engine installation instructions to ensure that it is clearly communicated by the applicant to the installer. As a result of this comment, we modified the final rule to clarify that this information must be documented in the engine installation instructions.

Also, Sino Swearingen expressed concern that § 33.28(h)(2) does not define the unacceptable change in thrust or power or ''allowable degradation'' in engine operating and starting characteristics. We find that including this information in the rule would be overly prescriptive. Unacceptable changes or allowable degradation often depend on the installation. We find, therefore, that it is more appropriate to explain unacceptable changes in thrust, power, or engine operating and starting characteristics in the advisory material that accompanies this rule. We did not change the final rule due to this comment.

Aircraft-Supplied Electrical Power

The new § 33.28(i) establishes requirements for the response of the engine control system to the loss or interruption of electrical power supplied from the aircraft. Section 33.28(i) applies to all electrical power supplied to the engine control system, including that supplied from the aircraft power system and from the dedicated power source, if required.

GE commented the applicant should be able to identify the characteristics of any electrical power supplied from the aircraft to the engine control system for starting and operating the engine in any document that is part of the certification process rather than in the engine instructions for installation, as required by the proposed rule.

The FAA has observed a significant number of problems caused by inadequate communication between the applicant and the installer regarding aircraft-supplied electrical power. We have found it is critical that this level of detail be clearly communicated by the applicant to the installer. The FAA notes also that at the time of engine certification, it is not always clear who the ultimate installer(s) will be. Providing these details, therefore, in the engine instructions for installation will help to ensure the installer has the needed information. We did not change the final rule due to this comment.

Programmable Logic Devices

The new § 33.28(m) establishes safety requirements for programmable logic devices (PLDs) that include application-specific integrated circuits and programmable gate arrays. The rule requires that development of the devices and associated encoded logic used in their design and implementation be at a level equal to the hazard level of the functions performed via the devices.

EASA suggested that the FAA should clarify the rule to ensure it is not the FAA's intent to mandate that the type certificate (TC) holder design and implement PLD logic. EASA argued the TC holder should only be required to provide evidence that these devices have been developed using a method, for example DO–254, that is acceptable to the FAA.

We agree with EASA that the proposed language might be misinterpreted. We, therefore, have revised § 33.28(m) in the final rule to indicate the applicant must provide evidence that PLDs have been developed in accordance with a method approved by the FAA.

Instrument Connection

We revised § 33.29 by adding new paragraphs (e) through (h). The new § 33.29(e) requires that applicants provide instrumentation necessary to ensure engine operation in compliance with the engine operating limitations. The new § 33.29(f) requires that applicants provide a means to minimize the possibility of incorrect fitting of instruments, sensors and connectors. The new § 33.29(g) reduces the probability of faults propagating from the instrumentation and monitoring functions to the control functions, or vice versa, by prescribing that the probability of propagation of faults be consistent with the criticality of the function performed. The new § 33.29(h) adds requirements for instrumentation that enables the flight crew to monitor the functioning of the turbine case cooling system.

Sino Swearingen agreed it is appropriate in § 33.29(f) to specify that the engine design should include means to prevent improper installation or ''fit'' of instruments, sensors and connectors. Sino Swearingen commented, however, that it is virtually impossible to consider the effects of multiple possible incorrect assembly and installation scenarios within the engine control system's SSA especially since it must consider airplane-installed instruments to be comprehensive.

The FAA notes the intent of this rule is to achieve an engine design where the fit of the installation will prevent an accidental incorrect assembly. When incorrect fit cannot be ensured, the SSA needs to address the effects of the incorrect assembly. The FAA is not intending to include aircraft-installed instruments in this assessment. We did not change the final rule due to this comment.

Engine Overtemperature Test

We did not propose changes to this section in the NPRM. We are, however, changing a reference in this section in the final rule from § 33.67(d) to § 33.28(k) because this rule eliminates § 33.67(d) and moves its contents to § 33.28(k). We did not make any other changes to § 33.88 by this rule.

Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)) requires the FAA consider the impact of paperwork and other information collection burdens imposed on the public. We have determined there is no current or new requirement for information collection associated with this amendment.

An agency may not collect or sponsor the collection of information, nor may it impose an information collection requirement unless it displays a currently valid Office of Management and Budget (OMB) control number.

International Compatibility

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to comply with International Civil Aviation Organization (ICAO) Standards and Recommended Practices to the maximum extent practicable. The FAA has reviewed the corresponding ICAO Standards and Recommended Practices and has identified no differences with these regulations.

Regulatory Evaluation, Regulatory Flexibility Determination, International Trade Impact Assessment, and Unfunded Mandates Assessment

Changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 directs each Federal agency propose or adopt a regulation only upon a determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 (Pub. L. 96–354) requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Trade Agreements Act (Pub. L. 96–39) prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. In developing U.S. standards, this Trade Act also requires agencies to consider international standards and, where appropriate, use them as the basis of U.S. standards. Fourth, the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local, or tribal governments, in the aggregate, or by private sector, of $100 million or more annually (adjusted for inflation with base year of 1995). This portion of the preamble summarizes the FAA's analysis of the economic impacts of this final rule.

Department of Transportation Order DOT 2100.5 prescribes policies and procedures for simplification, analysis, and review of regulations. If the expected cost impact is so minimal that a proposed or final rule does not warrant a full evaluation, this order permits that a statement to that effect, and the basis for it, be included in the preamble if a full regulatory evaluation of the cost and benefits is not prepared. Such a determination has been made for this final rule.

Presently, engine manufacturers must satisfy both United States and European requirements to certify and market part 33 engines in both the United States and in Europe. Meeting two sets of certification requirements raises the cost of developing a new engine often with no increase in safety. In the interest of fostering international trade, lowering the cost of engine development, and making the certification process more efficient, the FAA, EASA, and manufacturers have worked to create to the maximum extent possible a single set of certification requirements accepted in both the United States and Europe. These efforts are referred to as harmonization.

This final rule codifies current industry practices and harmonizes FAA requirements for aircraft engine control systems with similar requirements recently adopted by EASA, thereby simplifying airworthiness approvals for import and export. Similar international requirements reduce duplicative testing which will reduce certification costs. The FAA has not attempted to quantify the cost savings that may accrue due to this specific rule, beyond noting that while they may be minimal they contribute to harmonization savings. In addition, a potential for increased safety lies in having clearer and more explicit regulations. The agency concludes that there is consensus among potentially impacted manufacturers that savings will result, and further analysis is not required. The benefits of this final rule justify the costs and the existing level of safety will be preserved.

Economic Summary

The FAA has determined that the benefits of this final rule justify the costs. It is not a ''significant regulatory action'' as defined in section 3(f) of Executive Order 12866, and is not ''significant'' as defined in DOT's Regulatory Policies and Procedures.

Final Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (Pub. L. 96–354) (RFA) establishes ''as a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that such proposals are given serious consideration.'' The RFA covers a wide-range of small entities,

including small businesses, not-for-profit organizations, and small governmental jurisdictions.

Agencies must perform a review to determine whether a rule will have a significant economic impact on a substantial number of small entities. If the agency determines that it will, the agency must prepare a regulatory flexibility analysis as described in the RFA.

However, if an agency determines that a rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) of the RFA provides that the head of the agency may so certify and a regulatory flexibility analysis is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

During the comment period, one individual questioned our determination that the rule would not affect a substantial number of small entities. In the Initial Regulatory Flexibility Determination, we found there would not be a significant economic impact on a substantial number of small entities and used the broadest category, ''more than just a few,'' in determining if a substantial number of small entities were impacted. There were no other comments on the potential effect on small businesses.

Although there are engine manufacturers who qualify as small businesses based on Small Business Administration Size Standards, this rule reduces cost. Our final regulatory flexibility determination is that this final rule will not have a significant economic impact on a substantial number of small entities.

Therefore, as the Acting FAA Administrator, I certify that this final rule will not have a significant economic impact on a substantial number of small entities.

International Trade Impact Assessment

The Trade Agreements Act of 1979 (Pub. L. 96–39) prohibits Federal agencies from establishing any standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. Legitimate domestic objectives, such as safety, are not considered unnecessary obstacles. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards.

This final rule considers and incorporates an international standard as the basis of an FAA regulation. Thus this final rule complies with The Trade Agreements Act of 1979 and does not create unnecessary obstacles to international trade.

Unfunded Mandates Assessment

Title II of the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may result in an expenditure of $100 million or more (adjusted annually for inflation with the base year 1995) in any one year by State, local, and tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a ''significant regulatory action.'' The level equivalent of $100 million in CY 1995, adjusted for inflation to CY 2007 levels by the Consumer Price Index for all Urban Consumers (CPI–U) as published by the Bureau of Labor Statistics, is $136.1 million.

This final rule does not contain such a mandate. The requirements of Title II do not apply.

Executive Order 13132, Federalism

The FAA has analyzed this final rule under the principles and criteria of Executive Order 13132, Federalism. We have determined that this action will not have a substantial direct effect on the States, or the relationship between the national Government and the States, or on the distribution of power and responsibilities among the various levels of government, and, therefore, does not have federalism implications.

Environmental Analysis

FAA Order 1050.1E identifies FAA actions that are categorically excluded from preparation of an environmental assessment or environmental impact statement under the National Environmental Policy Act in the absence of extraordinary circumstances. The FAA has determined this rulemaking action qualifies for the categorical exclusion identified in paragraph 312d and involves no extraordinary circumstances.

Regulations That Significantly Affect Energy Supply, Distribution, or Use

The FAA has analyzed this final rule under Executive Order 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use (May 18, 2001). We have determined that it is not a ''significant energy action'' under the executive order because it is not a ''significant regulatory action'' under Executive Order 12866, and it is not likely to have a significant adverse effect on the supply, distribution, or use of energy.

Availability of Rulemaking Documents

You can get an electronic copy of rulemaking documents using the Internet by—

1. Searching the *Federal* eRulemaking Portal (*http://www.regulations.gov*);

2. Visiting the FAA's Regulations and Policies Web page at *http://www.faa.gov/regulations_policies/*; or

3. Accessing the Government Printing Office's Web page at *http://www.gpoaccess.gov/fr/index.html.*

You can also get a copy by sending a request to the Federal Aviation Administration, Office of Rulemaking, ARM–1, 800 Independence Avenue, SW., Washington, DC 20591, or by calling (202) 267–9680. Make sure to identify the amendment number or docket number of this rulemaking.

Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act statement in the **Federal Register** published on April 11, 2000 (Volume 65, Number 70; Pages 19477–78) or you may visit *http://docketsinfo.dot.gov.*

Small Business Regulatory Enforcement Fairness Act

The Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 requires the FAA to comply with small entity requests for information or advice about compliance with statutes and regulations within its jurisdiction. If you are a small entity and you have a question regarding this document, you may contact your local FAA official, or the person listed under the **FOR FURTHER INFORMATION CONTACT** heading at the beginning of the preamble. You can find out more about SBREFA on the Internet at *http://www.faa.gov/regulations_policies/rulemaking/sbre_act/*.

List of Subjects in 14 CFR Part 33

Aircraft, Aviation safety, Life-limited parts, Reporting and recordkeeping requirements.

The Amendment

■ In consideration of the foregoing, the Federal Aviation Administration amends Chapter I of Title 14, Code of Federal Regulations as follows:

PART 33—AIRWORTHINESS STANDARDS: AIRCRAFT ENGINES

■ 1. The authority citation for part 33 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701–44702, 44704

■ 2. Amend § 33.5 by adding new paragraphs (a)(4), (a)(5), (a)(6), and (b)(5), to read as follows:

§ 33.5 Instruction manual for installing and operating the engine.

* * * * *

(a) * * *

(4) A definition of the physical and functional interfaces with the aircraft and aircraft equipment, including the propeller when applicable.

(5) Where an engine system relies on components that are not part of the engine type design, the interface conditions and reliability requirements for those components upon which engine type certification is based must be specified in the engine installation instructions directly or by reference to appropriate documentation.

(6) A list of the instruments necessary for control of the engine, including the overall limits of accuracy and transient response required of such instruments for control of the operation of the engine, must also be stated so that the suitability of the instruments as installed may be assessed.

(b) * * *

(5) A description of the primary and all alternate modes, and any back-up system, together with any associated limitations, of the engine control system and its interface with the aircraft systems, including the propeller when applicable.

* * * * *

■ 3. Amend § 33.7 by adding new paragraph (d) to read as follows:

§ 33.7 Engine ratings and operating limitations.

* * * * *

(d) In determining the engine performance and operating limitations, the overall limits of accuracy of the engine control system and of the necessary instrumentation as defined in § 33.5(a)(6) must be taken into account.

■ 4. Amend § 33.27 by revising paragraph (b) to read as follows:

§ 33.27 Turbine, compressor, fan, and turbosupercharger rotors.

* * * * *

(b) The design and functioning of engine systems, instruments, and other methods, not covered under § 33.28 must give reasonable assurance that those engine operating limitations that affect turbine, compressor, fan, and turbosupercharger rotor structural integrity will not be exceeded in service.

* * * * *

■ 5. Revise § 33.28 to read as follows:

§ 33.28 Engine control systems.

(a) *Applicability.* These requirements are applicable to any system or device that is part of engine type design, that controls, limits, or monitors engine operation, and is necessary for the continued airworthiness of the engine.

(b) *Validation.*

(1) *Functional aspects.* The applicant must substantiate by tests, analysis, or a combination thereof, that the engine control system performs the intended functions in a manner which:

(i) Enables selected values of relevant control parameters to be maintained and the engine kept within the approved operating limits over changing atmospheric conditions in the declared flight envelope;

(ii) Complies with the operability requirements of §§ 33.51, 33.65 and 33.73, as appropriate, under all likely system inputs and allowable engine power or thrust demands, unless it can be demonstrated that failure of the control function results in a non-dispatchable condition in the intended application;

(iii) Allows modulation of engine power or thrust with adequate sensitivity over the declared range of engine operating conditions; and

(iv) Does not create unacceptable power or thrust oscillations.

(2) *Environmental limits.* The applicant must demonstrate, when complying with §§ 33.53 or 33.91, that the engine control system functionality will not be adversely affected by declared environmental conditions, including electromagnetic interference (EMI), High Intensity Radiated Fields (HIRF), and lightning. The limits to which the system has been qualified must be documented in the engine installation instructions.

(c) *Control transitions.*

(1) The applicant must demonstrate that, when fault or failure results in a change from one control mode to another, from one channel to another, or from the primary system to the back-up system, the change occurs so that:

(i) The engine does not exceed any of its operating limitations;

(ii) The engine does not surge, stall, or experience unacceptable thrust or power changes or oscillations or other unacceptable characteristics; and

(iii) There is a means to alert the flight crew if the crew is required to initiate, respond to, or be aware of the control mode change. The means to alert the crew must be described in the engine installation instructions, and the crew action must be described in the engine operating instructions;

(2) The magnitude of any change in thrust or power and the associated transition time must be identified and described in the engine installation instructions and the engine operating instructions.

(d) *Engine control system failures.* The applicant must design and construct the engine control system so that:

(1) The rate for Loss of Thrust (or Power) Control (LOTC/LOPC) events, consistent with the safety objective associated with the intended application can be achieved;

(2) In the full-up configuration, the system is single fault tolerant, as determined by the Administrator, for electrical or electronic failures with respect to LOTC/LOPC events;

(3) Single failures of engine control system components do not result in a hazardous engine effect; and

(4) Foreseeable failures or malfunctions leading to local events in the intended aircraft installation, such as fire, overheat, or failures leading to damage to engine control system components, do not result in a hazardous engine effect due to engine control system failures or malfunctions.

(e) S*ystem safety assessment.* When complying with this section and § 33.75, the applicant must complete a System Safety Assessment for the engine control system. This assessment must identify faults or failures that result in a change in thrust or power, transmission of erroneous data, or an effect on engine operability producing a surge or stall together with the predicted frequency of occurrence of these faults or failures.

(f) *Protection systems.*

(1) The design and functioning of engine control devices and systems, together with engine instruments and operating and maintenance instructions, must provide reasonable assurance that those engine operating limitations that affect turbine, compressor, fan, and turbosupercharger rotor structural integrity will not be exceeded in service.

(2) When electronic overspeed protection systems are provided, the design must include a means for testing, at least once per engine start/stop cycle, to establish the availability of the protection function. The means must be such that a complete test of the system can be achieved in the minimum number of cycles. If the test is not fully automatic, the requirement for a manual test must be contained in the engine instructions for operation.

(3) When overspeed protection is provided through hydromechanical or mechanical means, the applicant must demonstrate by test or other acceptable means that the overspeed function remains available between inspection and maintenance periods.

(g) *Software.* The applicant must design, implement, and verify all associated software to minimize the existence of errors by using a method, approved by the FAA, consistent with the criticality of the performed functions.

(h) *Aircraft-supplied data.* Single failures leading to loss, interruption or corruption of aircraft-supplied data (other than thrust or power command signals from the aircraft), or data shared between engines must:

(1) Not result in a hazardous engine effect for any engine; and

(2) Be detected and accommodated. The accommodation strategy must not result in an unacceptable change in thrust or power or an unacceptable change in engine operating and starting characteristics. The applicant must evaluate and document in the engine installation instructions the effects of these failures on engine power or thrust, engine operability, and starting characteristics throughout the flight envelope.

(i) *Aircraft-supplied electrical power.*

(1) The applicant must design the engine control system so that the loss, malfunction, or interruption of electrical power supplied from the aircraft to the engine control system will not result in any of the following:

(i) A hazardous engine effect, or

(ii) The unacceptable transmission of erroneous data.

(2) When an engine dedicated power source is required for compliance with paragraph (i)(1) of this section, its capacity should provide sufficient margin to account for engine operation below idle where the engine control system is designed and expected to recover engine operation automatically.

(3) The applicant must identify and declare the need for, and the characteristics of, any electrical power supplied from the aircraft to the engine control system for starting and operating the engine, including transient and steady state voltage limits, in the engine instructions for installation.

(4) Low voltage transients outside the power supply voltage limitations declared in paragraph (i)(3) of this section must meet the requirements of paragraph (i)(1) of this section. The engine control system must be capable of resuming normal operation when aircraft-supplied power returns to within the declared limits.

(j) *Air pressure signal.* The applicant must consider the effects of blockage or leakage of the signal lines on the engine control system as part of the System Safety Assessment of paragraph (e) of this section and must adopt the appropriate design precautions.

(k) *Automatic availability and control of engine power for 30-second OEI rating.* Rotorcraft engines having a 30-second OEI rating must incorporate a means, or a provision for a means, for automatic availability and automatic control of the 30-second OEI power within its operating limitations.

(l) *Engine shut down means.* Means must be provided for shutting down the engine rapidly.

(m) *Programmable logic devices.* The development of programmable logic devices using digital logic or other complex design technologies must provide a level of assurance for the encoded logic commensurate with the hazard associated with the failure or malfunction of the systems in which the devices are located. The applicant must provide evidence that the development of these devices has been done by using a method, approved by the FAA, that is consistent with the criticality of the performed function.

■ 6. Amend § 33.29 by adding new paragraphs (e) through (h) to read as follows:

§ 33.29 Instrument connection.

* * * * *

(e) The applicant must make provision for the installation of instrumentation necessary to ensure operation in compliance with engine operating limitations. Where, in presenting the safety analysis, or complying with any other requirement, dependence is placed on instrumentation that is not otherwise mandatory in the assumed aircraft installation, then the applicant must specify this instrumentation in the engine installation instructions and declare it mandatory in the engine approval documentation.

(f) As part of the System Safety Assessment of § 33.28(e), the applicant must assess the possibility and subsequent effect of incorrect fit of instruments, sensors, or connectors. Where necessary, the applicant must take design precautions to prevent incorrect configuration of the system.

(g) The sensors, together with associated wiring and signal conditioning, must be segregated, electrically and physically, to the extent necessary to ensure that the probability of a fault propagating from instrumentation and monitoring functions to control functions, or vice versa, is consistent with the failure effect of the fault.

(h) The applicant must provide instrumentation enabling the flight crew to monitor the functioning of the turbine cooling system unless appropriate inspections are published in the relevant manuals and evidence shows that:

(1) Other existing instrumentation provides adequate warning of failure or impending failure;

(2) Failure of the cooling system would not lead to hazardous engine effects before detection; or

(3) The probability of failure of the cooling system is extremely remote.

■ 7. Amend § 33.53 by revising the section heading and paragraph (a) to read as follows:

§ 33.53 Engine system and component tests.

(a) For those systems and components that cannot be adequately substantiated in accordance with endurance testing of § 33.49, the applicant must conduct additional tests to demonstrate that systems or components are able to perform the intended functions in all declared environmental and operating conditions.

* * * * *

§ 33.67 [Amended]

■ 8. Remove paragraph (d) from § 33.67.

■ 9. Amend § 33.88 by revising paragraph (b) to read as follows:

§ 33.88 Engine overtemperature test.

* * * * *

(b) In addition to the test requirements in paragraph (a) of this section, each engine for which 30-second OEI and 2-minute OEI ratings are desired, that incorporates a means for automatic temperature control within its operating limitations in accordance with § 33.28(k), must run for a period of 4 minutes at the maximum power-on rpm with the gas temperature at least 35 °F (19 °C) higher than the maximum operating limit at 30-second OEI rating. Following this run, the turbine assembly may exhibit distress beyond the limits for an overtemperature condition provided the engine is shown by analysis or test, as found necessary by the FAA, to maintain the integrity of the turbine assembly.

* * * * *

■ 10. Amend § 33.91 by revising the section heading and paragraph (a) to read as follows:

§ 33.91 Engine system and component tests.

(a) For those systems or components that cannot be adequately substantiated in accordance with endurance testing of § 33.87, the applicant must conduct additional tests to demonstrate that the systems or components are able to perform the intended functions in all declared environmental and operating conditions.

* * * * *

Issued in Washington, DC, on July 2, 2008.

Robert A. Sturgell,

Acting Administrator.

[FR Doc. E8–19048 Filed 8–18–08; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA–2008–0627; Directorate Identifier 2008–CE–033–AD; Amendment 39–15647; AD 2008–17–09]

RIN 2120–AA64

Airworthiness Directives; EADS SOCATA Model TBM 700 Airplanes

AGENCY: Federal Aviation Administration (FAA), Department of Transportation (DOT).

ACTION: Final rule.

SUMMARY: We are superseding an existing airworthiness directive (AD) for the products listed above. This AD results from mandatory continuing airworthiness information (MCAI) issued by an aviation authority of another country to identify and correct an unsafe condition on an aviation product. The MCAI describes the unsafe condition as:

A rupture of the alternator and vapour cycle cooling system pulley drive assembly has reportedly been found. Such a failure could lead to the loss of the alternator and vapour cycle cooling systems and could also cause mechanical damage inside the powerplant compartment.

We are issuing this AD to require actions to correct the unsafe condition on these products.

DATES: This AD becomes effective September 23, 2008.

As of September 23, 2008, the Director of the Federal Register approved the incorporation by reference of certain publications listed in this AD.

ADDRESSES: You may examine the AD docket on the Internet at *http://www.regulations.gov* or in person at the Docket Management Facility, U.S. Department of Transportation, Docket Operations, M–30, West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue, SE., Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT Albert Mercado, Aerospace Engineer, FAA, Small Airplane Directorate, 901 Locust, Room 301, Kansas City, Missouri 64106; *telephone:* (816) 329–4119; *fax*: (816) 329–4090.

SUPPLEMENTARY INFORMATION:

Discussion

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to include an AD that would apply to the specified products. That NPRM was published in the **Federal Register** on June 9, 2008 (73 FR 32495), and proposed to supersede AD 2008–10–13, Amendment 39–15520 (73 FR 26318, May 9, 2008). That NPRM proposed to correct an unsafe condition for the specified products. The MCAI states that:

A rupture of the alternator and vapour cycle cooling system pulley drive assembly has reportedly been found. Such a failure could lead to the loss of the alternator and vapour cycle cooling systems and could also cause mechanical damage inside the powerplant compartment.

To address this condition, AD 2008–0063–E had been published to require a check of the pulley drive assembly for leakage and, as an interim action, removal of the compressor drive belt from the assembly, and adoption of a new operational procedure to keep the air-conditioning system deactivated.

This AD retains the requirements of AD 2008–0063–E which is superseded, introduces a mandatory terminating action which consists in replacing the original pulley drive assembly by a new one of an improved design—corresponding to the EADS SOCATA modification MOD 70–0231–21—that permits reinstallation of the compressor drive belt.

Comments

We gave the public the opportunity to participate in developing this AD. We received no comments on the NPRM or on the determination of the cost to the public.

Conclusion

We reviewed the available data and determined that air safety and the public interest require adopting the AD as proposed.

Differences Between This AD and the MCAI or Service Information

We have reviewed the MCAI and related service information and, in general, agree with their substance. But we might have found it necessary to use different words from those in the MCAI to ensure the AD is clear for U.S. operators and is enforceable. In making these changes, we do not intend to differ substantively from the information provided in the MCAI and related service information.

We might also have required different actions in this AD from those in the MCAI in order to follow FAA policies. Any such differences are highlighted in a NOTE within the AD.

Costs of Compliance

We estimate that this AD will affect 21 products of U.S. registry. We also estimate that it will take about 10 work-hours per product to comply with basic requirements of this AD. The average labor rate is $80 per work-hour. Required parts will cost about $2,912 per product.

Based on these figures, we estimate the cost of this AD to the U.S. operators to be $77,952, or $3,712 per product.

Authority for This Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. ''Subtitle VII: Aviation Programs,'' describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in ''Subtitle VII, Part A, Subpart III, Section 44701: General requirements.'' Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

We determined that this AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify this AD:

(1) Is not a ''significant regulatory action'' under Executive Order 12866;

(2) Is not a ''significant rule'' under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); and

(3) Will not have a significant economic impact, positive or negative, on a substantial number of small entities