# EASA Decision not to adopt FAA AD 2020-18-12

**EASA considerations, leading to the decision not to adopt Federal Aviation Administration (FAA) AD 2020-18-12**

On 21 September 2020, the FAA issued AD 2020-18-12, applicable to certain Boeing 777 aeroplanes, except those on which the wing centre box is a dry bay and not part of the fuel tank, or modified to install a Flammability Reduction System (FRS), or equipped with an ignition mitigation means.

That AD requires modifying the fuel quantity indicating system (FQIS) to prevent development of an ignition source inside the centre fuel tank.

EASA is not in possession of sufficient data to allow determination of an unsafe condition and to support corrective action that would be deemed proportionate to the risk. Consequently, there is insufficient justification to warrant the actions as required by FAA AD 2020-18-12.

For the reason described above, EASA has decided not to adopt FAA AD 2020-18-12.

However, EASA is considering possible alternative action(s) to mitigate the safety risk addressed by FAA AD 2020-18-12 for aeroplanes operating under EU regulation. In that regard, EASA will be closely coordinating with the design approval holder and the FAA for obtaining and accessing additional data.

For further information, please contact the Programming and Continued Airworthiness Information Section, Certification Directorate, EASA, E-mail: ADs@easa.europa.eu.

Original Signed

Cologne, 24 September 2020

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**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 39**

**[Docket No. FAA-2016-6140; Product Identifier 2015-NM-059-AD; Amendment 39-21233; AD 2020-18-12]**

**RIN 2120-AA64**

**Airworthiness Directives; The Boeing Company Airplanes**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule.

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**SUMMARY:** The FAA is adopting a new airworthiness directive (AD) for certain The Boeing Company Model 777-200, -200LR, and -300 series airplanes. This AD was prompted by the FAA's analysis of the Model 777 fuel system reviews conducted by the manufacturer. This AD requires modifying the fuel quantity indicating system (FQIS) to prevent development of an ignition source inside the center fuel tank due to electrical fault conditions. This AD also provides alternative actions for cargo airplanes. The FAA is issuing this AD to address the unsafe condition on these products.

**DATES:** This AD is effective October 26, 2020.

**ADDRESSES:**
**Examining the AD Docket**

You may examine the AD docket on the internet at https://www.regulations.gov by searching for and locating Docket No. FAA-2016-6140; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, any comments received, and other information. The address for Docket Operations is 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:** Jon Regimbal, Aerospace Engineer, Propulsion Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3557; email: Jon.Regimbal@faa.gov.

## SUPPLEMENTARY INFORMATION:

### Discussion

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to certain The Boeing Company Model 777 airplanes. The NPRM published in the Federal Register on May 4, 2016 (81 FR 26750). The NPRM was prompted by the FAA's analysis of the Model 777 fuel system reviews conducted by the manufacturer. The NPRM proposed to require modifying the FQIS to prevent development of an ignition source inside the center fuel tank due to electrical fault conditions. The NPRM also proposed to provide alternative actions for cargo airplanes. The FAA is issuing this AD to address ignition sources inside the center fuel tank, which, in combination with flammable fuel vapors, could result in a fuel tank explosion and consequent loss of the airplane.

### Comments

The FAA gave the public the opportunity to participate in developing this final rule. The following presents the comments received on the NPRM and the FAA's response to each comment.

### Support for the NPRM

The Air Line Pilots Association, International (ALPA) and National Air Traffic Controllers Association (NATCA) supported the intent of the NPRM. Additional comments from NATCA are addressed below.

### Request To Withdraw NPRM: No Unsafe Condition

Boeing requested that the FAA withdraw the NPRM. Boeing suggested that, by requiring center fuel tank FQIS wire separation for passenger airplanes that have not incorporated a nitrogen generating system (NGS), the NPRM specifically addresses airplanes regulated by the European Union Aviation Safety Agency (EASA) and other civil aviation authorities and the lack of a flammability reduction means (FRM) rule. Boeing stated that because it considered the use of FRM (NGS) to address unknown ignition sources as the final corrective action, Boeing has not developed center tank FQIS wire separation service instructions for passenger aircraft. Boeing stated that it believes no unsafe condition exists and does not feel that the lack of FRM rule harmonization should cause additional work and expense for airlines.

The FAA disagrees with the commenter's request. The FAA determined that an unsafe condition exists using the criteria in FAA Policy Memorandum ANM100-2003-112-15, “SFAR 88–Mandatory Action Decision Criteria,” dated February 25, 2003.[1] That policy was used to evaluate the noncompliant design areas identified in the manufacturer's fuel system reviews and to determine which noncompliance issues were unsafe conditions that required corrective action under 14 CFR part 39. The FAA's unsafe condition determination was not based on an assessment of average risk or total fleet risk, but rather was driven by the qualitative identification of an unacceptable level of individual risk that exists on flights that are anticipated to occur with a preexisting latent in-tank failure condition and with a flammable center fuel tank. For these reasons, and based on further detailed responses to similar comments in the supplemental NPRM (SNPRM) for Docket No. FAA-2012-0187 (80 FR 9400, February 23, 2015), and in the subsequently issued final rule, AD 2016-07-07, Amendment 39-18452 (81 FR 19472, April 5, 2016) (“AD 2016-07-07”), which addressed the

[1]http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgPolicy.nsf/0/dc94c3a46396950386256d5e006aed11/$FILE/Feb2503.pdf.

same unsafe condition for Boeing Model 757 airplanes, the FAA has determined that it is necessary to issue this final rule.

**Request To Withdraw NPRM: Unjustified by Risk**

KLM Royal Dutch Airlines (KLM), Cathay Pacific (Cathay), and Emirates requested that the FAA withdraw the NPRM. KLM stated that it understands that Boeing is not able to explain or substantiate the rationale behind the NPRM. Singapore Airlines (SIA) suggested that the FAA should consider the Special Federal Aviation Regulation (SFAR) No. 88 (in 14 CFR part 21) modifications that have already been implemented to mitigate ignition risks and the resultant reduced risk exposure. SIA added that the determination of the risk level should also consider the remaining operating life of the Model 777 fleet. The FAA infers that SIA is also requesting that the NPRM be withdrawn. Cathay noted that operators have already accomplished numerous SFAR 88-related service bulletins, which have increased the level of fuel system safety. KLM and Emirates stated that the NPRM does not clarify the necessity of additional actions beyond the currently mandated SFAR 88-related service bulletins, airworthiness limitations, and critical design configuration control limitations (CDCCLs).

The FAA disagrees with the commenters' request. The FAA notes that similar comments were addressed in the SNPRM for Docket No. FAA-2012-0187 in the comment response for “Request To Withdraw NPRM (77 FR 12506, March 1, 2012): Unjustified by Risk.” As explained in that comment response, in addition to examining average risk and total fleet risk, the FAA examines the individual flight risk on the worst reasonably anticipated flights. In general, the FAA issues ADs in cases where reasonably anticipated flights with preexisting failures (either due to latent failure conditions or allowable dispatch configurations) are vulnerable to a catastrophic event due to an additional foreseeable single failure condition. This is because the FAA considers operation of flights vulnerable to a potentially catastrophic single failure condition to be an excessive safety risk to the passengers on those flights. The FAA has determined that the currently mandated SFAR 88 service bulletins, airworthiness limitations, and critical design configuration control limitations do not adequately address the unsafe condition identified in this AD and therefore it is necessary to issue this final rule. The FAA has not changed this AD regarding this issue.

**Request To Withdraw NPRM: Inadequate Fleet Exposure and Cost Estimates**

Boeing requested that the FAA withdraw the NPRM. Boeing stated that the fleet exposure for the affected fleet continues to decrease due to aging airplanes. Boeing added that the estimated costs in the NPRM do not take into account the costs of compliance for passenger airplanes without FRM installed.

The FAA disagrees with the commenter's request. The FAA did not base its unsafe condition determination on fleet risk but instead on individual risk. This is discussed in detail in the response to comments in the SNPRM for Docket No. FAA-2012-0187, under the heading “Request To Withdraw NPRM (77 FR 12506, March 1, 2012): Unjustified by Risk.” Therefore, the age of the airplane does not affect the determination that an unsafe condition still exists on an individual airplane.

The NPRM for this final rule did contain a cost estimate for passenger airplanes that was based on the estimate provided by Boeing for the Model 757 and Model 767 airplanes, which have an FQIS of similar design. The FAA notes that Boeing asserted that the cost to operators of modifying an airplane's FQIS to be fully compliant with the airworthiness standards would be similar to the cost of installing Boeing's NGS flammability reduction system. Based on that, Boeing requested that the FAA agree to not require Boeing to develop service information for a fully compliant FQIS modification. However, the FAA used Boeing's estimate of the cost to modify the Model 757 and Model 767 FQIS to a fully part-25-compliant configuration to provide the estimated costs in the NPRM, based on an assumption that the cost for Model 747 airplanes would be similar. At the time, Boeing concurred with this estimate. This is discussed in detail in the response to comments in the SNPRM for Docket No. FAA-2012-0187. The FAA has not changed this AD regarding this issue.

**Request To Cancel Any Retroactive Modification Requirements**

Cathay and KLM requested that any plans to require retroactive modification to install FRM on in-service airplanes be cancelled. Cathay stated that EASA does not plan to require retroactive modification to install FRM on in-service airplanes registered in the EASA member states. Cathay noted that Hong Kong Airworthiness Notice No. 103 states that FRM is non-mandatory on aircraft manufactured before February 1, 2012. Cathay added that if the NPRM is not withdrawn, it should be limited to U.S.-registered airplanes. KLM noted that the proposed AD would create a huge financial burden. KLM also noted that EASA only adopted the requirement to equip an FRM on newly delivered airplanes.

The FAA does not agree. First, the FAA has already issued a final rule, Reduction of Fuel Tank Flammability in Transport Category Airplanes (73 FR 42444, July 21, 2008), the Fuel Tank Flammability Reduction (FTFR) rule, which requires retrofitting of FRM or ignition mitigation means (IMM) on passenger airplanes. The FAA has no plans to rescind that action, which was intended to increase the level of fuel tank safety on transport airplanes. Separately from that rulemaking, the FAA has determined that an unsafe condition exists in several Boeing and Airbus models, including early versions of the Model 777 airplanes. The reasons behind that determination are detailed in the response to comments in the SNPRM for Docket No. FAA-2012-0187, under the heading "Request To Withdraw NPRM (77 FR 12506, March 1, 2012): Unjustified by Risk." The FAA acknowledges that the cost of this retrofitting may be high, but has determined that the unsafe condition must be addressed.

**Request To Record Only Certain Codes**

Boeing requested that paragraph (h)(1) of the proposed AD be revised to only require corrective actions if a nondispatchable fault code pertaining to the center wing tank is recorded (as opposed to any nondispatchable fault code being recorded). Boeing stated that all FQIS wire separation changes in the proposed AD are limited to the center wing tank, therefore only built-in test equipment (BITE) check messages pertaining to the center wing tank are applicable to the proposed AD. In addition, Boeing stated that a final rule should be postponed until the FAA develops a list of "nondispatchable fault codes" in conjunction with Boeing.

The FAA agrees that the unsafe condition addressed by this AD is limited to the center wing tank. However, the FAA does not agree that the AD should be changed as proposed by Boeing. It is not clear to the FAA whether there may be FQIS BITE fault codes that are not clearly identified as related to the center wing tank but that may impact center tank circuits. Therefore, the FAA has determined that all nondispatchable fault codes recorded prior to the BITE check or as a result of the BITE check required by paragraph (h)(1) of this AD must be addressed. Operators or Boeing may request an alternative method of compliance (AMOC) under the provisions of paragraph (i) of this AD if they can provide sufficient data that a particular fault code does not pertain to the unsafe condition addressed by this AD.

Regarding the requirement to record and address fault codes read immediately prior to running the BITE check procedure, the FAA notes that the normal Boeing procedure for performing an FQIS BITE check is to first erase all of the existing fault codes, then perform the BITE check and troubleshoot any resulting new fault codes. For this AD, the FAA did not want any already stored fault codes to be potentially ignored due to erasure at the first step because some of the failures of concern can be intermittent. This AD therefore requires operators to record the existing codes before doing the BITE check, then do the BITE check and record the new codes that result from that BITE check, and then do the appropriate troubleshooting and corrective action for both sets of codes per the manufacturer's guidance. The FAA has not changed this AD regarding this issue.

Finally, the FAA does not agree to delay the final rule while Boeing proposes and obtains FAA agreement on a list of nondispatchable fault codes. The FAA requested service information from

Boeing in 2016 to support the option for all-cargo airplanes on all of the Boeing models for which similar FQIS ADs were planned. Boeing chose at that time to develop service information only for the Model 747-400, 757, and 767 airplanes because at that time only those airplanes had affected cargo configuration for which Boeing was the design approval holder. The FAA agreed at that time to not require Boeing to develop a BITE check service bulletin for the Model 777 airplanes because Boeing had not yet developed a cargo conversion service bulletin or supplemental type certificate (STC) for the Model 777 airplanes. The FAA also considered that, because the BITE check instructions already existed in the Model 777 AMM, a BITE check service bulletin could be developed quickly at a later date if needed. In addition, the process for obtaining FAA agreement on a list of nondispatchable fault codes for the models Boeing chose to support took less than 30 days. If any service information is developed to support compliance with paragraph (h) of this AD it will be evaluated for approval using the AMOC process specified in paragraph (i) of this AD.

**Request To Exclude Certain Airplanes From the Applicability**

Boeing requested that the proposed AD be revised to exclude all Model 777-300ER and 777F airplanes, as well as all airplanes having line numbers 562 and subsequent. Boeing explained that all Model 777-300ER and 777F airplanes were produced with FQIS center wing tank wire separation that has been shown to be compliant with 14 CFR 25.981(a)(3) as amended by amendment 25-102 (66 FR 23086, May 7, 2001) (“amendment 25-102”). Boeing added that all Model 777 passenger airplanes after line number 562 were also produced with FQIS center wing tank wire separation that has been shown to be compliant with 14 CFR 25.981(a)(3), as amended by amendment 25-102.

KLM also requested that the proposed AD be revised to exclude line numbers 562 and subsequent because those airplanes have an improved FQIS wire separation, removing any potential for the unsafe condition to occur.

The FAA agrees for the reasons provided. The FAA has revised paragraph (c) of this AD to remove the requested airplanes from the applicability. The FAA has also revised the Costs of Compliance section of this AD accordingly.

**Request To Exclude Airplanes Based on Prior Incorporation of Certain Service Information**

Air France requested that the applicability of the proposed AD be revised to exclude airplanes on which certain service information has been incorporated.

The FAA disagrees with the commenter's request (which the commenter inadvertently posted to docket FAA-2016-6141). The service information mentioned by the commenter does not address the unsafe condition identified in this AD. The FAA has not changed this AD regarding this issue.

**Request To Remove Inspection Requirement for Cargo Airplanes**

Air France noted that paragraph (h)(1) of the proposed AD requires an inspection (BITE check) on cargo airplanes. Air France asked why this action is required on cargo airplanes but not passenger airplanes.

The FAA infers that the commenter is requesting that the FAA remove paragraph (h)(1) of this AD. The FAA disagrees with the commenter's request (which the commenter inadvertently posted to docket FAA-2016-6141). The FAA has determined that the changes required for passenger airplanes–either compliance with the FTFR regulations or modification of the FQIS to make it fully compliant with the airworthiness regulations–are adequate to address the unsafe condition without the periodic BITE check required under the optional method of compliance for cargo airplanes. The optional method of compliance for cargo airplanes does not require compliance with the FTFR regulations or a fully compliant FQIS modification so the additional checks are necessary. The FAA has not changed the AD regarding this issue.

**Request To Change Compliance Time**

Japan Airlines (JAL) requested that the FAA extend the compliance time for the modifications specified in paragraphs (g) and (h)(2) of the proposed AD to 72 months. JAL stated that Boeing anticipates that the installation of NGS will be an AMOC for the actions specified in the proposed AD. JAL added that some Model 777 airplanes are already being retired and that non-U.S. operators have not been mandated to install NGS. SIA requested that the compliance timeline take into consideration the lack of availability of a specific modification for operators to comply with, but did not request a specific change to the proposed compliance time.

Conversely, NATCA recommended that the FAA reject requests for a compliance time longer than 5 years as proposed in the NPRM. Assuming final rule issuance in 2016, NATCA stated that a 5-year compliance time would result in required compliance by 2021–25 years after the TWA Flight 800 fuel tank explosion that led to the requirements in SFAR 88, and 20 years after issuance of SFAR 88.

The FAA agrees with JAL's request to extend the compliance time, and disagrees with NATCA's request. The FAA received similar requests to extend the compliance time from several commenters regarding the NPRMs for the FQIS modification on other airplanes. The FAA has determined that a 72-month compliance time is appropriate and will provide operators adequate time to prepare for and perform the required modifications without excessive disruption of operations. The FAA has determined that the requested moderate increase in compliance time will continue to provide an acceptable level of safety. The FAA has revised paragraphs (g) and (h)(2) of this AD accordingly.

**Request To Exclude Airplanes To Be Retired**

British Airways (BA) requested that the proposed AD be revised to provide dispensation for aircraft to be retired, which would not be prohibitive for operators.

The FAA infers that the commenter is requesting an extension of the compliance time for airplanes that will be retired by a certain date or for the AD to exclude those airplanes from this AD. The FAA notes that the commenter did not propose a specific period of additional time for operation without addressing the unsafe condition, and did not propose any specific alternative corrective actions. In addition, it is the FAA's understanding that BA no longer operates any of the affected airplanes. As previously mentioned, the FAA has revised this AD to provide 72 months from the effective date of this AD for incorporation of the required modification, which should allow adequate time to plan for retiring aircraft if needed. If an operator wishes to make a specific proposal, they can submit that proposal using the AMOC process. The FAA has not changed this AD regarding this issue.

**Request To Address Unsafe Condition on All Fuel Tanks**

NATCA recommended that the FAA require design changes that eliminate unsafe FQIS failure conditions on all fuel tanks on the affected models, regardless of fuel tank location or the percentage of time the fuel tank is flammable. NATCA referred to four fuel tank explosions in low-flammability exposure time fuel tanks identified by the FAA during FTFR rulemaking. NATCA stated that neither FRM nor alternative actions for cargo airplanes (e.g., BITE checks (checks of built-in test equipment) followed by applicable repairs before further flight and modification of the center fuel tank FQIS wiring within 60 months) would bring the airplane into full regulatory compliance. NATCA added that the combination of failures described in the NPRM meets the criteria for “known combinations” of failures that require corrective action in FAA Policy Memorandum ANM100-2003-112-15.

The FAA disagrees with the commenter's request. The FAA has determined that, according to FAA Policy Memorandum ANM100-2003-112-15, the failure condition for the airplanes affected by this AD should not be classified as a “known combination.” While the FQIS design architecture is similar to that of the early Boeing Model 747 configuration that is suspected of contributing to the

TWA Flight 800 fuel tank explosion, significant differences exist in the design of FQIS components and wire installations between the affected Boeing airplane models and the early Model 747 airplanes such that the intent of the "known combinations" provision for low-flammability fuel tanks in the policy memorandum is not applicable. Therefore, this AD affects only the identified Boeing airplanes with high-flammability exposure time fuel tanks, as specified in paragraph (c) of this AD. The FAA provided a detailed response to similar comments in the preamble of the final rule for AD 2016-07-07. The FAA has not changed this final rule regarding this issue.

**Request To Require Cargo Airplane Option for All Airplanes**

Boeing requested that the NPRM be revised to make the alternative actions for cargo airplanes specified in paragraph (h) of the proposed AD applicable to all airplanes, including passenger airplanes with FRM not installed due to differences in foreign regulations. In addition, Boeing requested that the actions specified in paragraph (h) of the proposed AD become the primary means of compliance for all airplanes, not an alternative method of compliance for some airplanes.

The FAA disagrees with the commenter's request. As discussed in the comment response in the SNPRM for Docket No. FAA-2012-0187, under the heading "Requests To Withdraw NPRM (77 FR 12506, March 1, 2012) Based on Applicability" the FAA does not consider the alternative action for cargo airplanes allowed by this AD to provide an adequate level of safety for passenger airplanes. The FAA is willing to accept a higher level of individual flight risk exposure for cargo flights that are not fail-safe due to the absence of passengers and the resulting significant reduction in occupant exposure on a cargo airplane versus a passenger airplane, and due to relatively low estimated individual flight risk that would exist on a cargo airplane after the corrective actions are taken. The FAA has not changed this AD regarding this issue.

**Request To Exclude Certain Airplanes**

United Airlines (UAL) noted that 14 CFR 121.1117 requires that an FRM will have been installed on all affected airplanes in passenger configuration by December 26, 2018, well ahead of the compliance deadline of the proposed AD. UAL further suggested that the FAA either delete paragraph (g) of the proposed AD or make paragraph (g) of the proposed AD applicable only to airplanes in a cargo configuration that do not have an FRM installed and non-U.S.-registered airplanes that do not have to comply with FRM requirements.

The FAA disagrees with the commenter's request. There are other passenger-carrying airplanes operated under 14 CFR part 91 that are not required to install FRM. (The requirement to install FRM on all passenger-carrying airplanes operated by air carriers is in 14 CFR 121.1117.) The FAA notes that foreign air carriers may not have to comply with that requirement or similar requirements of their own civil aviation authority. EASA, for example, has chosen not to require FRM to be retrofitted to in-service airplanes. This AD is intended to require any Model 777 series passenger airplane that does not have FRM, regardless of the rules under which it is operated, to address the FQIS latent-plus-one unsafe condition with a corrective action that fully complies with the FAA airworthiness standards. This requirement fulfills the FAA's International Civil Aviation Organization (ICAO) obligation to address unsafe conditions on all of the aircraft manufactured by the state of design, not just those aircraft whose operation is under the jurisdiction of the state of design. The FAA has not changed this AD regarding this issue.

**Request To Clarify Certification Basis for Modification Requirements**

NATCA recommended that the FAA revise paragraph (g) of the proposed AD to clearly state that the required FQIS design changes must comply with the fail-safe requirements of 14 CFR 25.901(c), as amended by amendment 25-46 (43 FR 50597, October 30, 1978); and 14 CFR

25.981(a) and (b), as amended by amendment 25-102; NATCA added that these provisions are required by SFAR 88.

The FAA does not agree to change paragraph (g) of this AD. While the FAA agrees that modifications to comply with paragraph (g) of this AD should be required to comply with the referenced regulations, that requirement already exists in 14 CFR part 21. No change to this AD is necessary.

**Request To Require Modification on All Production Airplanes**

NATCA recommended that the FAA require designs that comply with 14 CFR 25.901(c) and 25.981(a)(3) on all newly produced transport airplanes. NATCA stated that continuing to grant exemptions to 14 CFR 25.901(c), as amended by amendment 25-40 (42 FR 15042, March 17, 1977); and 14 CFR 25.981(a)(3), as amended by amendment 25-102; has allowed continued production of thousands of airplanes with this known unsafe condition.

The FAA disagrees with the commenter's request. The recommendation to require production airplanes to fully comply with 14 CFR 25.901(c) and 14 CFR 25.981(a)(3) is outside the scope of this rulemaking. In addition, the FAA has implemented requirements for all large transport airplanes produced after September 2010 to include flammability reduction methods for tanks that would otherwise be high-flammability fuel tanks. Boeing incorporated this change into the Model 777 series airplanes that are still in production and the FAA has excluded those models from the applicability of this AD. The FAA has not changed this final rule regarding this issue.

**Request To State That an Exemption Is Required**

Boeing requested that paragraph (h) of the proposed AD be revised to state that an exemption is required to accomplish the specified actions. Boeing stated that the FAA has identified that the BITE procedure and wire separation design changes specified in the proposed AD are not sufficient for compliance to 14 CFR 25.981(a) at the FQIS level. Boeing stated that an exemption is therefore needed prior to approval of the related design change.

The FAA agrees to clarify. The BITE check is not a type design change or alteration, so no exemption from the airworthiness standards is required for that action. The design data approval of any partial wire separation modification would require an exemption. That exemption would be obtained by the party seeking approval of the alteration data, and no further exemption would be required for the party using that data to alter an aircraft. Obtaining such an exemption would be part of the certification process for such a change, so the FAA does not find it necessary to include such information in paragraph (h) of this AD. In addition, some parties may choose to comply with the AD using a design change that fully complies with the airworthiness standards. The FAA also notes that the commenter appears to misunderstand why an exemption is needed for the required modification. The exemption is needed because, even with the modification, the FQIS does not comply with 14 CFR 25.901(c) and 14 CFR 25.981(a). The exemption does not authorize evaluation of a partial system for compliance with the system level requirement. The FAA has not changed this AD regarding this issue.

**Request To Change Compliance Time Relative to Receipt of Exemption**

Boeing requested that the FAA revise the compliance time for the proposed AD to “60 months after an exemption from [14 CFR 25.981(a)(3)] is FAA-approved.” Boeing suggested that it would take 6 months to develop an exemption petition and 6 months for the FAA to approve that exemption. Boeing added that the FAA has previously identified that the BITE checks procedure and wire separation design were not sufficient for compliance with 14 CFR 25.981(a)(3).

The FAA disagrees with the commenter's request. An AD typically does not include a compliance time that is based on an optional action that an operator or manufacturer might choose to

take. In addition, the FAA notes that Boeing has already received exemptions for Model 747-400, 757, and 767 airplanes, and could quickly petition for and obtain approval of a similar exemption for the Model 777 airplanes using an almost identical petition. The FAA's flow time to disposition such a petition would be approximately 90 days, during which time Boeing could still proceed with development of the modification. In addition, as noted above, the compliance time for the actions specified in paragraph (h)(2) of this AD has been extended to 72 months, giving additional time for operators or manufacturers to obtain an exemption.

**Request To Extend Repetitive BITE Check Interval**

Boeing requested that paragraph (h)(1) of the proposed AD be revised to extend the repetitive check interval for the BITE checks. Boeing requested that the repetitive interval be extended to 750 flight hours to match the repetitive intervals specified in service information for other airplane models.

The FAA agrees to extend the repetitive check interval to 750 flight hours. The FAA intended to propose a 750 flight hour interval, but inadvertently specified 650 flight hour intervals in the proposed AD. The FAA has revised paragraph (h)(1) of this AD to specify repetitive intervals of 750 flight hours.

**Request To Provide Cost-Effective Method of Compliance**

SIA, Emirates, JAL, Korean Air Lines (KAL), KLM, Cathay, and BA requested that the FAA provide a cost-effective method of compliance for passenger airplanes. Emirates and KAL noted that the proposed AD does not provide a clear means of compliance for the modification, such as a Boeing service bulletin. SIA stated that Boeing should develop a modification to specifically address the unsafe condition in the proposed AD and that operators should have the opportunity to assess compliance options. Emirates suggested that the only method of compliance for non-U.S. operators will be installation of an NGS. KAL noted that the majority of non-FAA operators are not required to retrofit the NGS system. JAL, KAL, KLM, and BA requested that the FAA encourage Boeing to develop an acceptable cost-effective method of compliance that does not require installation of an NGS. Cathay also urged Boeing to develop a cost-effective solution as method of compliance for the proposed actions.

The FAA agrees that the lack of service information for FQIS modifications makes it difficult to assess the required work to modify the FQIS, and acknowledges the high cost of NGS. However, the FAA disagrees with the commenters' requests. For passenger-carrying airplanes, the cost per airplane of providing a modification of the FQIS that fully complies with the airworthiness standards was estimated by Boeing and their FQIS vendor (Goodrich) prior to the issuance of the NPRM to be comparable to the cost of installing NGS. Based on that cost estimate, Boeing proposed that they not be required to develop a fully compliant FQIS modification for passenger airplanes because it would not provide significant savings to operators and NGS would provide a greater safety benefit. The FAA agreed.

The FAA's understanding is that Boeing's current position is the same, and that they do not plan to develop a fully compliant FQIS modification for passenger airplanes to address paragraph (g) of this AD. However, if service information is developed, approved, and available in the future, operators may request approval under the provisions of paragraph (i) of this AD to use approved service instructions as an AMOC for the requirements of this AD, or the FAA may approve the service information as a global AMOC for this AD.

**Request To Clarify Applicability**

China Eastern Airlines (CEA) asked for clarification regarding the airplanes affected by the proposed AD. CEA asked if airplanes equipped with NGS satisfy the requirements of paragraph (c)(2) of the proposed AD.

The FAA agrees to clarify. This AD applies to the listed airplane models listed in paragraph (c) of this AD, except for those that meet one of the exceptions listed in paragraphs (c)(1) through (3) of this AD. Paragraph (c)(2) of this AD provides an exception for airplanes that already have a flammability reduction means (such as an NGS installed in production or using a service bulletin) that meets the current airworthiness standards. Therefore, airplanes that are equipped with an NGS that meets current FAA airworthiness standards meet the requirements of paragraph (c)(2) of this AD and are compliant with the AD.

**Request To Clarify if a Reference Document Exists for the Modification**

CEA asked if a document exists for operators to reference when incorporating the modification specified in paragraph (g) of the proposed AD. SIA stated it understands that Boeing intends to propose Boeing Service Bulletin 777-47-0002 as an AMOC to the proposed AD.

The FAA agrees to clarify. This AD requires modifying the FQIS using a method approved in accordance with the procedures specified in paragraph (i) of this AD. For airplanes identified in the applicability of this AD, which excludes airplanes identified in paragraphs (c)(1) through (3) of this AD, there currently is no service information for accomplishing the FQIS modification. However, Boeing has issued an NGS installation service bulletin (Boeing Service Bulletin 777-47-0002, Revision 4, dated September 27, 2016) that addresses the unsafe condition. For airplanes on which that service bulletin modification is installed, the modified airplane would no longer be subject to the actions in this AD due to the exception in paragraph (c)(2) of this AD.

**Request To Clarify Intent of Different Requirements in Paragraphs (g) and (h) of the Proposed AD**

Boeing asked that the FAA clarify the intent of the differences between the requirements in paragraphs (g) and (h) of the proposed AD. Boeing stated that it is unclear what change is expected for compliance with paragraph (g) of the proposed AD versus paragraph (h) of the proposed AD. Boeing suggested that one possibility is that paragraph (g) of the proposed AD is intended to cover development of transient suppression, while paragraph (h) of the proposed AD is intended to cover compliance via FQIS wire separation and BITE checks.

The FAA agrees to clarify. Paragraph (g) of this AD is intended to require, for passenger airplanes that are subject to this AD, a modification to the FQIS that makes it fully compliant with 14 CFR 25.981(a), as amended by amendment 25-102. A fully compliant FQIS modification might include wire separation or transient suppression devices, but due to the system design, either option would likely require changes to the FQIS processor.

Paragraph (h) of this AD is intended to allow, as an optional method of compliance for all-cargo airplanes only, a change that isolates the center fuel tank circuit wiring between the FQIS processor and the fuel tanks from other wiring that is connected to a sufficient power source to create an ignition source in the event of a hot short between the wiring. Such a change would not be fully compliant with the airworthiness regulations (hence the requirement to obtain a partial exemption from 14 CFR 25.901(c) and 14 CFR 25.981(a) for any such design change), but would provide a level of risk reduction that the FAA considers acceptable for all-cargo airplanes and would significantly reduce the costs relative to a fully compliant modification.

**Request To Require Design Changes From Manufacturers**

NATCA recommended that the FAA follow the agency's compliance and enforcement policy to require manufacturers to develop the necessary design changes soon enough to support operators' ability to comply with the proposed requirements. NATCA noted that SFAR 88 required manufacturers to develop all design changes for unsafe conditions identified by their SFAR 88 design reviews by December 2002, or within an additional 18 months if the FAA granted an extension.

The FAA acknowledges the commenter's concerns. However, any enforcement action is outside the scope of this rulemaking. The FAA has not changed this final rule regarding this issue.

**Clarification of BITE Check Compliance Time**

The FAA has revised paragraph (h)(1) of this AD to clarify the compliance time for the BITE check relative to the requirement to record the fault codes. The FAA recognized that operators might interpret the proposed requirements for alternative actions for cargo airplanes as allowing additional flights prior to performing the BITE check after first recording the fault codes. The FAA intended for operators to perform the BITE check immediately after recording the fault codes to address both the fault codes that exist prior to performing the BITE check and any new codes that are identified during the BITE check.

**Clarification of Applicability**

The FAA has added paragraph (c)(3) of this AD to clarify that airplanes equipped with an IMM approved by the FAA as compliant with certain regulations are excluded from this AD. The FAA intended for airplanes with compliant IMM to be excluded from the actions required by this AD. The FAA has determined that the installation of an approved IMM provides a level of risk reduction at least as great as that provided by FRM and adequately addresses the unsafe condition.

**Clarification of Costs of Compliance**

The FAA had previously determined, as specified in the NPRM, that the work involved for the cargo airplane wire separation modification would take 230 work-hours. Boeing has since provided an updated estimate of 74 work-hours for the alternative modification for cargo airplanes. The FAA has revised the cost estimate for the modification accordingly in this final rule.

**Conclusion**

The FAA reviewed the relevant data, considered the comments received, and determined that air safety and the public interest require adopting this final rule with the changes described previously and minor editorial changes. The FAA has determined that these minor changes:

- Are consistent with the intent that was proposed in the NPRM for addressing the unsafe condition; and
- Do not add any additional burden upon the public than was already proposed in the NPRM.

The FAA also determined that these changes will not increase the economic burden on any operator or increase the scope of this final rule.

**Costs of Compliance**

The FAA estimates that this AD affects 180 airplanes of U.S. registry. Currently, there are no experimental, private, business/corporate/executive, or government aircraft registered in the United States that would be affected by this AD. The affected U.S. air-carrier passenger airplanes are already required by applicable FAA operating regulations to be modified to include FRM, so this AD would

not apply to those airplanes. However, to address the potential for those airplanes to be converted to cargo airplanes before the compliance deadline for the operating rule FRM requirement, the FAA provides the following cost estimates to comply with this AD:

**Estimated Costs: Required Actions**

| Action | Labor cost | Parts cost | Cost per product |
|---|---|---|---|
| Modification | 600 work-hours × $85 per hour = $51,000 | $150,000 | $201,000 |

**Estimated Costs: Alternative Actions**

| Action | Labor cost | Parts cost | Cost per product |
|---|---|---|---|
| BITE check | 1 work-hours × $85 per hour = $85 per check | $0 | $85 per check |
| Wire separation | 74 work-hours × $85 per hour = $6,290 | $10,000 | $16,290 |

## 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.

The FAA is 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

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 that this AD:

(1) Is not a “significant regulatory action” under Executive Order 12866,

(2) Will not affect intrastate aviation in Alaska, and

(3) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

## List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

## Adoption of the Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

**PART 39–AIRWORTHINESS DIRECTIVES**

1. The authority citation for part 39 continues to read as follows:

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

**§ 39.13 [Amended]**

2. The FAA amends § 39.13 by adding the following new airworthiness directive (AD):

**2020-18-12 The Boeing Company:** Amendment 39-21233; Docket No. FAA-2016-6140; Product Identifier 2015-NM-059-AD.

**(a) Effective Date**

This AD is effective October 26, 2020.

**(b) Affected ADs**

None.

**(c) Applicability**

This AD applies to The Boeing Company Model 777-200, 777-200LR, and 777-300 series airplanes, certificated in any category, line numbers 1 through 561 inclusive, excluding airplanes identified in paragraphs (c)(1) through (3) of this AD.

(1) Airplanes on which the center tank consists only of the inboard structural box of the left and right wings (i.e., the wing center structural box is a dry bay and is not part of the fuel tank).

(2) Airplanes equipped with a flammability reduction means (FRM) approved by the FAA as compliant with the fuel tank flammability reduction (FTFR) requirements of 14 CFR 25.981(b) or 26.33(c)(1).

(3) Airplanes equipped with an ignition mitigation means (IMM) approved by the FAA as compliant with the FTFR requirements of 14 CFR 25.981(c) or 26.33(c)(2).

**(d) Subject**

Air Transport Association (ATA) of America Code 28, Fuel.

**(e) Unsafe Condition**

This AD was prompted by the FAA's analysis of the Model 777 fuel system reviews conducted by the manufacturer. The FAA is issuing this AD to prevent ignition sources inside the center fuel tank, which, in combination with flammable fuel vapors, could result in a fuel tank explosion and consequent loss of the airplane.

**(f) Compliance**

Comply with this AD within the compliance times specified, unless already done.

**(g) Modification**

Within 72 months after the effective date of this AD, modify the fuel quantity indicating system (FQIS) to prevent development of an ignition source inside the center fuel tank due to electrical fault

conditions, using a method approved in accordance with the procedures specified in paragraph (i) of this AD.

**(h) Alternative Actions for Cargo Airplanes**

For airplanes used exclusively for cargo operations: As an alternative to the requirements of paragraph (g) of this AD, do the actions specified in paragraphs (h)(1) and (2) of this AD, using methods approved in accordance with the procedures specified in paragraph (i) of this AD. To exercise this alternative, operators must perform the first inspection required under paragraph (h)(1) of this AD within 6 months after the effective date of this AD. To exercise this alternative for airplanes returned to service after conversion of the airplane from a passenger configuration to an all-cargo configuration more than 6 months after the effective date of this AD, operators must perform the first inspection required under paragraph (h)(1) of this AD prior to further flight after the conversion.

(1) Within 6 months after the effective date of this AD, record the existing fault codes stored in the FQIS processor and before further flight thereafter do a BITE check (check of built-in test equipment) of the FQIS. If any nondispatchable fault code is recorded prior to the BITE check or as a result of the BITE check, before further flight, do all applicable repairs and repeat the BITE check until a successful test is performed with no nondispatchable faults found, using a method approved in accordance with the procedures specified in paragraph (i) of this AD. Repeat these actions thereafter at intervals not to exceed 750 flight hours. Modification as specified in paragraph (h)(2) of this AD does not terminate the repetitive BITE check requirement of this paragraph.

(2) Within 72 months after the effective date of this AD, modify the airplane by separating FQIS wiring that runs between the FQIS processor and the center tank wing spar penetrations, including any circuits that might pass through a main fuel tank, from other airplane wiring that is not intrinsically safe, using methods approved in accordance with the procedures specified in paragraph (i) of this AD.

**(i) Alternative Methods of Compliance (AMOCs)**

(1) The Manager, Seattle ACO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (j) of this AD. Information may be emailed to: 9-ANM-Seattle-ACO-AMOC-Requests@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(3) An AMOC that provides an acceptable level of safety may be used for any repair, modification, or alteration required by this AD if it is approved by The Boeing Company Organization Designation Authorization (ODA) that has been authorized by the Manager, Seattle ACO Branch, to make those findings. To be approved, the repair method, modification deviation, or alteration deviation must meet the certification basis of the airplane, and the approval must specifically refer to this AD.

**(j) Related Information**

For more information about this AD, contact Jon Regimbal, Aerospace Engineer, Propulsion Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3557; email: Jon.Regimbal@faa.gov.

**(k) Material Incorporated by Reference**

None.

Issued on August 26, 2020.

Lance T. Gant,

Director, Compliance & Airworthiness Division, Aircraft Certification Service.

[FR Doc. 2020-19584 Filed 9-18-20; 8:45 am]