[4910-13-P]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2020-0686; Product Identifier 2019-NM-035-AD]

RIN 2120-AA64

Airworthiness Directives; The Boeing Company Airplanes

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: The FAA proposes to supersede Airworthiness Directive (AD) 2018-23-51, which applies to all The Boeing Company Model 737-8 and 737-9 (737 MAX) airplanes. Since AD 2018-23-51 was issued, the agency has determined that final corrective action is necessary to address the unsafe condition. This proposed AD would require installing new flight control computer (FCC) software, revising the existing Airplane Flight Manual (AFM) to incorporate new and revised flightcrew procedures, installing new MAX display system (MDS) software, changing the horizontal stabilizer trim wire routing installations, completing an angle of attack sensor system test, and performing an operational readiness flight. This proposed AD would also apply to a narrower set of airplanes than the superseded AD, and allow operation (dispatch) of an airplane with certain inoperative systems only if certain provisions are incorporated in the operator's existing FAA-approved minimum equipment list (MEL). The FAA is proposing this AD to address the unsafe condition on these products.

DATES: The FAA must receive comments on this proposed AD by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

• Federal eRulemaking Portal: Go to https://www.regulations.gov. Follow the instructions for submitting comments.

• Fax: 202-493-2251.

• Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.

• Hand Delivery: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For Boeing service information identified in this NPRM, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminster Blvd., MC 110-SK57, Seal Beach, CA 90740-5600; telephone 562-797-1717; Internet https://www.myboeingfleet.com. You may view this referenced service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 2200 South 216th St., Des Moines, WA. For information on the availability of this material at the FAA, call 206-231-3195. It is also available in the Docket for this rulemaking, which may be found on the Internet at https://www.regulations.gov by searching for and locating Docket No. FAA-2020-0686.

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-2020-0686; 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 NPRM, any comments received, and other information. The street address for Docket Operations is listed above. Comments will be available in the AD docket shortly after receipt.

FOR FURTHER INFORMATION CONTACT: Ian Won, Manager, Seattle ACO Branch, FAA, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3500; email: 9-FAA-SACO-AD-Inquiry@faa.gov.

SUPPLEMENTARY INFORMATION:

Comments Invited

The FAA invites you to participate in this rulemaking by submitting written comments, data, or views about this proposal. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. To ensure the docket does not contain duplicate comments, commenters should submit only one copy of the comments. Send your comments to an address listed under the ADDRESSES section. Include "Docket No. FAA-2020-0686; Product Identifier 2019-NM-035-AD" at the beginning of your comments.

Except for Confidential Business Information (CBI) as described in the following paragraph, and other information as described in 14 CFR 11.35, the FAA will post all comments received, without change, as well as a report summarizing each substantive public contact with FAA personnel concerning this proposed rulemaking. Before acting

on this proposal, the FAA will consider all comments received by the closing date for comments. The FAA will consider comments filed after the comment period has closed if it is possible to do so without incurring expense or delay. The FAA may change this NPRM because of those comments.

Confidential Business Information (CBI)

CBI is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If comments responsive to this NPRM contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this NPRM, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as "PROPIN." The FAA will treat such marked submissions as confidential under the FOIA, and they will not be placed in the public docket of this NPRM. Submissions containing CBI should be sent to the person identified in the FOR FURTHER INFORMATION CONTACT section. Any commentary that the FAA receives which is not specifically designated as CBI will be placed in the public docket for this rulemaking.

Background

On October 29, 2018, a Boeing Model 737-8 airplane operated by Lion Air (Lion Air Flight 610) was involved in an accident after takeoff from Soekarno-Hatta International Airport in Jakarta, Indonesia, resulting in 189 fatalities. Investigation of the accident has been completed by the Indonesian authorities (Komite Nasional Keselamatan Transportasi (KNKT)) with assistance from the National Transportation

Safety Board (NTSB) and the FAA of the United States, the manufacturer, and the operator. Reports[1] from the accident investigation indicate that the airplane's flight control system[2] generated repeated airplane nose-down horizontal stabilizer trim[3] commands contributing to the accident.

Following the Lion Air Flight 610 accident on October 29, 2018, data from the flight data recorder, which is contained in the Indonesian accident report (http://knkt.dephub.go.id/knkt/ntsc_aviation/baru/2018%20-%20035%20-%20PK-LQP%20Final%20Report.pdf), indicated that a single erroneously high angle of attack (AOA) sensor[4] input to the flight control system while the flaps are retracted can cause repeated airplane nose-down trim of the horizontal stabilizer and multiple flightdeck effects.

[1] Preliminary KNKT.18.10.35.04 Aircraft Accident Investigation Report, dated November 2018, and Final KNKT.18.10.35.04 Aircraft Accident Investigation Report, dated October 2019, can be found in the AD docket.

[2] The flight control system for 737 MAX airplanes includes two flight control computers, FCC A and FCC B, which process inputs from the pilots and aircraft sensors to move the airplane's control surfaces.

[3] An airplane's nose-up or nose-down attitude is known as its "pitch attitude." On the 737 MAX, the airplane's pitch attitude is primarily controlled by a combination of two movable surfaces on the tail of the airplane: the horizontal stabilizer, which is controlled by electric and manual (pilot) trim inputs, and the elevator, which is controlled by moving the control columns. "Pitch trim" commands move the horizontal stabilizer. Pilots use pitch trim to adjust the position of the horizontal stabilizer to achieve the desired flight path and to manage the forces necessary to keep the airplane in stable flight.

[4] The angle of attack (or AOA) is the angle at which the airplane wing meets the oncoming air. On the current 737 MAX, AOA is measured by two independent AOA sensors, which are small vanes mounted on either side of the forward exterior of the fuselage. For the purposes of this NPRM, "high" AOA is a relatively large angle (associated with flight conditions outside of the normal flight envelope), and "low" AOA is a relatively small angle (associated with flight conditions within the normal flight envelope). Although wing lift increases with increased AOA, an excessively high airplane nose-up AOA can be hazardous, since eventually lift can be lost, causing the airplane to stall. A stall occurs when the airflow around the wing is sufficiently disrupted to cause the wing to no longer generate lift. To warn of an impending stall, the 737 MAX is equipped with a "stick shaker," which vibrates the control column, providing tactile annunciation to the pilot.

These effects include stall warning activation, airspeed disagree alert, and altitude disagree alert,[5] and may affect the flightcrew's ability to accomplish continued safe flight and landing.

On November 7, 2018, the FAA issued Emergency AD 2018-23-51 as an interim corrective action.[6] The FAA sent Emergency AD 2018-23-51 to all known U.S. owners and operators of Boeing Model 737 MAX airplanes to require revising certificate limitations and operating procedures of the AFM to provide the flightcrew with runaway horizontal stabilizer trim procedures to follow under certain conditions. The FAA sent Emergency AD 2018-23-51 to all affected civil aviation authorities (CAAs) at the same time. AD 2018-23-51, Amendment 39-19512 (83 FR 62697, December 6, 2018; corrected December 11, 2018 (83 FR 63561)), was published in the Federal Register as an amendment to 14 CFR 39.13.

On March 10, 2019, a Boeing Model 737-8 airplane operated by Ethiopian Airlines (Ethiopian Airlines Flight 302) was involved in an accident after takeoff from

[5] Stall warning indication is the activation of the stick shaker and other warnings. An airspeed disagree alert, or "IAS (indicated airspeed) DISAGREE" on the 737 MAX, is a visual alert on the airplane's primary flight displays (PFDs) that the airspeed displayed on the captain's and first officer's PFDs, as sensed by the pitot tubes on either side of the airplane, disagree by more than 5 knots for more than 5 seconds. An altitude disagree alert, or "ALT (altitude) DISAGREE" on the 737 MAX, is a visual alert on the PFDs that the altitude, as sensed by the static ports on either side of the airplane, disagree by more than 200 feet for more than 5 seconds.

[6] Flight data recorder (FDR) data from the Lion Air Flight 610 accident airplane indicated that on the flight just prior to the accident flight (Lion Air Flight 043), the airplane experienced the same single erroneously high AOA sensor failure condition upon takeoff that the Lion Air Flight 610 crew encountered. The flightcrew on Lion Air Flight 043 was able to maintain continued safe flight and land at their planned destination airport in Jakarta. The flightcrew on Lion Air Flight 043 had no prior awareness of this type of failure or how to respond to it. The FAA's review of these flights and associated risk assessments provided the basis for the revised pilot procedures contained in the interim action of the FAA's emergency AD; specifically, the rationale was that if pilots were provided awareness of the airplane and flightdeck effects of this specific failure scenario and were provided appropriate instructions via the emergency AD, this would enable appropriate pilot response to the erroneously high AOA failure scenario for the period of time needed to fully eliminate this unsafe condition with a software revision to the flight control computers.

Addis Ababa Bole International Airport in Addis Ababa, Ethiopia, resulting in 157 fatalities. The accident is under investigation by the Ethiopian Accident Investigation Bureau (EAIB) with assistance from the NTSB and the FAA of the United States, the French Bureau of Enquiry and Analysis for Civil Aviation Safety (BEA), the European Union Aviation Safety Agency (EASA), the manufacturer, the operator, and the Ethiopian Civil Aviation Authority (ECAA).

The data from the flight data recorders, as summarized in reports[7] of the Ethiopian Airlines Flight 302 accident and the Lion Air Flight 610 accident, indicated that if a single erroneously high AOA sensor input is received by the flight control system, the maneuvering characteristics augmentation system (MCAS)[8] can command repeated airplane nose-down trim of the horizontal stabilizer. This unsafe condition, if not addressed, could cause the flightcrew to have difficulty controlling the airplane, and lead to excessive airplane nose-down attitude, significant altitude loss, and impact with terrain.

To address the unsafe condition, the FAA proposes to require four design changes: (1) installing updated flight control software (with new control laws) for the FCC operational program software (OPS), (2) installing updated MDS display processing

[7] Ethiopian Aircraft Accident Investigation Preliminary Report AI-01/19, dated March 2019, and the Ethiopian Interim Investigation Report of accident MAX-8 ET-AVJ, ET-302, dated March 2020, can be found in the AD docket.

[8] MCAS is a function of the Speed Trim System (STS), which is part of the airplane's flight control system. The STS provides automatic trim inputs to the horizontal stabilizer during manual flight. The STS uses data from a variety of sources, such as pitot tubes and the AOA sensors, to calculate when to make commands. MCAS is activated only during manual flight, with flaps up, and when the AOA sensors detect that the airplane is flying with a high AOA, such as when climbing aggressively or performing excessively tight turns with high bank angles. MCAS makes pitch trim commands to the horizontal stabilizer during a high AOA event so that the 737 MAX handling qualities are compliant with FAA regulations (including 14 CFR 25.173).

computer (DPC) software to generate an AOA disagree alert,[9] (3) revising certain AFM flightcrew operating procedures, and (4) changing the routing of horizontal stabilizer trim wires. The first design change is intended to prevent erroneous MCAS activation. The second design change alerts the pilots that the airplane's two AOA sensors are disagreeing by a certain amount indicating a potential AOA sensor failure. The third design change is intended to ensure that the flightcrew has the means to recognize and respond to erroneous stabilizer movement and the effects of a potential AOA sensor failure. The fourth design change is intended to restore compliance with the FAA's latest wire separation safety standards.

In addition to these four design changes, the FAA also proposes to require operators to conduct an AOA sensor system test and perform an operational readiness flight prior to returning each airplane to service. Finally, operators with an existing FAA-approved MEL would be required to incorporate more restrictive provisions to dispatch the airplane with certain inoperative equipment. The new master minimum equipment list (MMEL), approved by the FAA, was published on April 10, 2020, after undergoing a public notice and comment process.

Proposed Design Changes

The FAA proposes mandating the following changes to the 737 MAX type design, to address the various aspects of the unsafe condition.

To ensure that an erroneous signal from a failed single AOA sensor does not prevent continued safe flight and landing, and specifically that it does not generate

[9] An AOA disagree alert, or "AOA DISAGREE" on the 737 MAX, is a visual alert on the airplane's PFDs that alerts the flightcrew of a disagreement between the angles of attack measured by each of the airplane's two AOA sensors.

erroneous MCAS activation, the FAA proposes to require installation of updated FCC software with revised flight control laws[10] associated with MCAS. These revised flight control laws would use inputs from both AOA sensors to activate MCAS. This is in contrast to the original MCAS design, which relied on data from only one sensor at a time, and allowed repeated MCAS activation as a result of input from a single AOA sensor.

The updated FCC software would also compare the inputs from the two sensors to detect a failed AOA sensor. If the difference between the AOA sensor inputs is above a calculated threshold,[11] the FCC would disable the speed trim system (STS), including its MCAS function, for the remainder of that flight, and provide a corresponding indication of such deactivation on the flight deck.

To ensure that MCAS will not command repeated movements of the horizontal stabilizer, the revised flight control laws would permit only one activation of MCAS per sensed high AOA event. A subsequent activation of MCAS would be possible only after the airplane returns to a low AOA state, below the threshold that would cause MCAS activation.

The updated FCC software would also limit[12] the magnitude of any MCAS command to move the horizontal stabilizer, such that the final horizontal stabilizer position (after the MCAS command) would preserve the flightcrew's ability to control

[10] A flight control law generates commands to move flight control surfaces based on inputs from the flightcrew and sensors on the airplane. Flight control laws reside in software, and are developed to generate commands from the flight control computers that will achieve desired airplane performance.
[11] The calculated threshold would be a function of the magnitude of the disagreement and the rate of change of the AOA sensor position values.
[12] The magnitude of the command varies according to parameters such as the airplane's altitude and airspeed, and would be limited such that after the command is made, the pilot would be able to maintain level flight, climb, and descend, using control column inputs only.

the airplane pitch by using only the control column. The original design allowed MCAS commands to be made without consideration of the horizontal stabilizer position – before or after the MCAS command.

An undesired MCAS activation could prompt the flightcrew to perform a non-normal procedure. To ensure that after any foreseeable failure of the stabilizer system, safe flight is not dependent on the timeliness of the flightcrew performing a non-normal procedure, the FAA proposes multiple changes.

First, as previously discussed, the flight control laws would be changed to instead use inputs from two AOA sensors for MCAS activation, so that there would not be an undesired MCAS activation due to a single AOA sensor failure that could lead a flightcrew to perform a non-normal procedure.

Second, in the event that MCAS is activated as intended (i.e., during a high AOA event), the updated flight control laws software would limit the number of MCAS activations to one per high AOA event, and limit the magnitude of any single activation so that the flightcrew could maintain pitch control without needing to perform a non-normal procedure.

The FAA also proposes requiring an additional software update that would alert the flightcrew to a disagreement between the two AOA sensors. This disagreement indicates certain AOA sensor failures or a significant calibration issue. The updated MDS software would implement an AOA DISAGREE alert on all 737 MAX airplanes. Some 737 MAX airplanes were delivered without this alert feature, by error. While the lack of an AOA DISAGREE alert is not an unsafe condition itself, the FAA is proposing to mandate this software update to restore compliance with 14 CFR 25.1301 and because

the flightcrew procedures mandated by this AD now rely on this alert to guide flightcrew action. As a result of the changes proposed in this AD, differences between the two AOA sensors greater than a certain threshold[13] would cause an AOA DISAGREE alert on the primary flight displays (PFDs).

Also, as a result of the installation of this revised MDS software, operators would be required to remove "INOP" markers, if present, from the electronic flight instrument system (EFIS) panel of the airplane, because the markers would no longer be necessary, due to other changes in the updated MDS software that are unrelated to this unsafe condition. These markers, labeled "INOP," indicate that one of the positions on the dial that selects display settings is inoperative.

To facilitate the flightcrew's ability to recognize and respond to undesired horizontal stabilizer movement and the effects of a potential AOA sensor failure, the FAA proposes to mandate revising and adding certain operating procedures (checklists) of the AFM[14] used by the flightcrew for the 737 MAX. All transport category airplanes have non-normal checklists to aid the pilots in responding to airplane failures.

[13] More than 10 degrees difference for more than 10 seconds.

[14] The AFM is an FAA-approved document that manufacturers are required to furnish to owners upon delivery of the airplane, and that provides necessary safety information. See 14 CFR 25.1581. This information includes procedures (emergency and non-normal) for foreseeable but unusual situations that necessitate flightcrew action. See 14 CFR 25.1585. These procedures provide the flightcrew with instructions, including checklists, on how to respond to these conditions. Some of these conditions require immediate action by the flightcrew, so some checklists identify certain tasks that the flightcrew is expected to accomplish from memory; these items are commonly known as memory steps or "recall" items. Other conditions have checklists that do not need to be memorized; these items are commonly known as "reference" items.

The following is a general description of the changes that would be made to these checklists,[15] and the purpose of each change. The FAA will conduct an operational evaluation before finalizing these checklists. (See Flightcrew Training section in this preamble for further information.)

To reduce the workload on the flightcrew when they suspect that the airspeed indications are unreliable, the FAA proposes to revise the Airspeed Unreliable checklist of the AFM. This checklist would be revised to (1) add a step to allow the flightcrew to determine a reliable airspeed indication without the use of reference tables, (2) improve the procedure for go-arounds to allow for increased use of automation, (3) add a step to ensure that erroneous altitude information is not transmitted via the transponder to air traffic control (ATC), and (4) add erroneous AOA as a potential cause for unreliable airspeed conditions.

The Runaway Stabilizer checklist of the AFM is used when there is undesired movement of the airplane's horizontal stabilizer. The FAA proposes revisions to the criteria for this checklist's use, to include when uncommanded horizontal stabilizer movement occurs continuously or in a manner not appropriate for current flight conditions. The revised checklist would include an explicit recall item that instructs the flightcrew to use their thumb-actuated trim switch to reduce forces on the control column. The checklist would also include a recall item to use the control column and thrust levers to control the airplane's pitch attitude and airspeed. Finally, the checklist would be

[15] All of the checklists that the FAA proposes to revise or add to the AFM are already part of Boeing's Quick Reference Handbook, or QRH, for the 737 MAX (except for the IAS Disagree checklist, which is new to both the AFM and the QRH). The QRH is a nonregulatory tool used by flightcrews that includes information for non-normal and emergency conditions, including AFM procedures.

revised to add a reference item to manually trim the horizontal stabilizer for pitch control, and note that a two-pilot effort may be used to correct an out-of-trim condition.

The Stabilizer Trim Inoperative checklist of the AFM would be revised to better align with the other non-normal checklists, and modified to provide guidance for manually trimming the stabilizer for pitch control, noting that a two-pilot effort may be used and will not cause system damage.

As previously discussed, one of the design changes proposed by this NPRM is a flight control law that would render the STS and MCAS functions inoperative if the airplane's AOA sensors disagree. To assist the flightcrew in properly responding to such an occurrence, a non-normal checklist, called the Speed Trim Fail checklist, would be added to the AFM. This checklist would be used when the STS and MCAS functions are inoperative, and inform the flightcrew to continue normal operation. It would also note that the STS will not provide horizontal stabilizer trim inputs when the airplane deviates from its trimmed airspeed.

The FAA proposes adding the Stabilizer Out of Trim checklist to the AFM. The Stabilizer Out of Trim checklist would be used when the autopilot does not set the horizontal stabilizer trim correctly. Under the current design, the STAB OUT OF TRIM light illuminates in flight to inform the flightcrew that the airplane's autopilot is not setting the horizontal stabilizer trim correctly. Under the new design, as part of the aforementioned FCC software update, this light will now also illuminate on the ground, to inform the flightcrew of a partial failure of a flight control computer. If the airplane is on the ground, the checklist will instruct the flightcrew to not take off. The checklist provides additional information for the flightcrew to use if the airplane is in flight.

The FAA proposes to add an AOA Disagree checklist as a procedure to the AFM, because the FAA proposes that the AOA DISAGREE alert be available on the PFDs for all 737 MAX airplanes. Therefore, this proposed checklist would be used when there is an indication, such as an AOA DISAGREE alert, that the airplane's left and right AOA vanes disagree. The checklist would inform the flightcrew to accomplish the Airspeed Unreliable checklist.

The FAA proposes to add the ALT Disagree checklist as a procedure to the AFM. This checklist is used when the captain's and first officer's altitude indicators disagree, generating an ALT DISAGREE alert on the airplane's PFDs. This proposed checklist would provide procedures to the flightcrew that would initially be driven by whether there is also an IAS DISAGREE alert shown on the airplane's PFDs. The checklist would also provide additional steps for the flightcrew to subsequently complete for the descent, approach, and landing phases of flight.

The final checklist that the FAA proposes to add to the AFM is a new IAS Disagree checklist. This checklist is used when captain's and first officer's airspeed indicators – their "indicated airspeed" or "IAS" – disagree. The checklist directs the flightcrew to accomplish the Airspeed Unreliable checklist.

Since this NPRM proposes to supersede AD 2018-23-51, the procedural information required by that AD would be outdated when the final rule is effective and therefore would be removed.

As part of the FAA's review of these design changes, the agency reviewed the entirety of the 737 MAX horizontal stabilizer control system. This review revealed that the physical separation of the horizontal stabilizer trim arm wiring and the horizontal

stabilizer trim control wiring does not meet the criteria specified in 14 CFR 25.1707. This design standard was promulgated in 2007 and therefore is part of the certification basis of the 737 MAX but not of previous Boeing Model 737 airplanes. Certain wiring installations must have enough physical separation so that a wiring failure cannot create a hazard. Since design changes must comply with FAA regulations, the FAA proposes to require changes to the wiring installation to meet the required physical separation between the horizontal stabilizer trim arm wiring and the horizontal stabilizer trim control wiring. The FAA proposes this action to bring the airplanes into regulatory compliance.

Proposed Maintenance-Related Actions

To ensure that each airplane's two AOA sensors are functioning properly upon return to service, the FAA proposes to mandate that operators perform an AOA sensor system test on each airplane prior to its return to service. This test uses a fixture to position the AOA vane and verify that the reading provided by each AOA sensor is accurate.

The FAA allows operators to utilize an MEL for time-limited operation with certain equipment inoperative, after which the system must be fully restored. (See 14 CFR 91.213, 121.628, 125.201, and 129.14.) This proposed AD would continue to allow use of an existing FAA-approved MEL associated with the flight control system modified by the actions of this AD, provided that the more restrictive provisions of figure 10 to paragraph (i) of this proposed AD are adopted into the operator's existing FAA-approved MEL.

Given the unprecedented length of time that the FAA has limited the operation of these airplanes, and the importance of the flight control system to safety, the FAA

proposes to mandate an operational readiness flight after the design changes proposed by this AD have been done, but prior to each airplane being introduced into service.

Emergency Order of Prohibition

On March 13, 2019, the FAA issued an Emergency Order of Prohibition, which prohibits the operation of Boeing Model 737-8 and 737-9 airplanes by U.S.-certificated operators or in U.S. territory.

The FAA plans to amend the Emergency Order of Prohibition in conjunction with adopting the final rule. The amended Emergency Order of Prohibition will address the actions that the Administrator deems appropriate to return the affected airplanes to service.

Related Service Information Under 1 CFR Part 51

The FAA reviewed the following service information.

• Boeing Special Attention Service Bulletin 737-31-1860, dated June 12, 2020, describes procedures for installation of MDS software, a software installation verification and corrective actions, and removal of certain INOP markers on the EFIS control panels.

• Boeing Special Attention Service Bulletin 737-27-1318, Revision 1, dated June 24, 2020, describes procedures for changing of the horizontal stabilizer trim wire routing installations.

• Boeing Special Attention Service Bulletin 737-00-1028, dated July 20, 2020, describes procedures for an AOA sensor system test and an operational readiness flight.

This service information is reasonably available because the information is posted in the docket and because the interested parties otherwise have access to it through their normal course of business or by the means identified in the ADDRESSES section.

FAA's Determination

The FAA is proposing this AD because the agency evaluated all the relevant information and determined the unsafe condition described previously is likely to exist or develop in other products of the same type design.

Proposed AD Requirements

This proposed AD would require the following actions:

• Installing new FCC OPS software and doing a software installation verification.

• Revising the existing AFM to incorporate new and revised information and procedures, and to remove the information from the applicable sections that was required by AD 2018-23-51, because that information would be no longer applicable based on the design changes specified in this proposed AD.

• Requiring, for operators who wish to allow dispatch of an airplane with certain inoperative systems, incorporating certain provisions into the operator's existing FAA-approved MEL.

This proposed AD would also require the following actions. For information on those procedures, see this service information at https://www.regulations.gov by searching for and locating Docket No. FAA-2020-0686**.**

• Changing the horizontal stabilizer trim wire routing installation, by accomplishing the actions identified as "RC" (required for compliance) in the Accomplishment Instructions of Boeing Special Attention Service Bulletin 737-27-1318, Revision 1, dated June 24, 2020.

• Installing revised MDS software, doing a software installation verification, and removing INOP markers if applicable, by accomplishing the applicable actions identified

as “RC” in the Accomplishment Instructions of Boeing Special Attention Service Bulletin 737-31-1860, dated June 12, 2020.

• Performing an AOA sensor system test, by accomplishing the applicable actions identified as “RC” in the Accomplishment Instructions of Boeing Special Attention Service Bulletin 737-00-1028, dated July 20, 2020.

• Performing an operational readiness flight, by accomplishing the applicable actions identified as “RC” in the Accomplishment Instructions of Boeing Special Attention Service Bulletin 737-00-1028, dated July 20, 2020.

Explanation of Change to the Applicability

AD 2018-23-51 applies to all 737 MAX airplanes. This proposed AD would apply only to the 737 MAX airplanes identified in Boeing Special Attention Service Bulletin 737-31-1860, dated June 12, 2020, which identifies line numbers for airplanes with an original airworthiness certificate or original export certificate of airworthiness issued on or before the effective date of the original Emergency Order of Prohibition. Airplanes that have not received an original airworthiness certificate or original export certificate of airworthiness on or before the date of the original Emergency Order of Prohibition will have been modified to incorporate the changes required by this AD prior to receiving an original, or original export, airworthiness certificate.

Flightcrew Training

The FAA, through an operational evaluation, will assess the impact of the proposed aircraft design changes on pilot training. The FAA intends to conduct this evaluation jointly with three international civil aviation authorities: Agência Nacional de Aviação Civil (ANAC) Brazil, Transport Canada Civil Aviation (TCCA), and the EASA.

The FAA will issue a draft Boeing 737 Flight Standardization Board Report documenting the results of the operational evaluation on pilot training. The FAA will post the draft Boeing 737 Flight Standardization Board Report at https://www.faa.gov/aircraft/draft_docs/fsb/ for public comment. You may subscribe to this page to receive notification when the FAA posts the draft report.

Additionally, during the operational evaluation, the FAA will evaluate the operating procedures (checklists) proposed in this AD. If the FAA determines that the operational evaluation results necessitate additional changes to the checklists proposed in this AD, the FAA will post these changes as an addendum to the draft Boeing 737 Flight Standardization Board Report for public comment. If an addendum is posted, the FAA will announce the availability of it in the Federal Register. The FAA will consider the report and the comments submitted in finalizing the AD.

Explanation of Certain Provisions for Alternative Methods of Compliance (AMOCs)

Because some operators may use a procedural method for translating AFM requirements that is different from that published by Boeing, the FAA will consider approving AMOCs, as appropriate, to address those differences. For procedural aspects (including how specific AFM wording is translated into operationally approved documents such as a Flight Crew Operations Manual (FCOM) or related Quick Reference Handbook (QRH)), the FAA encourages operators, in coordination with their principal inspectors, to contact the appropriate Aircraft Evaluation Group (AEG) office for additional guidance.

In addition, Boeing Special Attention Service Bulletin 737-27-1318, Revision 1, dated June 24, 2020, specifies reporting and coordinating any deviations from the

Accomplishment Instructions with Boeing. Boeing will coordinate deviations from "RC" actions with the FAA. Documenting approval of these deviations will facilitate the approval of AMOCs, if needed.

Costs of Compliance

The FAA estimates that this proposed AD affects 73 airplanes of U.S. registry. The agency estimates the following costs to comply with this proposed AD:

Estimated costs

Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
FCC OPS installation and verification	1 work-hour X $85 per hour = $85	$0	$85	$6,205
AFM revisions	1 work-hour X $85 per hour = $85	$0	$85	$6,205
MDS installation and verification, INOP marker removal	1 work-hour X $85 per hour = $85	$0	$85	$6,205
Stabilizer wiring change	Up to 79 work-hours X $85 per hour = Up to $6,715	Up to $3,790	Up to $10,505	Up to $766,865
AOA sensor system test	40 work-hours X $85 per hour = $3,400	$0	$3,400	$248,200

The FAA has received no definitive data that would enable the agency to provide cost estimates for the operational readiness flight specified in this proposed AD.

Operators that have a MEL and choose to dispatch an airplane with an inoperative flight control system affected by this AD would be required to incorporate certain provisions into the operator's existing FAA-approved MEL. The FAA has determined that revising the operator's existing FAA-approved MEL takes an average of 90 work-hours per operator, although the agency recognizes that this number may vary from operator to operator. Since operators incorporate MEL changes for their affected fleet(s),

the FAA has determined that a per-operator estimate is more accurate than a per-airplane estimate. Therefore, the FAA estimates the average total cost per operator to be $7,650 (90 work-hours x $85 per work-hour).

According to the manufacturer, some or all of the costs of this proposed AD may be covered under warranty, thereby reducing the cost impact on affected operators.

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

The FAA has determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would 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 the proposed regulation:

(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.

The Proposed Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA proposes to amend 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 removing Airworthiness Directive (AD) 2018-23-51, Amendment 39-19512 (83 FR 62697, December 6, 2018; corrected December 11, 2018 (83 FR 63561)), and adding the following new AD:

The Boeing Company: Docket No. FAA-2020-0686; Product Identifier 2019-NM-035-AD.

(a) Comments Due Date

The FAA must receive comments on this AD action by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Affected ADs

This AD replaces AD 2018-23-51, Amendment 39-19512 (83 FR 62697, December 6, 2018; corrected December 11, 2018 (83 FR 63561)) ("AD 2018-23-51").

(c) Applicability

This AD applies to The Boeing Company Model 737-8 and 737-9 airplanes, certificated in any category, as identified in Boeing Special Attention Service Bulletin 737-31-1860, dated June 12, 2020.

(d) Subject

Air Transport Association (ATA) of America Code 22, Auto flight; 27, Flight controls; and 31, Indicating/recording systems.

(e) Unsafe Condition

This AD was prompted by the potential for a single erroneously high angle of attack (AOA) sensor input received by the flight control system to result in repeated airplane nose-down trim of the horizontal stabilizer, which, in combination with multiple flightdeck effects, could affect the flightcrew's ability to accomplish continued safe flight and landing.

(f) Compliance

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

(g) Installation/Verification of Flight Control Computer (FCC) Operational Program Software (OPS)

Before further flight, install FCC OPS software version P12.1.2, part number (P/N) 2274-COL-AC2-26, or later-approved software versions, on FCC A and FCC B, and do a software installation verification. During the installation verification, if the approved software part number is not shown as being installed on FCC A and FCC B,

before further flight, do corrective actions until the approved software part number is installed on FCC A and FCC B. Later-approved software versions are only those Boeing software versions that are approved as a replacement for the applicable software, and are approved as part of the type design by the FAA after the effective date of this AD.

Note 1 to paragraph (g): Guidance for doing the installation and installation verification of the FCC OPS software can be found in Boeing 737-7/8/8200/9/10 Aircraft Maintenance Manual (AMM), Section 22-11-33.

(h) Airplane Flight Manual (AFM) Revisions

Before further flight, revise the existing AFM to include the changes specified in paragraphs (h)(1) through (10) of this AD. Revising the existing AFM to include the changes specified in paragraphs (h)(2) through (10) of this AD may be done by inserting a copy of figures 1 through 9 to paragraphs (h)(2) through (10) of this AD into the existing AFM.

(1) In the Certificate Limitations and Operating Procedures chapters, remove the information identified as "Required by AD 2018-23-51."

(2) In the Operating Procedures chapter, revise the General paragraph to include the information in figure 1 to paragraph (h)(2) of this AD.

Figure 1 to paragraph (h)(2) – *AFM revision: General paragraph*

Definitions	**(Required by AD 2020-**-**)**
Recall items are minimum immediate actions items.	
Reference items are accomplished after Recall items have been accomplished.	

(3) In the Operating Procedures chapter, replace the existing Airspeed Unreliable paragraph with the information in figure 2 to paragraph (h)(3) of this AD.

Figure 2 to paragraph (h)(3) – AFM revision: Airspeed Unreliable

Airspeed Unreliable (E) **(Required by AD 2020-**-**)**

Airspeed or Mach indications are suspected to be unreliable:

Recall:

If autopilot is engaged, disengage. If autothrottle is engaged, disengage. Set both F/D switches to off. Set the following gear up pitch attitude and thrust:

Flaps extended: 10° and 80% N1

Flaps up: 4° and 75% N1

Reference:

PROBE HEAT switches check on.

The following indications are reliable: attitude, N1, ground speed, and radio altitude.

Notes:

1. Stick shaker, overspeed warning and airspeed low alerts may sound erroneously or simultaneously.

2. The flight path vector and pitch limit indicator may be unreliable on the PFD and HUD (as installed).

3. If the AOA indicator option is installed, the stick shaker indicator may be unreliable. AOA digital readout, analog needle, and approach reference band may be unreliable if the airspeed unreliable condition is caused by erroneous AOA.

Attempt to determine a reliable airspeed indication.

If a reliable airspeed indication can be determined:

Use the reliable airspeed indication for the remainder of the flight. If only the standby airspeed indication is reliable do not use autopilot, autothrottle, or flight directors. If the captain's or first officer's airspeed indication is reliable, turn on the flight director switch on the reliable side. If needed, engage autopilot on the reliable side. Do not use autothrottle.

Note: Autopilot may not engage or may disengage automatically.

If a reliable airspeed indication cannot initially be determined:

Using performance tables from an approved source, set the pitch attitude and thrust setting for the current airplane configuration and phase of flight. When in trim and stabilized, compare the captain, first officer, and standby airspeed indicators with the airspeed shown in the table. An airspeed indication that differs by more than 20 knots or 0.03 Mach from the airspeed shown in the table should be considered unreliable. If only the standby airspeed indication is reliable, do not use autopilot, autothrottle, or flight directors. If the captain's or first officer's airspeed

indication is reliable, turn on the flight director switch on the reliable side, and autopilot if needed. Do not use autothrottle.

Note: Autopilot may not engage or may disengage automatically.

If a reliable airspeed indication cannot be determined using performance tables from an approved source:

Using the performance tables from an approved source, set pitch attitude and thrust setting for the airplane configuration and phase of flight as needed. Reference an approved source for landing distances.

Notes:

1. Maintain visual conditions if possible.

2. Establish landing configuration early.

3. Radio altitude reference is available below 2500 feet.

4. Use electronic and visual glideslope indicators, where available, for approach and landing.

Attempt to determine a reliable altitude indication.

Use the most reliable altitude indication for the remainder of the flight. If the captain's or first officer's altitude indication is reliable:

The airplane may not meet RVSM requirements. Set transponder to reliable side and select traffic alerts only mode.

If captain's or first officer's altitude indications are both unreliable:

Turn off transponder altitude reporting.

Note: Airplane does not meet RVSM requirements.

In addition to the normal descent, approach and landing checklists, complete the following deferred items:

For approach, only set the BARO minimums on the reliable PFD. Remove the BARO minimums from the unreliable PFD.

Note: If BARO minimums are set only on the First Officer's PFD, DH/MDA aural callouts are not provided. In the event of a go-around, do the normal go-around procedure except refer to the Flight with Unreliable Airspeed go-around table to determine the go-around pitch setting.

In the event of a go-around if either the Captain's or First Officer's airspeed indication is reliable, when TO/GA is pushed, the flight director pitch bar may be removed. Selection of an AFDS pitch mode change, such as LVL CHG, restores the flight director pitch bar.

In the event of a go-around and the standby airspeed indication is the only reliable airspeed, do not use TO/GA.

(4) In the Operating Procedures chapter, replace the existing Runaway Stabilizer paragraph with the information in figure 3 to paragraph (h)(4) of this AD.

Figure 3 to paragraph (h)(4) – *AFM revision: Runaway Stabilizer*

Runaway Stabilizer (E) **(Required by AD 2020-**-**)**

If uncommanded stabilizer movement occurs continuously or in a manner not appropriate for flight conditions:

Recall:

Firmly hold control column. Disengage autopilot if engaged. Disengage autothrottle if engaged. Use the control column and thrust levers to control airplane pitch attitude and airspeed. Use main electric stabilizer trim to reduce control column forces.

If the runaway stops after autopilot is disengaged, do not re-engage autopilot or autothrottle; end of procedure.

If the runaway continues after autopilot is disengaged, place both STAB TRIM cutout switches to CUTOUT.

If the runaway continues, grasp and hold stabilizer trim wheel.

Reference:

Trim the stabilizer manually.

Notes:

1. A two-pilot effort may be used to correct an out of trim condition.

2. Reducing airspeed reduces airloads on the stabilizer which can reduce the effort needed to manually trim. Anticipate trim requirements. Do not re-engage autopilot or autothrottle.

In addition to the normal descent, approach and landing checklists, complete the following deferred item:

Establish landing configuration and in-trim condition early on final approach.

(5) In the Operating Procedures chapter, replace the existing Stabilizer Trim Inoperative paragraph with the information in figure 4 to paragraph (h)(5) of this AD.

Figure 4 to paragraph (h)(5) – *AFM revision: Stabilizer Trim Inoperative*

Stabilizer Trim Inoperative **(Required by AD 2020-**-**)**

Loss of electric trim through the main electric stabilizer trim switches, or when directed by the Stabilizer Out of Trim procedure.

Place both STAB TRIM cutout switches to CUTOUT. The autopilot is not available. Trim stabilizer manually. A two-pilot effort may be used and will not cause system damage.

Notes:

1. Reducing airspeed reduces airloads on the stabilizer which can reduce the effort needed to manually trim.

2. If the failure could be due to ice accumulation, descend to a warmer temperature and attempt again to trim manually.

If the stabilizer can be trimmed manually, anticipate trim requirements. If the stabilizer cannot be trimmed manually, expect higher than normal elevator forces during approach and landing. The thrust reduction at flare will cause a nose down pitch.

Plan a flaps 15 landing. Set Vref 15+10 knots.

Note: The maximum wind additive should not exceed 5 knots. Check the non-normal landing distance tables in an approved source.

In addition to the normal descent, approach and landing checklists, complete the following deferred items:

Review the normal go-around procedure. During a go-around, advance thrust to go-around smoothly and slowly to avoid excessive pitch-up.

Establish landing configuration early on final approach.

(6) In the Operating Procedures chapter, add the information in figure 5 to paragraph (h)(6) of this AD.

Figure 5 to paragraph (h)(6) – *AFM revision: Speed Trim Fail*

Speed Trim Fail	**(Required by AD 2020-**-**)**
The Speed Trim function and MCAS function are inoperative. Continue normal operation. **Note:** The Speed Trim System will not provide stabilizer trim inputs when deviating from a trimmed airspeed.	

(7) In the Operating Procedures chapter, add the information in figure 6 to paragraph (h)(7) of this AD.

Figure 6 to paragraph (h)(7) – *AFM revision: Stabilizer Out of Trim*

Stabilizer Out of Trim	**(Required by AD 2020-**-**)**
The STAB OUT OF TRIM light illuminates for the following conditions: On the ground: A partial failure of a Flight Control Computer. In-flight: the autopilot does not set the stabilizer trim correctly. If on ground, do not takeoff. End of procedure. In flight, during large changes in trim requirements, the STAB OUT OF TRIM light may illuminate momentarily. If the stabilizer is trimming, continue normal operation; end of procedure. In flight, if the stabilizer is not trimming, hold control column firmly. Disengage autopilot. Disengage autothrottle if engaged. Use main electric stabilizer trim as needed. If the stabilizer responds to electric trim inputs, do not re-engage the autopilot or autothrottle; end of procedure. If the stabilizer does not respond to electric trim inputs, accomplish the Stabilizer Trim Inoperative procedure.	

(8) In the Operating Procedures chapter, add the information in figure 7 to paragraph (h)(8) of this AD.

Figure 7 to paragraph (h)(8) – *AFM revision: AOA Disagree*

AOA Disagree	**(Required by AD 2020-**-**)**
When AOA DISAGREE appears on the PFD, this indicates the left and right angle of attack vanes disagree. Accomplish the Airspeed Unreliable procedure.	

(9) In the Operating Procedures chapter, add the information in figure 8 to paragraph (h)(9) of this AD.

Figure 8 to paragraph (h)(9) – *AFM revision: ALT Disagree*

ALT Disagree	**(Required by AD 2020-**-**)**
The ALT DISAGREE alert is displayed on the captain's and first officer's altitude tape on the PFD when the indications disagree.	
If the IAS DISAGREE alert is also shown on the speed tape of the PFD, accomplish the Airspeed Unreliable procedure.	
If the IAS DISAGREE is not shown, check all altimeters are set to correct barometric setting.	
If the ALT DISAGREE alert remains, do not use the flight path vector, and if a reliable altitude is determined, use the transponder for the reliable side.	
If a reliable altitude is not determined, set the transponder to not transmit altitude.	
In addition to the normal descent, approach and landing checklists, complete the following deferred items:	
For approach, only set the BARO minimums on the reliable PFD. Remove the BARO minimums from the unreliable PFD.	
Note: If BARO minimums are set only on the First Officer's PFD, DH/MDA aural callouts are not provided.	
Establish landing configuration early.	
Radio altitude reference is available below 2,500 ft.	
Use electronic and visual glideslope indicators where available for approach and landing.	

(10) In the Operating Procedures chapter, add the information in figure 9 to paragraph (h)(10) of this AD.

Figure 9 to paragraph (h)(10) – *AFM revision: IAS Disagree*

IAS Disagree	**(Required by AD 2020-**-**)**
When IAS DISAGREE appears on the PFD, this indicates the captain's and first officer's airspeed indicators disagree. Accomplish the Airspeed Unreliable procedure.	

(i) Minimum Equipment List (MEL) Provisions for Inoperative Flight Control System Functions

In the event that the airplane functions associated with the flight control system as modified by this AD are inoperative, an airplane may be operated (dispatched) only if the provisions specified in figure 10 to paragraph (i) of this AD are incorporated into the operator's existing FAA-approved MEL.

Figure 10 to paragraph (i): *MEL provisions*

(1) Dispatch is not permitted with both autopilot systems inoperative.

(2) The autopilot disengage aural warning system must be operative for dispatch.

(3) The STAB OUT OF TRIM light must be operative for dispatch.

(4) The speed trim function must be operative for dispatch.

NOTE: This requires both FCCs to be operative for dispatch.

(5) The SPEED TRIM FAIL light must be operative for dispatch.

(6) Dispatch is not permitted with both A/P ENGAGE Command (CMD) Switches (A and B) inoperative.

(7) Dispatch is not permitted with both A/P ENGAGE Command (CMD) switch lights inoperative.

(8) Dispatch is not permitted with both autopilot (A/P) disengage lights inoperative. Dispatch may be made with one A/P disengage light inoperative provided the autopilot disengage aural warning system operates normally.

(9) Dispatch is not permitted with both Control Wheel Autopilot Disengage Switches inoperative. Dispatch may be made with one control wheel autopilot disengage switch inoperative provided the following conditions are met.

a) Mode Control Panel autopilot DISENGAGE bar operates normally,

b) Autopilot is not used below 1,500 feet AGL, and

c) Approach minimums do not require use of autopilot.

(10) Both control wheel trim switch systems must be operative for dispatch.

Note 2 to paragraph (i): The MEL provisions specified in figure 10 to paragraph (i) of this AD correspond to Master Minimum Equipment List (MMEL) items 22-10-01B, 22-10-02, 22-10-03, 22-11-01, 22-11-02, 22-11-05-02B, 22-11-06-2B,

22-11-08-01A, 22-11-08-01B, 22-11-10A, 22-11-10B, and 27-41-01, in the existing FAA-approved Boeing 737 MAX B-737-8/-9 MMEL, Revision 2, dated April 10, 2020, which can be found on the Flight Standards Information Management System (FSIMS) website, https://fsims.faa.gov/PICResults.aspx?mode=Publication&doctype=MMELByModel.

(j) Installation/Verification of MAX Display System (MDS) Software, Removal of INOP Markers

Before further flight, do all applicable actions identified as "RC" (required for compliance) in, and in accordance with, the Accomplishment Instructions of Boeing Special Attention Service Bulletin 737-31-1860, dated June 12, 2020.

(k) Horizontal Stabilizer Trim Wire Bundle Routing Change

Before further flight, do all applicable actions identified as "RC" in, and in accordance with, the Accomplishment Instructions of Boeing Special Attention Service Bulletin 737-27-1318, Revision 1, dated June 24, 2020.

(l) AOA Sensor System Test

Before further flight, do all applicable actions identified as "RC" for the "Angle of Attack (AOA) Sensor System Test" specified in, and in accordance with, the Accomplishment Instructions of Boeing Special Attention Service Bulletin 737-00-1028, dated July 20, 2020.

(m) Operational Readiness Flight

(1) Before further flight and after accomplishment of all applicable required actions in paragraphs (g) through (l) of this AD, do all applicable actions identified as "RC" for the "Operational Readiness Flight" specified in, and in accordance with, the Accomplishment Instructions of Boeing Special Attention Service Bulletin

737‑00‑1028, dated July 20, 2020. A special flight permit is not required to accomplish the operational readiness flight required by this paragraph.

(2) After the operational readiness flight and before further flight, any mechanical irregularities that occurred during the operational readiness flight must be resolved following the operator's FAA-approved maintenance or inspection program, as applicable.

(n) Special Flight Permits

Special flight permits may be issued in accordance with 14 CFR 21.197 and 21.199 to operate the airplane to a location where the actions of this AD can be performed.

(o) Credit for Previous Actions

This paragraph provides credit for the actions specified in paragraph (k) of this AD, if those actions were performed before the effective date of this AD using Boeing Special Attention Service Bulletin 737-27-1318, dated June 10, 2020**.**

(p) 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 responsible Flight Standards 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 (q)(1) 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 responsible Flight Standards Office.

(3) AMOCs approved previously for AD 2018-23-51 are not approved as AMOCs for this AD.

(4) For service information that contains steps that are labeled as Required for Compliance (RC), the provisions of paragraphs (p)(4)(i) and (ii) of this AD apply.

(i) The steps labeled as RC, including substeps under an RC step and any figures identified in an RC step, must be done to comply with the AD. If a step or substep is labeled "RC Exempt," then the RC requirement is removed from that step or substep. An AMOC is required for any deviations to RC steps, including substeps and identified figures.

(ii) Steps not labeled as RC may be deviated from using accepted methods in accordance with the operator's maintenance or inspection program without obtaining approval of an AMOC, provided the RC steps, including substeps and identified figures, can still be done as specified, and the airplane can be put back in an airworthy condition.

(q) Related Information

(1) For more information about this AD, contact Ian Won, Manager, Seattle ACO Branch, FAA, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3500; email: 9-FAA-SACO-AD-Inquiry@faa.gov.

(2) For service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Contractual & Data Services (C&DS), 2600 Westminster Blvd., MC 110-SK57, Seal Beach, CA 90740-5600; telephone 562-797-1717; Internet

https://www.myboeingfleet.com. You may view this referenced service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 2200 South 216th St., Des Moines, WA. For information on the availability of this material at the FAA, call 206-231-3195.

Issued on

Compliance & Airworthiness Division,
Aircraft Certification Service.