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## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

#### **14 CFR Part 39**

**[Docket No. FAA-2013-0331; Directorate Identifier 2011-NM-170-AD; Amendment 39-17792; AD 2014-05-19]**

**RIN 2120-AA64**

#### **Airworthiness Directives; The Boeing Company Airplanes**

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

**ACTION:** Final rule.

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**SUMMARY:** We are adopting a new airworthiness directive (AD) for certain The Boeing Company Model 747-200B, 747-200F, 747-300, 747SP, 747-400, and 747-400F series airplanes equipped with Rolls-Royce RB211-524 engines; and certain Model 767-300 series airplanes equipped with Rolls-Royce RB211-524 engines. This AD was prompted by multiple reports of uncommanded thrust reverser unlock events. This AD requires replacing certain relays and relay sockets, and doing wiring changes. For certain airplanes, this AD also requires installing new relay panels, and removing and installing certain components. Additionally, this AD requires, for certain airplanes, accomplishing concurrent actions, which include installing an additional locking system on the thrust reversers and modifying system wiring for in-flight fault indications of the thrust reverser system. We are issuing this AD to prevent an uncommanded thrust reverser deployment during takeoff or in flight, resulting in decreased airplane control and performance, possible runway excursions, and failure to climb.

**DATES:** This AD is effective April 25, 2014.

The Director of the Federal Register approved the incorporation by reference of certain publications listed in the AD as of April 25, 2014.

The Director of the Federal Register approved the incorporation by reference of a certain other publication listed in this AD as of February 18, 2000 (65 FR 5222, February 3, 2000).

The Director of the Federal Register approved the incorporation by reference of a certain other publication listed in this AD as of September 14, 1994 (59 FR 41647, August 15, 1994).

**ADDRESSES:** For service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Data & Services Management, P.O. Box 3707, MC 2H-65, Seattle, WA 98124-2207; telephone 206-544-5000, extension 1; fax 206-766-5680; Internet <https://www.myboeingfleet.com>. You may view this referenced service information at the FAA, Transport Airplane Directorate, 1601

Lind Avenue SW., Renton, WA. For information on the availability of this material at the FAA, call 425-227-1221.

## **Examining the AD Docket**

You may examine the AD docket on the Internet at <http://www.regulations.gov>; by searching for and locating Docket No. FAA-2013-0331; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, the regulatory evaluation, any comments received, and other information. The address for the Docket Office (phone: 800-647-5527) is Docket Management Facility, U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.

**FOR FURTHER INFORMATION CONTACT:** Tung Tran, Aerospace Engineer, Propulsion Branch, ANM-140S, Seattle Aircraft Certification Office (ACO), FAA, 1601 Lind Avenue SW., Renton, WA 98057-3356; phone: 425-917-6505; fax: 425-917-6590; email: [Tung.Tran@faa.gov](mailto:Tung.Tran@faa.gov).

## **SUPPLEMENTARY INFORMATION:**

### **Discussion**

We 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 747-200B, 747-200F, 747-300, 747SP, 747-400, and 747-400F series airplanes equipped with Rolls-Royce RB211-524 engines; and certain Model 767-300 series airplanes equipped with Rolls-Royce RB211-524 engines. The NPRM published in the Federal Register on April 17, 2013 (78 FR 22802). The NPRM was prompted by multiple reports of uncommanded thrust reverser unlock events. The NPRM proposed to require replacing certain relays and relay sockets, and doing wiring changes. For certain airplanes, the NPRM proposed to require installing new relay panels, and removing and installing certain components. Additionally, the NPRM proposed to require, for certain airplanes, accomplishing concurrent actions, which include installing an additional locking system on the thrust reversers, installing an additional locking gearbox on each engine and modifying system wiring for in-flight fault indications of the thrust reverser system, and installing a second locking gearbox system on the thrust reversers. We are issuing this AD to prevent an uncommanded thrust reverser deployment during takeoff or in flight, resulting in decreased airplane control and performance, possible runway excursions, and failure to climb.

### **Comments**

We gave the public the opportunity to participate in developing this AD. The following presents the comments received on the proposal (78 FR 22802, April 17, 2013) and the FAA's response to each comment.

### **Support for the NPRM (78 FR 22802, April 17, 2013)**

Boeing stated that it concurred with the contents of the NPRM (78 FR 22802, April 17, 2013).

The Air Line Pilots Association International stated that it agrees with the intent of the NPRM (78 FR 22802, April 17, 2013).

## **Request To Specify Thrust Reverser Unit (TRU) Part Numbers**

Rolls-Royce plc requested that instead of specifying the engine models, we specify the part numbers of the affected TRUs for tracking purposes. Rolls-Royce plc stated that the TRUs are swapped from engine to engine, and AD compliance would be difficult to track unless it is tracked based on the TRUs.

We do not agree with the commenter's request. This final rule only requires changes to the control logic of the thrust reverser by modifying the associated electrical panels on the airplane. There is no requirement for TRU hardware replacement. Therefore, it is unnecessary to specify the part numbers of the affected TRUs in this final rule. We have not changed this final rule in this regard.

## **Statement of Financial Impact**

Rolls-Royce plc stated that it is likely the actions required by the NPRM (78 FR 22802, April 17, 2013) will have a significant financial affect upon Middle Eastern and Far East operations. Rolls-Royce plc did not request any change to the NPRM in this regard.

The commenter did not provide specific information to substantiate why Middle Eastern and Far East operations would be uniquely affected. The Costs of Compliance paragraph in this final rule is based on estimates provided in the service information and is an estimate of costs incurred by United States operators. We have not changed this final rule in this regard.

## **Changes to This Final Rule**

We clarified the required actions specified in the SUMMARY section of this final rule by removing the wording "installing an additional locking system on the thrust reversers" and "installing a second locking gearbox system on the thrust reversers." These actions are included in the phrase "installing an additional locking system on the thrust reversers." No change has been made to the actions required by this final rule.

We revised paragraph (b) of this final rule to indicate that this final rule affects the requirements of AD 2000-01-05, Amendment 39-11502 (65 FR 1051, January 7, 2000).

We revised paragraph (h)(2) of this final rule to clarify that the installation of an additional gearbox is on the thrust reverser of each engine, rather than on each engine.

## **Conclusion**

We reviewed the relevant data, considered the comments received, and determined that air safety and the public interest require adopting this AD with the change described previously and minor editorial changes. We have determined that these minor changes:

- Are consistent with the intent that was proposed in the NPRM (78 FR 22802, April 17, 2013) for correcting the unsafe condition; and
- Do not add any additional burden upon the public than was already proposed in the NPRM (78 FR 22802, April 17, 2013).

## **Costs of Compliance**

We estimate that this AD affects 1 airplane of U.S. registry.  
We estimate the following costs to comply with this AD:

### Estimated Costs

Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
Replacement and wiring change for Model 747-200B, 747-200F, 747-300, and 747SP series airplanes (1 U.S.-registered airplane)	30 work-hours × \$85 per hour = \$2,550	\$4,289	\$6,839	\$6,839
Removal, installations, and wiring changes for Model 747-400 and 747-400F series airplanes (0 U.S.-registered airplanes)	Up to 90 work-hours × \$85 per hour = \$7,650	Up to \$16,607	Up to \$24,257	0
Replacements and wiring changes for Model 767-300 series airplanes (0 U.S.-registered airplanes)	Up to 32 work-hours × \$85 per hour = \$2,720	Up to \$2,245	Up to \$4,965	0

We estimate the following costs to do any necessary concurrent requirements. We have no way of determining the number of aircraft that might need accomplishment of the concurrent requirements.

### Concurrent Costs

Action	Labor cost	Parts cost	Cost per product
Installation of an additional locking system for Model 747-200B, 747-200F, 747-300, and 747SP series airplanes	336 work-hours × \$85 per hour = \$28,560	\$62,674	\$91,234
Installation of an additional locking gearbox on each engine and modification of the system wiring for Model 747-400 and 747-400F series airplanes	185 work-hours × \$85 per hour = \$15,725	72,860	88,585
Installation of a second locking gearbox system for Model 767-300 series airplanes	754 work-hours × \$85 per hour = \$64,090	0	64,090

### Authority for This Rulemaking

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

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

### Regulatory Findings

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) Is not a "significant rule" under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),
- (3) Will not affect intrastate aviation in Alaska, and
- (4) 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):



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**2014-05-19 The Boeing Company:** Amendment 39-17792; Docket No. FAA-2013-0331; Directorate Identifier 2011-NM-170-AD.

**(a) Effective Date**

This AD is effective April 25, 2014.

**(b) Affected ADs**

This AD affects the requirements of AD 2000-01-05, Amendment 39-11502 (65 FR 1051, January 7, 2000).

**(c) Applicability**

This AD applies to The Boeing Company airplanes, certificated in any category, identified in paragraphs (c)(1), (c)(2), and (c)(3) of this AD, and equipped with Rolls-Royce RB211-524 engines.

(1) Model 747-200B, 747-200F, 747-300, and 747SP series airplanes, as identified in Boeing Service Bulletin 747-78-2178, Revision 1, dated August 4, 2011.

(2) Model 747-400 and 747-400F series airplanes, as identified in Boeing Service Bulletin 747-78-2180, Revision 2, dated November 11, 2011.

(3) Model 767-300 series airplanes, as identified in Boeing Service Bulletin 767-78-0096, Revision 1, dated December 10, 2009.

**(d) Subject**

Joint Aircraft System/Component (JASC) Code 7830, Engine Thrust Reverser.

**(e) Unsafe Condition**

This AD was prompted by multiple reports of uncommanded thrust reverser unlock events, three of which had all three locks disengaged. We are issuing this AD to prevent an uncommanded thrust reverser deployment during takeoff or in flight resulting in decreased airplane control and performance, possible runway excursions, and failure to climb.

**(f) Compliance**

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

**(g) Replacement**

Within 60 months after the effective date of this AD: Do the actions specified in paragraphs (g)(1), (g)(2), and (g)(3) of this AD, as applicable.

(1) For Model 747-200B, 747-200F, 747-300, and 747SP series airplanes: Replace relays and relay sockets in the P252 and P253 panels with new relays and relay sockets, and do wiring changes,

in accordance with the Accomplishment Instructions of Boeing Service Bulletin 747-78-2178, Revision 1, dated August 4, 2011.

(2) For Model 747-400 and 747-400F series airplanes: Install the components removed from the existing P252 and P253 panels, install new relays and relay sockets, and do wiring changes on the new P252 and P253 relay panels, in accordance with the Accomplishment Instructions of Boeing Service Bulletin 747-78-2180, Revision 2, dated November 11, 2011.

(3) For Model 767-300 series airplanes: Replace relays and relay sockets in the P36 and P37 panels with new relays and relay sockets, and do wiring changes in the P33, P36, and P37 panels, in accordance with the Accomplishment Instructions of Boeing Service Bulletin 767-78-0096, Revision 1, dated December 10, 2009.

#### **(h) Concurrent Requirements**

(1) For Model 747-200B, 747-200F, 747-300, and 747SP series airplanes: Prior to or concurrently with accomplishing the actions required by paragraph (g)(1) of this AD, install an additional locking system on the thrust reversers, in accordance with the Accomplishment Instructions of Boeing Service Bulletin 747-78-2156, Revision 1, dated August 30, 2001. Accomplishing this installation is a method of compliance with the installation required by paragraph (c) of AD 2000-01-05, Amendment 39-11502 (65 FR 1051, January 7, 2000).

(2) For Model 747-400 and 747-400F series airplanes identified as Group 1, 2, 3, 4, 7, 8, or 9 airplanes in Boeing Service Bulletin 747-78-2180, Revision 2, dated November 11, 2011: Prior to or concurrently with accomplishing the actions required by paragraph (g)(2) of this AD, install an additional locking gearbox on the thrust reversers of each engine and modify system wiring for in-flight fault indications of the thrust reverser system, in accordance with the Accomplishment Instructions of Boeing Service Bulletin 747-78-2158, Revision 2, dated July 29, 1999.

Note 1 to paragraph (h)(2) of this AD: Paragraph (a)(1) of AD 2000-02-22, Amendment 39-11540 (65 FR 5222, February 3, 2000), refers to Boeing Service Bulletin 747-78-2158, Revision 2, dated July 29, 1999, as the appropriate source of service information for accomplishing the installation required by that paragraph.

(3) For Model 767-300 series airplanes identified as Group 2 airplanes in Boeing Service Bulletin 767-78-0096, Revision 1, dated December 10, 2009: Prior to or concurrently with accomplishing the actions required by paragraph (g)(3) of this AD, install a second locking gearbox system on the thrust reversers, in accordance with the Accomplishment Instructions of Boeing Service Bulletin 767-78-0059, Revision 3, dated January 20, 1994.

Note 2 to paragraph (h)(3) of this AD: Paragraph (c) of AD 94-17-03, Amendment 39-8998 (59 FR 41647, August 15, 1994), refers to Boeing Service Bulletin 767-78-0059, Revision 3, dated January 20, 1994, as an appropriate source of service information for accomplishing the installation required by that paragraph.

#### **(i) Credit for Previous Actions**

(1) This paragraph provides credit for the requirements of paragraph (g)(1) of this AD, if those actions were performed before the effective date of this AD using Boeing Service Bulletin 747-78-2178, dated January 22, 2009, which is not incorporated by reference in this AD.

(2) This paragraph provides credit for the requirements of paragraph (g)(2) of this AD, if those actions were performed before the effective date of this AD using Boeing Service Bulletin 747-78-2180, dated April 10, 2008, which is not incorporated by reference in this AD.

(3) This paragraph provides credit for the requirements of paragraph (g)(2) of this AD, if those actions were performed before the effective date of this AD using Boeing Service Bulletin 747-78-2180, Revision 1, dated November 11, 2010, which is not incorporated by reference in this AD.

(4) This paragraph provides credit for the requirements of paragraph (g)(3) of this AD, if those actions were performed before the effective date of this AD using Boeing Service Bulletin 767-78-0096, dated August 7, 2008, which is not incorporated by reference in this AD.

(5) This paragraph provides credit for the requirements of paragraph (h)(1) of this AD, if those actions were performed before the effective date of this AD using Boeing Service Bulletin 747-78-2156, dated October 31, 1996, which was incorporated by reference in AD 99-18-03, Amendment 39-11269 (64 FR 47365, August 31, 1999).

Note 3 to paragraph (i)(5) of this AD: Paragraph (c) of AD 2000-01-05, Amendment 39-11502 (65 FR 1051, January 7, 2000), refers to Boeing Service Bulletin 747-78-2156, dated October 31, 1996, as the appropriate source of service information for accomplishing the installation required by that paragraph.

(6) This paragraph provides credit for the requirements of paragraph (h)(2) of this AD, if those actions were performed before the effective date of this AD using Boeing Service Bulletin 747-78-2158, Revision 1, dated January 22, 1998, which is not incorporated by reference in this AD.

Note 4 to paragraph (i)(6) of this AD: In AD 2000-02-22, Amendment 39-11540 (65 FR 5222, February 3, 2000), Note 2 to paragraph (a)(1) of AD 2000-02-22 refers to Boeing Service Bulletin 747-78-2158, Revision 1, dated January 22, 1998, as a method of compliance for accomplishing the installation required by paragraph (a)(1) of AD 2000-02-22.

(7) This paragraph provides credit for the requirements of paragraph (h)(3) of this AD, if those actions were performed before the effective date of this AD using Boeing Service Bulletin 767-78-0059, Revision 2, dated June 10, 1993, which is not incorporated by reference in this AD, which was incorporated by reference in AD 94-17-03, Amendment 39-8998 (59 FR 41647, August 15, 1994).

Note 5 to paragraph (i)(7) of this AD: Paragraph (c) of AD 94-17-03, Amendment 39-8998 (59 FR 41647, August 15, 1994), refers to Boeing Service Bulletin 767-78-0059, Revision 2, dated June 10, 1993, as an appropriate source of service information for accomplishing the installation required by that paragraph.

#### **(j) Alternative Methods of Compliance (AMOCs)**

(1) The Manager, Seattle Aircraft Certification Office, 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 ACO, send it to the attention of the person identified in paragraph (k) 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 required by this AD if it is approved by the Boeing Commercial Airplanes Organization Designation Authorization that has been authorized by the Manager, Seattle ACO, to make those findings. For a repair method to be approved, the repair must meet the certification basis of the airplane, and the approval must specifically refer to this AD.

## **(k) Related Information**

(1) For more information about this AD, contact Tung Tran, Aerospace Engineer, Propulsion Branch, ANM-140S, Seattle Aircraft Certification Office (ACO), FAA, 1601 Lind Avenue SW., Renton, WA 98057-3356; phone: 425-917-6505; fax: 425-917-6590; email: Tung.Tran@faa.gov.

(2) Service information identified in this AD that is not incorporated by reference may be obtained at the addresses specified in paragraphs (1)(6) and (1)(7) of this AD.

## **(l) Material Incorporated by Reference**

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(3) The following service information was approved for IBR on April 25, 2014.

(i) Boeing Service Bulletin 747-78-2156, Revision 1, dated August 30, 2001.

(ii) Boeing Service Bulletin 747-78-2178, Revision 1, dated August 4, 2011.

(iii) Boeing Service Bulletin 747-78-2180, Revision 2, dated November 11, 2011.

(iv) Boeing Service Bulletin 767-78-0096, Revision 1, dated December 10, 2009.

(4) The following service information was approved for IBR on February 18, 2000 (65 FR 5222, February 3, 2000).

(i) Boeing Service Bulletin 747-78-2158, Revision 2, dated July 29, 1999.

(ii) Reserved.

(5) The following service information was approved for IBR on September 14, 1994 (59 FR 41647, August 15, 1994).

(i) Boeing Service Bulletin 767-78-0059, Revision 3, dated January 20, 1994.

(ii) Reserved.

(6) For Boeing service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Data & Services Management, P.O. Box 3707, MC 2H-65, Seattle, WA 98124-2207; telephone 206-544-5000, extension 1; fax 206-766-5680; Internet <https://www.myboeingfleet.com>.

(7) You may view this service information at FAA, Transport Airplane Directorate, FAA, 1601 Lind Avenue SW., Renton, WA. For information on the availability of this material at the FAA, call 425-227-1221.

(8) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: <http://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued in Renton, Washington, on February 19, 2014.

Jeffrey E. Duven,  
Manager, Transport Airplane Directorate,  
Aircraft Certification Service.