

Date: August 1, 2023

To: Chair of House Committee on Transportation, Highways, and Public Works  
Chair of Senate Committee on Transportation, Highways, and Public Works  
Petroleum Helicopters Inc. - Director of Operations  
Bristow Group Inc. - Director of Operations

From: Bradley R. Brandt, MSA  
Director of Aviation (DOTD)

Subject: L.R.S. 40:1486.2(F) State Participation in and Promotion of Transportation of Oil and Gas Workers Over Water – Requires the Director of Aviation (DA) to publish a report to the chairs of the House and Senate committees on transportation, highways and public works, wherein the DA shall summarize and comment upon:

- The previous year's developments in safe practices for operators who provide over water flight services in the state or adjacent to its shores.
- Evolution of safe practices through federal and industry organizations
- Insure knowledge of all such practices by operators within the industry

### **Background**

The legislature emphasizes that the production of oil for the energy needs of the state and nation is of vital concern, and the safety of those who work in the offshore industry and those who transport those workers is also of vital concern. The legislature through this vehicle has directed the Department of Transportation and Development - Director of Aviation to participate in education, communication and promotion of aviation safety in the offshore oil and gas industry. The goal is to reduce to as low as reasonably practicable the instances of helicopter accidents in the oil and gas industry by promotion of the adoption of safe practices in such operations.

This legislation requires that the Director of Aviation request membership in the Helicopter Safety Advisory Conference (HSAC) and attend regular scheduled meetings of the conference for the purpose of education, understanding, and dissemination of information developed for the purpose of the promotion of safety through cooperation, and encourage all operators who provide over water flight services to the oil and gas industry to adopt and incorporate the recommended practices of HSAC into their daily operations. Further, the Director of Aviation or his designated representative may attend and secure all writings in the form of recommended practices that result from HSAC conferences that relate to safe over water helicopter operations, and disseminate such writings in such a way that over water flight service providers in the state or adjacent to its shores are made aware of its content.

Additionally, the Director of Aviation is required to maintain familiarity with all Federal Aviation Regulations Part 91 – General Operating and Flight Rules, Part 127 – Certification and Operations of scheduled air carriers with Helicopters, Part 133 – Rotorcraft External Load Operations, and Part 135 – Operating Requirements: Commuter and On Demand Operations and Rules Governing Persons on Board Such Aircraft. The Director of Aviation is also required to post through an identifiable link on the DOTD website pertinent information relevant to new Federal Aviation Regulations and Advisory Circulars published by the Federal Aviation Administration or recommended best practices by the Helicopter Safety Advisory Conference.

The department is currently carrying out duties and responsibilities pursuant to Louisiana Revised Statutes Title 2 Aeronautics §2:6 which pertains to the powers and duties of the department in the promulgation of rules and regulations with respect to aeronautics. The department shall foster air

commerce within the state of Louisiana and shall have supervision over the aeronautical activities and facilities. Accordingly, the department may prescribe such reasonable rules and regulations as it deems necessary and advisable for the public safety and safety of those engaged in aeronautics. Further, no rule or regulation prescribed by the department under the authority of L.R.S. §2:6 shall be inconsistent with the then-current federal legislation governing aeronautics and the regulations duly promulgated thereunder.

The department currently conducts safety and compliance inspections on land-based heliports and helipads. The department takes into consideration the critical type of helicopter that will operate at the facilities in determining the proper safety areas, final approach and takeoff areas and actual touchdown area. To determine the proper dimensions, the department works closely with the helicopter operators to determine the length and width of the aircraft, the main rotor diameter and performance characteristics of the critical aircraft that will operate at the facility. This in turn assists the facilities in ensuring that the proper safety precautions are implemented and maintained and further promotes the adoption of safe practices for helicopter operations and to conduct those operations with the highest degree of safety in the public interest throughout the state.

### **Actions**

The Director of Aviation designates a representative to attend Helicopter Safety Advisory Conference (HSAC) meetings as they are scheduled and attends various committee meetings held during the conference. The designee also receives information from the U.S. Helicopter Safety Team (USHST), Helicopter Association International (HAI), EAA Airventure and the Louisiana Air Ambulance Advisory Committee.

### **Safety**

After attending the conferences and committee meetings, the Director of Aviation and/or the designated representative will identify the pertinent safety information received and update the department's website for dissemination of information. The department continues to be active with issues related to helicopter operations and safety to ensure compliance with this legislation and to promote the highest degree of safety for the citizens of Louisiana.

The department through involvement with the associations previously listed and interactions with the rotorcraft industry, have also attended meetings with aviation stakeholders, forums and presentations regarding present and future aviation challenges. One of which includes training of pilots and development of newer rotorcraft technology that are imperative to the improvement of helicopter safety.

Additionally, the department continues to ascertain and disseminate critical rotorcraft safety and operational information via links from the Department of Transportation and Development – Aviation Division website.

The following attachments are provided for your review:

1. 2023 Louisiana Legislative Session - Act 168) Amended Title 40:1486.2 – State Participation in and Promotion of Transportation of Oil and Gas Workers Over Water
2. FAA Notice of Proposed Rulemaking on 5G Radio Band for Rotorcraft
3. Airworthiness Directive (AD) 2021-23-13 – Radio Altimeters
4. FAA Aircraft Firefighting Foam Transition Plan

ACT No. 168

2023 Regular Session

HOUSE BILL NO. 398

BY REPRESENTATIVES ROMERO, ADAMS, AMEDEE, BACALA, BAGLEY, BOYD, BROWN, BRYANT, BUTLER, CARRIER, ROBBY CARTER, CORMIER, COX, CREWS, DAVIS, DESHOTEL, DUBUISSON, ECHOLS, EDMONDS, EDMONSTON, EMERSON, FISHER, FREEMAN, FREIBERG, GEYMAN, GOUDEAU, GREEN, HARRIS, HILFERTY, HORTON, IVEY, JENKINS, TRAVIS JOHNSON, JORDAN, KERNER, KNOX, LAFLEUR, LARVADAIN, LYONS, MCKNIGHT, MOORE, NEWELL, ORGERON, CHARLES OWEN, ROBERT OWEN, PIERRE, PRESSLY, SCHAMERHORN, SCHEXNAYDER, SCHLEGEL, SELDERS, ST. BLANC, STEFANSKI, TARVER, VILLIO, WHITE, WILLARD, WRIGHT, AND ZERINGUE

1 AN ACT  
2 To amend and reenact R.S. 40:1486.2(D), (E), and (F) and to enact R.S. 40:1486.2(G),  
3 relative to aircraft; to require each person being transported offshore by aircraft wear  
4 a life jacket equipped with a personal locator beacon; to provide for an effective date;  
5 and to provide for related matters.

6 Be it enacted by the Legislature of Louisiana:  
7 Section 1. R.S. 40:1486.2(D), (E), and (F) are hereby amended and reenacted and  
8 R.S. 40:1486.2(G) is hereby enacted to read as follows:

9 §1486.2. State participation in and promotion of transportation of oil and gas  
10 workers over water

11 \* \* \*

12 D. Notwithstanding any provision of law to the contrary, any aircraft used  
13 to transport offshore platform workers to and from the platform shall require each  
14 person being transported to wear a life jacket equipped with a personal locator  
15 beacon, as described in Paragraph (C)(1) of this Section.

16 E. The DA or his designated representative shall maintain familiarity with  
17 all Part 91, Part 133 and Part 135 regulations promulgated by the FAA pertaining to  
18 over water helicopter operations, and may obtain and review all advisory circulars  
19 of the FAA that relate to such over water helicopter operations in the state or



1 adjacent to its shores, issued under those parts of the Federal Aviation Regulations  
 2 ("FAR"). Where appropriate, the DA or his designated representative shall promote  
 3 the adherence to the regulations and adoption of the HSAC recommended practices.

4 ~~F.~~ F. The DA shall facilitate, as he deems necessary, information to the  
 5 director of operations of operators who provide over water flight services in the state  
 6 or adjacent to its shores, through publication on the Internet through an identifiable  
 7 link on the DOTD website, summaries or text of relevant new FAR and Advisory  
 8 Circulars published by the FAA or Recommended Practices published by HSAC.

9 ~~F.(1)~~ G.(1) The DA shall publish a report to the legislature, directed to the  
 10 chairs of the House and Senate committees on transportation, highways and public  
 11 works, wherein the DA shall summarize and comment upon all of the following:

12 (a) The previous year's developments in safe practices for operators who  
 13 provide over water flight services in the state or adjacent to its shores, as such safe  
 14 practices have evolved over the previous twelve months, through the federal and  
 15 industry organizations referenced in this Part.

16 (b) Efforts made by the DA to ensure knowledge of all such practices by  
 17 operators within the industry.

18 (2) The report shall be delivered to the committees no later than the first of  
 19 September, annually. A copy of the report shall also be sent to the director of  
 20 operations of each helicopter operator known by the DA to be engaged in providing  
 21 over water flight services in the offshore oil and gas industry.

22 Section 2. This Act shall become effective on January 1, 2024.

\_\_\_\_\_  
 SPEAKER OF THE HOUSE OF REPRESENTATIVES

\_\_\_\_\_  
 PRESIDENT OF THE SENATE

\_\_\_\_\_  
 GOVERNOR OF THE STATE OF LOUISIANA

APPROVED: \_\_\_\_\_

# Proposed Rules

Federal Register

Vol. 88, No. 70

Wednesday, April 12, 2023

This section of the FEDERAL REGISTER contains notices to the public of the proposed issuance of rules and regulations. The purpose of these notices is to give interested persons an opportunity to participate in the rule making prior to the adoption of the final rules.

## DEPARTMENT OF AGRICULTURE

### Agricultural Marketing Service

#### 7 CFR Parts 800 and 810

[Doc. No. AMS-FGIS-22-0083]

#### United States Standards for Soybeans; Correction

**AGENCY:** Agricultural Marketing Service, USDA.

**ACTION:** Proposed rule; correction.

**SUMMARY:** This document corrects the preamble to a proposed rule published in the *Federal Register* of March 31, 2023 regarding revisions to the United States Standards for Soybeans. This correction provides the corrected docket number for the proposed rule and the necessary **ADDRESSES** and instructions for interested parties who wish to submit written comments.

**DATES:** Comments must be submitted on or before May 1, 2023.

**ADDRESSES:** Interested persons are invited to submit comments on the proposed rule of March 31, 2023. Comments may be submitted through the Federal eRulemaking Portal at <https://www.regulations.gov>. Follow the online instructions for submitting comments. Please reference Doc. No. AMS-AMS-22-0083. Comments may also be submitted by email to Barry Gomoll at [Barry.L.Gomoll@usda.gov](mailto:Barry.L.Gomoll@usda.gov).

**FOR FURTHER INFORMATION CONTACT:** Barry Gomoll, USDA AMS; Telephone: (202) 720-8286; Email: [Barry.L.Gomoll@usda.gov](mailto:Barry.L.Gomoll@usda.gov). Copies of the current Standards are available at <https://www.ams.usda.gov/grades-standards/grain-standards>.

#### SUPPLEMENTARY INFORMATION:

##### Correction

In the proposed rule, FR Doc #2023-06679, beginning on page 19229 in the issue of March 31, 2023, make the following corrections:

On page 19229, in the third column, in the document headings, correct the

docket number to read: [Doc. No. AMS-AMS-22-0083].

On page 19229, in the third column, after the **DATES** caption, add the following:

**ADDRESSES:** Interested persons are invited to submit comments on the proposed rule of March 31, 2023. Comments may be submitted through the Federal eRulemaking Portal at <https://www.regulations.gov>. Follow the online instructions for submitting comments. Please reference Doc. No. AMS-AMS-22-0083. Comments may also be submitted by email to Barry Gomoll at [Barry.L.Gomoll@usda.gov](mailto:Barry.L.Gomoll@usda.gov).

All comments submitted in response to the proposed rule by the May 1, 2023, deadline will be included in the record and made available to the public. Please be advised that the substance of the comments and the identity of the individuals or entities submitting comments will be subject to public disclosure. AMS will make the comments publicly available on the internet via <https://www.regulations.gov>.

**Bruce Summers,**  
Administrator, Agricultural Marketing Service.

[FR Doc. 2023-07671 Filed 4-11-23; 8:45 am]

**BILLING CODE P**

## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

#### 14 CFR Part 39

[Docket No. FAA-2023-0668; Project Identifier AD-2023-00199-R]

RIN 2120-AA64

#### Airworthiness Directives; Various Helicopters

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

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** The FAA proposes to supersede Airworthiness Directive 2021-23-13, which applies to all helicopters equipped with a radio (also known as radar) altimeter. AD 2021-23-13 requires revising the limitations section of the existing rotorcraft flight manual (RFM) for your helicopter to incorporate limitations prohibiting

certain operations requiring radio altimeter data when in the presence of 5G C-Band interference in areas as identified by Notices to Air Missions (NOTAMs). Since the FAA issued AD 2021-23-13, the FAA determined that additional limitations are needed due to the continued deployment of new 5G C-Band base stations whose signals are expected to cover most of the contiguous United States at transmission frequencies between 3.7-3.98 GHz. This proposed AD would require revising the limitations section of the existing RFM to incorporate limitations prohibiting certain operations requiring radio altimeter data, due to the presence of 5G C-Band interference. 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 May 12, 2023.

**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 [regulations.gov](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.

**AD Docket:** You may examine the AD docket at [regulations.gov](https://www.regulations.gov) under Docket No. FAA-2023-0668; 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.

**FOR FURTHER INFORMATION CONTACT:** David Swartz, Continued Operational Safety Technical Advisor, COS Program Management Section, Operational Safety Branch, FAA, 222 W. 7th Ave, M/S #14 Anchorage, AK 99513; phone: 817-222-5390; email: [operationalsafety@faa.gov](mailto:operationalsafety@faa.gov).

**SUPPLEMENTARY INFORMATION:****Comments Invited**

The FAA invites you to send any written relevant data, views, or arguments about this proposal. Send your comments to an address listed under **ADDRESSES**. Include "Docket No. FAA-2023-0668; Project Identifier AD-2023-00199-R" at the beginning of your comments. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. The FAA will consider all comments received by the closing date and may amend the proposal because of those 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, to regulations.gov, including any personal information you provide. The agency will also post a report summarizing each substantive verbal contact received about this proposed AD.

**Confidential Business Information**

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 your 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 David Swartz, Continued Operational Safety Technical Advisor, COS Program Management Section, Operational Safety Branch, FAA, 222 W. 7th Ave, M/S #14 Anchorage, AK 99513; phone: 817-222-5390; email: [operationalsafety@faa.gov](mailto:operationalsafety@faa.gov). Any commentary that the FAA receives that is not specifically designated as CBI will be placed in the public docket for this rulemaking.

**Background**

The FAA issued Airworthiness Directive (AD) 2021-23-13, Amendment 39-21811 (86 FR 69992, December 9, 2021) (AD 2021-23-13), for all helicopters equipped with a radio

altimeter. AD 2021-23-13 was prompted by a determination that radio altimeters cannot be relied upon to perform their intended function if they experience interference from wireless broadband operations in the 3.7-3.98 GHz frequency band (5G C-Band). AD 2021-23-13 requires revising the limitations section of the existing RFM to incorporate limitations prohibiting certain operations requiring radio altimeter data when in the presence of 5G C-Band interference as identified by NOTAMs. The agency issued AD 2021-23-13 because radio altimeter anomalies that are undetected by the automation or pilot, particularly close to the ground, could lead to loss of continued safe flight and landing.

On the same day, the FAA also issued AD 2022-23-12, Amendment 39-21810 (86 FR 69984, December 9, 2021) (AD 2021-23-12), to correct the same unsafe condition on, and require similar operating limitations for, all transport and commuter category airplanes equipped with a radio altimeter.

**Actions Since AD 2021-23-13**

*Rotorcraft Capability and Alterations:* Since issuing AD 2021-23-13 and AD 2021-23-12, the FAA has reviewed data from alternative method of compliance (AMOC) requests, demonstrating that these radio altimeters can be relied upon to perform their intended function when operating beyond a certain protection radius around 5G C-Band transmitters. The iterative AMOC process allowed the FAA to gain insight into 5G C-Band transmission impacts in a progressively more sophisticated manner. At first, the FAA made conservative assumptions about the potential for impact on radio altimeters from 5G C-Band transmissions and applied them to all airspace. During the FAA's initial analyses of AMOC requests, the FAA looked to protect against 5G C-Band interference during critical operations that rely on radio altimeters, by prohibiting these operations within the vicinity of known 5G C-Band emitters. After some time and an improved understanding of the 5G C-Band signals and their effects on specific radio altimeters, the FAA was able to reduce the protected area around the 5G C-band emitters to protect rotorcraft.

The FAA received and reviewed many more AMOC proposals from transport category airplane operators for AD 2021-23-12 than from helicopter operators for AD 2021-23-13. Some of the radio altimeters used on rotorcraft are the same model as, or similar to, the radio altimeters installed on transport category airplanes. As a result, the

AMOC process for AD 2021-23-12 and AD 2021-23-13 also provided data about the varying levels of interference tolerance for a majority of radio altimeters on the market, allowing the FAA to understand the overall susceptibility to interference of the existing fleet of rotorcraft. In addition, the FAA learned about the aircraft alterations that can be accomplished quickly to improve a radio altimeter's tolerance to transmissions in adjacent or nearby spectrum bands. Now that the FAA better understands the performance of specific radio altimeters and the means to make them more tolerant of transmissions in adjacent or nearby spectrum bands, the FAA is proposing to retain the existing prohibitions in AD 2021-23-13 with an option to upgrade to a radio altimeter tolerant rotorcraft to avoid the prohibitions.

*5G Compatibility:* AMOCs allowing operations otherwise prohibited by AD 2021-23-13 were based on voluntary operational mitigations undertaken by AT&T and Verizon, 5G C-Band licensees. The FAA, AT&T, and Verizon have collaborated extensively to ensure 5G C-Band radio frequency transmissions and rotorcraft operations can safely co-exist. In early January 2022, the FAA progressively tailored runway safety zones around airports to envelop only the airspace areas where critical phases of flight occur. Although these tailored runway safety zones around airports primarily benefited transport and commuter airplane operations, they also benefited rotorcraft operating at those airports. This collaborative work has allowed safe rotorcraft operations to continue in the short term.

*Update to Safety Determination:* The FAA's initial determination that radio altimeters cannot be relied upon to perform their intended function if they experience interference from wireless broadband operations in the 5G C-Band remains unchanged. Unlike the Terrain Awareness and Warnings Systems (TAWS) in transport airplanes, most Helicopter Terrain Avoidance Warning Systems (HTAWS) do not rely on radio altimeter inputs, but rather use radar altimeter data for vertical situational awareness in low visibility conditions (*i.e.*, snow and dust blown up by rotor down wash) and as an input into several procedures and automated system. This means that a 5G C-Band interference event in most helicopters does not result in an erroneous HTAWS alert.

The FAA is concerned that 5G C-Band interference events will occur more frequently as telecommunication companies continue to deploy 5G C-

Band services throughout the country and the safety benefit from the use of radio altimeters in helicopters will be lost. On January 11, 2023, the FAA published an NPRM that would supersede AD 2021–23–12 for transport and commuter category airplanes equipped with a radio altimeter (88 FR 1520) (“transport NPRM”). The transport NPRM proposed, in part, to require that after February 1, 2024, operations under part 121 must be conducted with a radio altimeter tolerant airplane. This proposed requirement was prompted by the FAA’s determination that erroneous system warnings due to a malfunctioning radio altimeter will lead to flightcrew desensitization to system warnings. The FAA has assessed the cumulative effects of increasing numbers of erroneous warnings for rotorcraft, such as the display of erroneous vertical position input to the pilot, and determined that it has not yet risen to the level of an unsafe condition. For this reason, the FAA is not proposing to mandate equipage of radio altimeters meeting certain tolerance requirements for all helicopters, as proposed in the transport NPRM for airplanes.

*Why New Corrective Action is Needed:* The FAA expects an increase in the number of 5G C-Band base stations around airports in the national airspace system (NAS) and expects these stations to transmit in the entire 5G C-Band frequency band (from 3.7 to 3.98 GHz). Since the FAA issued AD 2021–23–13, which focused solely on a limited airspace environment, 5G C-Band base stations have increasingly begun transmission in other areas of the country. Whereas 5G C-Band transmissions were initially limited to 3.7 to 3.8 GHz, these transmissions have also begun to expand to 3.8 to 3.98 GHz, and the FAA expects deployment at the higher end of the frequency range to expand after July 1, 2023.<sup>1</sup> These higher frequencies are nearer to the spectrum allocation where radio altimeters operate (4.2 to 4.4 GHz), which means that the potential for interference to radio altimeters from in-band and spurious<sup>2</sup> emissions may be more likely. In addition, the FAA expects approximately 19 additional telecommunication companies in addition to AT&T and Verizon will begin transmitting in the C-Band at

some point after June 2023.<sup>3</sup> As the 21 telecommunication companies authorized to transmit 5G C-Band continue to expand transmissions throughout the country, using NOTAMs to identify affected areas and assessing proposed AMOCs will become untenable. NOTAMs are temporary means of disseminating information until the information can be publicized by other means. Given 5G C-Band signals are not expected to be temporary and that 5G C-Band signals will cover the contiguous U.S., NOTAMs are no longer the best means of communicating the location of the 5G C-Band environment. In addition, given the information gleaned over the past year, the FAA is now able to identify the conditions under which radio altimeters can be relied on to perform their intended function in the presence of a 5G C-Band environment. Therefore, case-by-case AMOC approvals that allow performing certain operations otherwise prohibited by an AD are no longer the most efficient way for helicopter operators to show that their radio altimeters perform their intended function in the 5G C-Band environment.

*Determination of Rotorcraft Radio Altimeter Tolerance Requirements:* The FAA is proposing interference tolerance requirements for radio altimeters that can be used across the affected fleet. Rotorcraft meeting these proposed minimum performance levels would be allowed to perform the prohibited operations in the contiguous U.S. airspace and would no longer be required to include the RFM limitations specified in AD 2021–23–12. After July 1, 2023, rotorcraft that do not meet the proposed minimum performance levels would be subject to the prohibited operations.

The FAA determined the proposed interference tolerance requirements by using the fuller understanding of specific radio altimeter capabilities the FAA gained during the AMOC process for AD 2021–23–12 and AD 2021–23–13. This process revealed the radio altimeter modifications that would not require a substantial system redesign, allowing aircraft operators to readily replace radio altimeters or install filters that allowed the aircraft to operate safely in a mitigated 5G environment.

The interference tolerance requirements are represented by a power spectral density (PSD) curve. The PSD curve, as depicted in figure 1 to paragraph (g)(1) of this proposed AD,

represents the height over the ground and received power from a 5G C-Band emitter, at or below which the radio altimeter is expected to function reliably, measured in decibel-milliwatts (dBm) per megahertz (MHz). For purposes of this proposed AD, a “radio altimeter tolerant rotorcraft” is one for which the radio altimeter, as installed, demonstrates tolerance to radio altimeter interference at or above PSD curve threshold specified in figure 1 to paragraph (g)(1) of this proposed AD. A radio altimeter tolerant rotorcraft also demonstrates tolerance to an aggregate spurious emission level of –42 dBm/MHz in the 4200–4400 MHz radio altimeter band. For purposes of this proposed AD, a “non-radio altimeter tolerant rotorcraft” is one for which the radio altimeter, as installed, does not demonstrate those tolerances. Operators will have the option to upgrade to a radio altimeter tolerant rotorcraft if they wish to avoid the prohibitions in this proposed AD. Some operators may need to install filters between the radio altimeter and antenna to increase a radio altimeter’s tolerance. For others, the addition of a filter will not be sufficient to address interference susceptibility; therefore, the radio altimeter will need to be replaced with an upgraded radio altimeter. The FAA has determined that radio altimeter tolerant rotorcraft are not expected to experience interference during a critical phase of flight in the contiguous U.S. airspace.

*Areas of Operation:* Over the past year, the FAA and the aviation industry, using data voluntarily provided by AT&T and Verizon, have identified maximum power levels for 5G C-Band transmissions that would permit safe aircraft operations. This data includes 5G C-Band tower or antenna locations, fundamental transmission power levels, and antenna height. The FAA has found that rotorcraft meeting the proposed standards as represented by the PSD curve can safely perform the prohibited operations specified in this proposed AD. These operations are safe for radio altimeter tolerant rotorcraft to perform within the contiguous U.S. airspace as long as telecommunication companies transmit at parameters under the current voluntary agreements with the FAA and FCC.

*Compatibility with 5G C-Band Providers:* The FAA has determined that any U.S. 5G C-Band provider that maintains the mitigated actions will not have an effect on the safety of rotorcraft with radio altimeters that meet the interference tolerance requirements. The FAA will assess the effects of any changes to transmission parameters in

<sup>1</sup> FCC licenses authorized 5G transmissions from 3.7 to 3.98 GHz.

<sup>2</sup> The tolerance to 5G spurious emissions is the level of aggregate interference in the radio altimeter band below which the installed radio altimeter system will meet its performance standards and perform its intended function.

<sup>3</sup> The additional 19 telecommunication companies will have access to the FCC-licensed spectrum after current users vacate use of the frequencies.

the contiguous U.S. airspace to determine whether they would result in a hazard to air navigation. If the transmission changes negatively affect the safe operation of a radio altimeter tolerant rotorcraft, the FAA will re-evaluate the risks and determine if further rulemaking is warranted.

Therefore, the FAA has determined that an unsafe condition exists when performing certain operations in the presence of 5G C-Band transmissions affecting the proper function of radio altimeters. For that reason, operators would be required to revise their existing RFM to prohibit these operations unless operating a radio altimeter tolerant rotorcraft. This proposed requirement would take effect on July 1, 2023.

**FAA's Determination**

The FAA is issuing this NPRM after determining that the unsafe condition described previously is likely to exist or develop on other products of the same type design.

**Proposed AD Requirements in This NPRM**

For rotorcraft with radio altimeters that meet the proposed interference tolerance requirements, this proposed AD would terminate the operational limitations imposed by AD 2021-23-13 with no further action.

For rotorcraft with radio altimeters that do not meet the proposed interference tolerance requirements, this proposed AD would retain the requirement in AD 2021-23-13 to revise the existing RFM to incorporate limitations prohibiting the following operations in the presence of 5G C-Band wireless broadband interference as identified by NOTAM (NOTAMs will be issued to state the specific airports where the radio altimeter is unreliable due to the presence of 5G C-Band wireless broadband interference) until June 30, 2023. On or before June 30, 2023, this proposed AD would also require, for non-radio altimeter tolerant rotorcraft, revising the existing RFM to incorporate limitations prohibiting these same operations in the contiguous U.S. airspace.

**Interim Action**

The FAA considers that this AD, if adopted as proposed, would be an interim action. Once the Technical Standard Order (TSO) standard for radio altimeters is established, which will follow the existing international technical consensus on the establishment of the minimum operational performance standards (MOPS), the FAA anticipates that the MOPS will be incorporated into the TSO. The FAA also anticipates that rotorcraft incorporating equipment approved under the new Radio Altimeter TSO will be able to operate in the contiguous U.S. airspace with no 5G C-Band-related RFM limitations. Once a new radio altimeter TSO is developed, approved, and available, the FAA might consider additional rulemaking.

**Costs of Compliance**

The FAA estimates that this AD, if adopted as proposed, would affect 1,128 helicopters of U.S. registry. The FAA 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
RFM revision for non-radio altimeter tolerant rotorcraft (Retained action from AD 2021-23-13).	1 work-hour × \$85 per hour = \$85 .....	\$0	\$85	\$95,880
New RFM revision for non-radio altimeter tolerant rotorcraft.	1 work-hour × \$85 per hour = \$85 .....	0	85	95,880

**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) Would not affect intrastate aviation in Alaska, and
- (3) Would 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:
  - a. Removing Airworthiness Directive (AD) 2021-23-13, Amendment 39-21811 (86 FR 69992, December 9, 2021), and
  - b. Adding the following new AD:

**Various Helicopters:** Docket No. FAA-2023-0668; Project Identifier AD-2023-00199-R.

**(a) Comments Due Date**

The FAA must receive comments on this airworthiness directive (AD) by May 12, 2023.



**(b) Affected ADs**

This AD replaces AD 2021–23–13, Amendment 39–21811 (86 FR 69992, December 9, 2021) (AD 2021–23–13).

**(c) Applicability**

This AD applies to all helicopters, certificated in any category, equipped with a radio (also known as radar) altimeter. These radio altimeters are installed on various helicopter models including, but not limited to, the helicopters for which the design approval holder is identified in paragraphs (c)(1) through (20) of this AD.

- (1) Airbus Helicopters
- (2) Airbus Helicopters Deutschland GmbH
- (3) Air Space Design and Manufacturing, LLC
- (4) Bell Textron Canada Limited
- (5) Bell Textron Inc.
- (6) Brantly International, Inc.
- (7) Centerpointe Aerospace Inc.
- (8) Columbia Helicopters, Inc.
- (9) The Enstrom Helicopter Corporation
- (10) Erickson Air-Crane Incorporated, DBA Erickson Air-Crane
- (11) Helicopteres Guimbal

- (12) Siam Hiller Holdings, Inc.
- (13) Kaman Aerospace Corporation
- (14) Leonardo S.p.a.
- (15) MD Helicopters Inc.
- (16) PZL Swidnik S.A.
- (17) Robinson Helicopter Company
- (18) Schweizer RSG LLC
- (19) Scotts-Bell 47 Inc.
- (20) Sikorsky Aircraft Corporation

**(d) Subject**

Air Transport Association (ATA) of America Code 3444, Ground Proximity System.

**(e) Unsafe Condition**

This AD was prompted by determination that radio altimeters cannot be relied upon to perform their intended function if they experience interference from wireless broadband operations in the 3.7–3.98 GHz frequency band (5G C-Band). The FAA is issuing this AD because radio altimeter anomalies that are undetected by the automation or pilot, particularly close to the ground, could lead to loss of continued safe flight and landing.

**(f) Compliance**

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

**(g) Definitions**

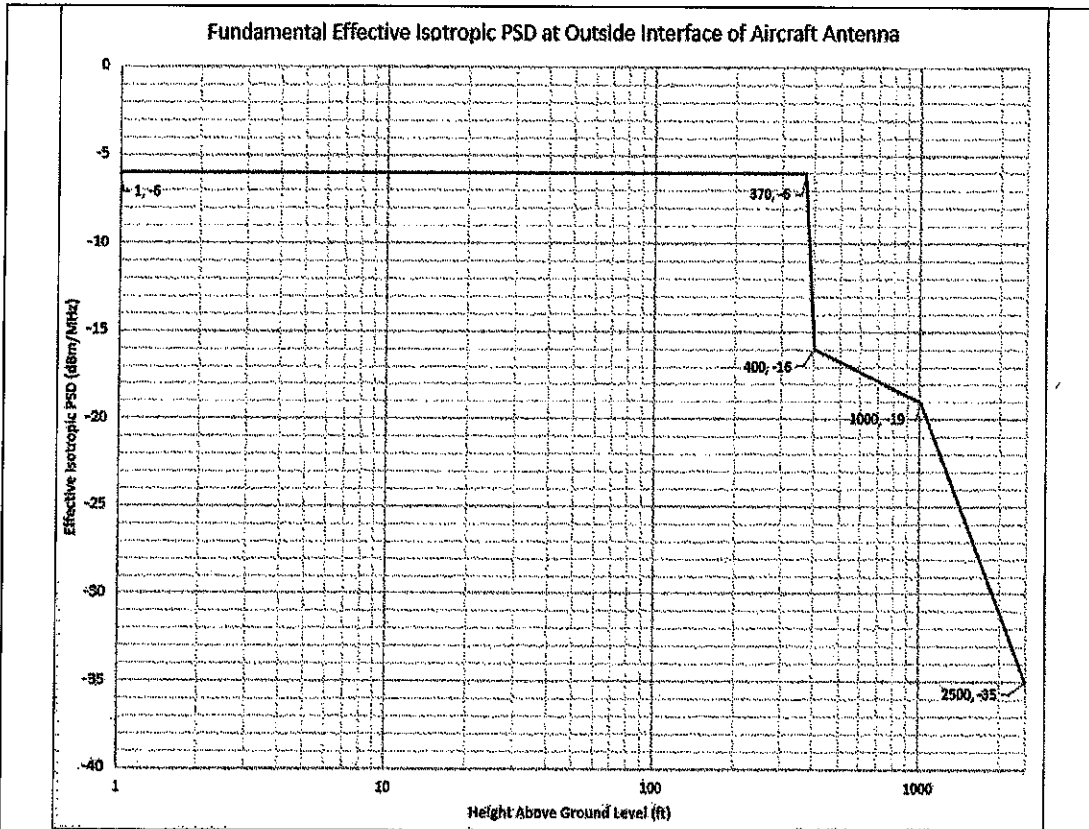
(1) For purposes of this AD, a “radio altimeter tolerant rotorcraft” is one for which the radio altimeter, as installed, demonstrates the tolerances specified in paragraphs (g)(1)(i) and (ii) of this AD, using a method approved by the FAA. No actions are required by this AD for radio altimeter tolerant rotorcraft.

(i) Tolerance to radio altimeter interference at or above the power spectral density (PSD) curve threshold specified in figure 1 to paragraph (g)(1) of this AD.

(ii) Tolerance to an aggregate base station conducted spurious emission level of –42 dBm/MHz in the 4200–4400 MHz radio altimeter band.

**Figure 1 to paragraph (g)(1)—Effective Power Spectral Density**

**BILLING CODE 4910–13–P**



\*The notch that occurs in the curve between 370 ft AGL to 1000 ft AGL is due to the impact of the Nationwide Equivalent Isotropic Radiated Power (EIRP) Elevation Mask, 75 ft horizontal minimum separation distance (MSD), and 50 ft vertical MSD for a 5G tower at 350 ft AGL.

Height above ground (ft)	Effective Isotropic PSD (dBm/MHz)
1	-6
370	-6
400	-16
1000	-19
2500	-35

(2) For purposes of this AD, a “non-radio altimeter tolerant rotorcraft” is one for which the radio altimeter, as installed, does not demonstrate the tolerances specified in paragraphs (g)(1)(i) and (ii) of this AD.

**(h) Retained Rotorcraft Flight Manual (RFM) Revision for Non-Radio Altimeter Tolerant Rotorcraft**

For non-radio altimeter tolerant rotorcraft: On or before January 4, 2022, revise the Limitations Section of the existing RFM for your helicopter by incorporating the limitations specified in figure 2 to paragraph (h) of this AD. This may be done by inserting a copy of this AD into the existing RFM for

your helicopter. The action required by this paragraph may be performed by the owner/operator (pilot) holding at least a private pilot certificate and must be entered into the aircraft records showing compliance with this AD in accordance with 14 CFR 43.9(a)(1) through (4) and 14 CFR 91.417(a)(2)(v). The record must be maintained as required by 14 CFR 91.417 or 14 CFR 135.439. **Figure 2 to paragraph (h)—RFM Revision**

**(Required by AD 2021-23-13)****Radio Altimeter Flight Restrictions**

When operating in U.S. airspace, the following operations requiring radio altimeter are prohibited in the presence of 5G C-Band wireless broadband interference as identified by NOTAM (NOTAMs will be issued to state the specific areas where the radio altimeter is unreliable due to the presence of 5G C-Band wireless broadband interference):

- Performing approaches that require radio altimeter minimums for rotorcraft offshore operations. Barometric minimums must be used for these operations instead.
- Engaging hover autopilot modes that require radio altimeter data.
- Engaging Search and Rescue (SAR) autopilot modes that require radio altimeter data.
- Performing takeoffs and landings in accordance with any procedure (Category A, Category B, or by Performance Class in the Rotorcraft Flight Manual or Operations Specification) that requires the use of radio altimeter data.

**(i) RFM Revision for Non-Radio Altimeter Tolerant Rotorcraft**

For non-radio altimeter tolerant rotorcraft, do the actions specified in paragraphs (i)(1) and (2) of this AD.

(1) On or before June 30, 2023, revise the Limitations Section of the existing RFM for your helicopter by including the information specified in figure 3 to paragraph (i) of this

AD. This may be done by inserting a copy of this AD into the existing RFM for your helicopter. The action required by this paragraph may be performed by the owner/operator (pilot) holding at least a private pilot certificate and must be entered into the aircraft records showing compliance with this AD in accordance with 14 CFR 43.9(a)(1) through (4) and 14 CFR 91.417(a)(2)(v). The record must be maintained as required by 14

CFR 91.417 or 14 CFR 135.439. Incorporating the RFM revision required by this paragraph terminates the RFM revision required by paragraph (h) of this AD.

(2) Before further flight after incorporating the limitations specified in figure 3 to paragraph (i) of this AD, remove the RFM revision required by paragraph (h) of this AD. **Figure 3 to paragraph (i)—RFM Revision for Non-Radio Altimeter Tolerant Rotorcraft**

**(Required by AD 20\*\*-\*\*-\*\*)****Radio Altimeter Flight Restrictions**

Due to the presence of 5G C-Band wireless broadband interference, when operating in the contiguous U.S. airspace, the following operations requiring radio altimeter are prohibited:

- Performing approaches that require radio altimeter minimums for rotorcraft offshore operations. Barometric minimums must be used for these operations instead.
- Engaging hover autopilot modes that require radio altimeter data.
- Engaging Search and Rescue (SAR) autopilot modes that require radio altimeter data.
- Performing takeoffs and landings in accordance with any procedure (Category A, Category B, or by Performance Class in the Rotorcraft Flight Manual or Operations Specification) that requires the use of radio altimeter data.

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

(1) The Manager, Operational Safety 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 Operational Safety Branch, send it to the attention of the person

identified in paragraph (k) of this AD. Information may be emailed to: *AMOC@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 for AD 2021-23-13 are approved as AMOCs for the requirements specified in paragraph (h) of this AD until June 30, 2023.

**(k) Related Information**

For more information about this AD, contact David Swartz, Continued Operational Safety Technical Advisor, COS Program Management Section, Operational Safety Branch, FAA, 222 W. 7th Ave, M/S #14 Anchorage, AK 99513; phone: 817-222-5390; email: *operationalsafety@faa.gov*.

**(l) Material Incorporated by Reference**

None.

Issued on April 5, 2023.

Christina Underwood,

Acting Director, Compliance & Airworthiness  
Division, Aircraft Certification Service.

[FR Doc. 2023-07743 Filed 4-10-23; 8:45 am]

BILLING CODE 4910-13-C

## DEPARTMENT OF HOMELAND SECURITY

### Coast Guard

#### 33 CFR Part 117

[Docket No. USCG-2022-0989]

RIN 1625-AA09

### Drawbridge Operation Regulation; Chicago River, Chicago, IL

AGENCY: Coast Guard, DHS.

ACTION: Notification of proposed  
rulemaking.

**SUMMARY:** The Coast Guard proposes to modify the operating schedule that governs the Dearborn Street Bridge, mile 1.13, over the Main Branch of the Chicago River at Chicago, Illinois. During this maintenance period, the bridge need only operate one leaf while the other leaf remains secured to masted navigation. Vessels able to pass under the bridge without an opening may do so at any time. We invite your comments on this proposed rulemaking. **DATES:** Comments and relate material must reach the Coast Guard on or before May 12, 2023.

**ADDRESSES:** You may submit comments identified by docket number USCG-2022-0989 using Federal Decision Making Portal at <https://www.regulations.gov>.

See the "Public Participation and Request for Comments" portion of the **SUPPLEMENTARY INFORMATION** section below for instructions on submitting comments.

**FOR FURTHER INFORMATION CONTACT:** If you have questions on this temporary final rule, call or email: Mr. Lee D. Soule, Bridge Management Specialist, Ninth Coast Guard District; telephone 216-902-6085, email [Lee.D.Soule@uscg.mil](mailto:Lee.D.Soule@uscg.mil).

#### SUPPLEMENTARY INFORMATION:

##### I. Table of Abbreviations

CFR Code of Federal Regulations  
DHS Department of Homeland Security  
FR Federal Register  
LWD Low Water Datum based on IGLD85  
OMB Office of Management and Budget  
NPRM Notice of Proposed Rulemaking  
§ Section  
U.S.C. United States Code

## II. Background, Purpose, and Legal Basis

The Dearborn Street Bridge, mile 1.13, spans the Main Branch of the Chicago River at Chicago, Illinois. The Dearborn Street Bridge, mile 1.13, over the Main Branch of the Chicago River provides a horizontal clearance of 200 feet and a vertical clearance of 22 feet above LWD. The bridges of Chicago are historic and all of them are over 100 years old and require frequent maintenance and repairs that occur with little warning. Typically, these repairs must be attended to immediately to protect the health and welfare of pedestrians crossing the bridges each day. The current bridge regulations for the Chicago River are contained in 33 CFR 117.391 and allows the bridges to open on signal if a 12-hour advance notice is provided by commercial vessels and a 20-hour advance notice by recreational vessel during posted times. The Chicago River bridges operate infrequently as almost all vessels can pass through the bridges without an opening. The exceptions are recreational sailing vessels that pass the bridge in City of Chicago sponsored flotillas twice a year; all affected sailing vessels can pass safely with one leaf open. Commercial vessels transits that require both bridge leaves to open are rare, occurring less than once a month on average. All vessels could detour through the Calumet River.

## III. Discussion of Proposed Rule

We propose a temporary change to the operation of the Dearborn Street Bridge, mile 1.13, over the Main Branch of the Chicago River at Chicago, Illinois. During the period from midnight on June 1, 2023, through noon on December 1, 2023, the Dearborn Street Bridge, mile 1.13, would only need to operate one leaf for the passage of vessels, while the other leaf is secured to masted navigation for maintenance. The effect of not performing the maintenance would be to deny the bridge to an estimated 10,000 persons commuting to work daily if repairs and required maintenance are not started in a timely manner.

On February 11, 2022, we published in the **Federal Register** (87 FR 7945) a temporary final rule allowing the bridge to be repaired with the same conditions as listed in this proposed rulemaking. During the temporary rule we did not receive any comments or complaints and we believe reducing the comment period from the traditional sixty days to thirty days will meet the reasonable needs of the community.

## IV. Regulatory Analyses

We developed this proposed rule after considering numerous statutes and Executive Orders related to rulemaking. Below we summarize our analyses based on these statutes and Executive Orders.

### A. Regulatory Planning and Review

Executive Orders 12866 and 13563 direct agencies to assess the costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits. This NPRM has not been designated a "significant regulatory action," under Executive Order 12866. Accordingly, the NPRM has not been reviewed by the Office of Management and Budget (OMB).

This regulatory action determination is based on the ability that vessels can still transit the bridge with one leaf open and that most of the vessels can pass safely under the bridge without an opening or can pass through the bridge with only one draw open. Vessels could also detour around the bridge on the Calumet River.

### B. Impact on Small Entities

The Regulatory Flexibility Act of 1980 (RFA), 5 U.S.C. 601-612, as amended, requires Federal agencies to consider the potential impact of regulations on small entities during rulemaking. The term "small entities" comprises small businesses, not-for-profit organizations that are independently owned and operated and are not dominant in their fields, and governmental jurisdictions with populations of less than 50,000. The Coast Guard certifies under 5 U.S.C. 605(b) that this proposed rule would not have a significant economic impact on a substantial number of small entities.

While some owners or operators of vessels intending to transit the bridge may be small entities, for the reasons stated in section IV.A above this proposed rule would not have a significant economic impact on any vessel owner or operator.

If you think that your business, organization, or governmental jurisdiction qualifies as a small entity and that this rule would have a significant economic impact on it, please submit a comment (see **ADDRESSES**) explaining why you think it qualifies and how and to what degree this rule would economically affect it.

Under section 213(a) of the Small Business Regulatory Enforcement Fairness Act of 1996 (Pub. L. 104-121), we want to assist small entities in understanding this proposed rule. If the

[4910-13-P]

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 39**

**[Docket No. FAA-2021-0954; Project Identifier AD-2021-01170-R; Amendment 39-21811; AD 2021-23-13]**

**RIN 2120-AA64**

**Airworthiness Directives; Various Helicopters**

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

**ACTION:** Final rule; request for comments.

**SUMMARY:** The FAA is adopting a new airworthiness directive (AD) for all helicopters equipped with a radio (also known as radar) altimeter. This AD was prompted by a determination that radio altimeters cannot be relied upon to perform their intended function if they experience interference from wireless broadband operations in the 3.7-3.98 GHz frequency band (5G C-Band). This AD requires revising the limitations section of the existing rotorcraft flight manual (RFM) for your helicopter to incorporate limitations prohibiting certain operations requiring radio altimeter data when in the presence of 5G C-Band interference in areas as identified by Notices to Air Missions (NOTAMs). The FAA is issuing this AD to address the unsafe condition on these products.

**DATES:** This AD is effective [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The FAA must receive comments on this 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.

### **Examining the AD Docket**

You may examine the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2021-0954; 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 street address for the Docket Operations is listed above.

**FOR FURTHER INFORMATION CONTACT:** Dave Swartz, Continued Operational Safety Technical Advisor, COS Program Management Section, Operational Safety Branch, FAA, 222 W. 7th Ave, M/S #14 Anchorage, AK 99513; phone: 817-222-5390; email: [operationalsafety@faa.gov](mailto:operationalsafety@faa.gov).

### **SUPPLEMENTARY INFORMATION:**

#### **Background**

In March 2020, the United States Federal Communications Commission (FCC) adopted final rules authorizing flexible use of the 3.7-3.98 GHz band for next generation services, including 5G and other advanced spectrum-based services.<sup>1</sup> Pursuant to these rules, C-Band wireless broadband deployment is permitted to occur in phases with the opportunity for operations in the lower 100 megahertz of the band (3.7-3.8 GHz) in 46

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<sup>1</sup> The FCC's rules did not make C-Band wireless broadband available in Alaska, Hawaii, and the U.S. Territories.

markets beginning as soon as December 5, 2021; however, the FAA does not expect actual deployment to commence until January 5, 2022. This AD refers to “5G C-Band” interference, but wireless broadband technologies, other than 5G, may use the same frequency band.<sup>2</sup> These other uses of the same frequency band are within the scope of this AD since they would introduce the same risk of radio altimeter interference as 5G C-Band.

In April 2020, RTCA formed a 5G Task Force, including members from RTCA, the FAA, aircraft and radio altimeter manufacturers, European Organisation for Civil Aviation Equipment (EUROCAE), industry organizations, and operators, to perform “a quantitative evaluation of radar altimeter performance regarding RF interference from expected 5G emissions in the 3.7-3.98 GHz band, as well as a detailed assessment of the risk of such interference occurring and impacting aviation safety.”<sup>3</sup> Based on the work of the task force, RTCA published a report, which concluded that there is “a major risk that 5G telecommunications systems in the 3.7-3.98 GHz band will cause harmful interference to radar altimeters on all types of civil aircraft—including commercial transport airplanes; business, regional, and general aviation airplanes; and both transport and general aviation helicopters.”<sup>4</sup>

The report further concludes that the likelihood and severity of radio frequency interference increases for operations at lower altitudes. That interference could cause the radio altimeter to either become inoperable or present misleading information, and/or also affect associated systems on civil aircraft. The RTCA report refers to FCC Report and

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<sup>2</sup> The regulatory text of the AD uses the term “5G C-Band” which, for purposes of this AD, has the same meaning as “5G”, “C-Band” and “3.7-3.98 GHz.”

<sup>3</sup> RTCA Paper No. 274-20/PMC-2073, Assessment of C-Band Mobile Telecommunications Interference Impact on Low Range Radar Altimeter Options, dated October 7, 2020 (RTCA Paper No. 274-20/PMC-2073), page i. This document is available in Docket No. FAA-2021-0954, and at [https://www.rtca.org/wp-content/uploads/2020/10/SC-239-5G-Interference-Assessment-Report\\_274-20-PMC-2073\\_accepted\\_changes.pdf](https://www.rtca.org/wp-content/uploads/2020/10/SC-239-5G-Interference-Assessment-Report_274-20-PMC-2073_accepted_changes.pdf).

<sup>4</sup> RTCA Paper No. 274-20/PMC-2073, page i.

Order (R&O) FCC 20-22,<sup>5</sup> which identifies radio frequencies and power level conditions for the new C-Band services. The RTCA report identified the possibility of interference from both wireless emitters (on base stations, for example) as well as onboard user handsets. The RTCA report and conclusions remain under review, including by federal spectrum regulators. The FAA risk assessment included consideration of the RTCA report, public comments to the RTCA report, and analyses from radio altimeter manufacturers and aircraft manufacturers in support of the safety risk determination. The analyses FAA considered were consistent with RTCA's conclusions pertaining to radio altimeter interference from C-Band emissions. The FAA determined that, at this time, no information has been presented that shows radio altimeters are not susceptible to interference caused by C-Band emissions permitted in the United States.

Additionally, the deployment of C-Band wireless broadband networks is occurring globally. In certain countries, deployment has already occurred in C-Band frequencies. In some countries, temporary technical, regulatory, and operational mitigations on C-Band systems have been implemented while aviation authorities complete their safety assessments. Under the FCC rules adopted in 2020, base stations in rural areas of the United States are permitted to emit at higher levels in comparison to other countries.

The radio altimeter is an important aircraft instrument, and its intended function is to provide direct height-above-terrain/water information to a variety of aircraft systems. Commercial aviation radio altimeters operate in the 4.2-4.4 GHz band, which is separated by 220 megahertz from the C-Band telecommunication systems in the 3.7-3.98 GHz band. The radio altimeter is more precise than a barometric altimeter and for that reason is used where aircraft height over the ground needs to be precisely measured, such as

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<sup>5</sup> FCC Report and Order (R&O) FCC 20-22 in the Matter of Expanding Flexible Use of the 3.7-4.2 GHz Band, adopted February 28, 2020, and released March 3, 2020. This document is available in Docket No. FAA-2021-0954, and at <https://www.fcc.gov/document/fcc-expands-flexible-use-c-band-5g-0>.



autohover or other low altitude operations. The receiver on the radio altimeter typically is highly accurate, however it may deliver erroneous results in the presence of out-of-band radio frequency emissions from other frequency bands. The radio altimeter must detect faint signals reflected off the ground to measure altitude, in a manner similar to radar. Out-of-band signals could significantly degrade radio altimeter functions during critical phases of flight, if the altimeter is unable to sufficiently reject those signals.

Many operators need to be able to land in low visibility conditions. These operators employ specially certified equipment and flightcrew training in order to be able to fly closer to the ground during approach in instrument conditions without visual reference to the landing environment. These operations can only be conducted with reference to actual height above the ground, as measured by a radio altimeter.

Additionally, automatic and/or manual flight guidance systems on helicopters facilitate low visibility operations and rely on accurate radio altimeter inputs. These inputs may provide height data for landing and takeoff for Category A and Category B operations. Anomalous (missing or erroneous) radio altimeter inputs to these systems may cause the aircraft to be maneuvered in an unexpected or hazardous manner during the final stages of approach and landing, and may not be detectable by the pilot in time to maintain continued safe flight and landing. Inaccurate radio altimeter data can result in pilots not trusting their instruments, eroding the foundation on which all instrument flight training is built.

Although the FAA has determined operations immediately at risk are those requiring a radio altimeter to takeoff, land, or establish and maintain a hover, a wide range of automated safety systems rely on radio altimeter data. The FAA continues to work with inter-agency and industry stakeholders to collect data on potential effects to these systems to determine whether additional mitigations are necessary. The FAA

determined, however, that mandatory action is not immediately required for these systems.

The FAA plans to use data provided by telecommunications providers to determine which heliports, airports, or areas within the United States have or will have C-Band base stations or other devices that could potentially impact helicopter systems. NOTAMs will be issued, as necessary, to state the specific areas where the data from a radio altimeter may be unreliable due to the presence of 5G C-Band wireless broadband signals.<sup>6</sup> For this reason, this AD requires flight manual limitations that prohibit certain operations requiring radio altimeter data in areas that will be identified by NOTAMs. Due to the dynamic nature of base station activation and the ongoing process of identifying the resulting affected airspace, including potential consideration for variability in C-Band deployment conditions such as radiated power levels and locations, the FAA has determined that NOTAMs are the best means to communicate changes in restrictions within affected areas.

Finally, the FAA notes that in accordance with paragraph (h) of this AD, any person may propose and request FAA approval of an alternative method of compliance (AMOC). The proposed AMOC must include specific conditions that would address the unsafe condition (e.g., by providing information substantiating that certain aircraft or altimeter models are not susceptible to C-Band radio frequency interference).

#### **FAA's Determination**

The FAA is issuing this AD because the agency has determined the unsafe condition described previously is likely to exist or develop in helicopters with a radio altimeter as part of their type design.

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<sup>6</sup> The FAA's process for issuing NOTAMs is described in FAA Order 7930.2S, *Notices to Air Missions (NOTAM)*, December 2, 2021.



## **AD Requirements**

This AD requires revising the limitations section of the existing RFM for your helicopter to incorporate limitations prohibiting certain operations requiring radio altimeter data when in the presence of 5G C-Band wireless broadband signals in areas as identified by NOTAM.

These prohibitions could prevent flights and could also result in flight diversions.

## **Compliance with RFM Revisions**

Section 91.9 prohibits any person from operating a civil aircraft without complying with the operating limitations specified in the RFM.

## **Interim Action**

The FAA considers this AD to be an interim action. If final action is later identified, the FAA might consider further rulemaking.

## **Justification for Immediate Adoption and Determination of the Effective Date**

Section 553(b)(3)(B) of the Administrative Procedure Act (APA) (5 U.S.C. 551 *et seq.*) authorizes agencies to dispense with notice and comment procedures for rules when the agency, for “good cause,” finds that those procedures are “impracticable, unnecessary, or contrary to the public interest.” Under this section, an agency, upon finding good cause, may issue a final rule without providing notice and seeking comment prior to issuance. Further, section 553(d) of the APA authorizes agencies to make rules effective in less than thirty days, upon a finding of good cause.

An unsafe condition exists that requires the immediate adoption of this AD without providing an opportunity for public comments prior to adoption. The FAA has found that the risk to the flying public justifies foregoing notice and comment prior to adoption of this rule because radio altimeter anomalies that are undetected by the aircraft automation or pilot, particularly close to the ground, could lead to loss of continued safe flight and landing. The urgency is based on C-Band wireless broadband deployment,

which is expected to occur in phases with operations beginning as soon as January 5, 2022. Accordingly, notice and opportunity for prior public comment are impracticable and contrary to the public interest pursuant to 5 U.S.C. 553(b)(3)(B).

In addition, the FAA finds that good cause exists pursuant to 5 U.S.C. 553(d) for making this amendment effective in less than 30 days, for the same reasons the FAA found good cause to forego notice and comment.

### **Comments Invited**

The FAA invites you to send any written data, views, or arguments about this final rule. Send your comments to an address listed under ADDRESSES. Include “Docket No. FAA-2021-0954 and Project Identifier AD-2021-01170-R” at the beginning of your comments. The most helpful comments reference a specific portion of the final rule, explain the reason for any recommended change, and include supporting data. The FAA will consider all comments received by the closing date and may amend this final rule because of those 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, to <https://www.regulations.gov>, including any personal information you provide. The agency will also post a report summarizing each substantive verbal contact received about this final rule.

### **Confidential Business Information**

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 your comments responsive to this AD 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 AD, 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 AD. Submissions containing CBI should be sent to Dave Swartz, Continued Operational Safety Technical Advisor, COS Program Management Section, Operational Safety Branch, FAA, 222 W. 7th Ave, M/S #14 Anchorage, AK 99513; phone: 817-222-5390; email: [operationalstafety@faa.gov](mailto:operationalstafety@faa.gov). Any commentary that the FAA receives which is not specifically designated as CBI will be placed in the public docket for this rulemaking.

### **Regulatory Flexibility Act**

The requirements of the Regulatory Flexibility Act (RFA) do not apply when an agency finds good cause pursuant to 5 U.S.C. 553 to adopt a rule without prior notice and comment. Because FAA has determined that it has good cause to adopt this rule without prior notice and comment, RFA analysis is not required.

### **Impact on Intrastate Aviation in Alaska**

For the reasons discussed above, this AD will not affect intrastate aviation in Alaska.

### **Costs of Compliance**

The FAA estimates that this AD affects 1,828 helicopters of U.S. registry. Labor rates are estimated at \$85 per work-hour. Based on these numbers, the FAA estimates the following costs to comply with this AD.

Revising the existing RFM for your helicopter would take about 1 work-hour for an estimated cost of \$85 per helicopter or \$155,380 for the U.S. fleet.

As previously discussed, there may be other impacts to aviation; however there remains uncertainty as to cost due to various factors such as which areas within the United States have, or will have, base stations or other devices that could interfere with aircraft radio altimeters.



### **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.

### **List of Subjects in 14 CFR Part 39**

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

### **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:  
**2021-23-13 Various Helicopters:** Amendment 39-21811; Docket No. FAA-2021-0954;  
Project Identifier AD-2021-01170-R.

**(a) Effective Date**

This airworthiness directive (AD) is effective [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**(b) Affected ADs**

None.

**(c) Applicability**

This AD applies to all helicopters, certificated in any category, equipped with a radio (also known as radar) altimeter. These radio altimeters are installed on various helicopter models including, but not limited to, the helicopters for which the design approval holder is identified in paragraphs (c)(1) through (20) of this AD.

- (1) Airbus Helicopters
- (2) Airbus Helicopters Deutschland GmbH
- (3) Air Space Design and Manufacturing, LLC
- (4) Bell Textron Canada Limited
- (5) Bell Textron Inc.
- (6) Brantly International, Inc.
- (7) Centerpointe Aerospace Inc.
- (8) Columbia Helicopters, Inc.
- (9) The Enstrom Helicopter Corporation
- (10) Erickson Air-Crane Incorporated, DBA Erickson Air-Crane
- (11) Helicopteres Guimbal
- (12) Siam Hiller Holdings, Inc.



(13) Kaman Aerospace Corporation

(14) Leonardo S.p.a.

(15) MD Helicopters Inc.

(16) PZL Swidnik S.A.

(17) Robinson Helicopter Company

(18) Schweizer RSG LLC

(19) Scotts-Bell 47 Inc.

(20) Sikorsky Aircraft Corporation

**(d) Subject**

Joint Aircraft Service Component (JASC) Code: 3444, Ground Proximity System.

**(e) Unsafe Condition**

This AD was prompted by a determination that radio altimeters cannot be relied upon to perform their intended function if they experience interference from wireless broadband operations in the 3.7-3.98 GHz frequency band (5G C-Band). The FAA is issuing this AD because radio altimeter anomalies that are undetected by the automation or pilot, particularly close to the ground, could lead to loss of continued safe flight and landing.

**(f) Compliance**

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

**(g) Rotorcraft Flight Manual (RFM) Revision**

On or before January 4, 2022: Revise the Limitations Section of the existing RFM for your helicopter by incorporating the limitations specified in figure 1 to paragraph (g) of this AD. This may be done by inserting a copy of this AD into the existing RFM for your helicopter. The action required by this paragraph may be performed by the owner/operator (pilot) holding at least a private pilot certificate and must be entered into the aircraft records showing compliance with this AD in accordance with 14 CFR

43.9(a)(1) through (4) and 14 CFR 91.417(a)(2)(v). The record must be maintained as required by 14 CFR 91.417 or 14 CFR 135.439.

**Figure 1 to paragraph (g) – RFM Revision**

<b>(Required by AD 2021-23-13)</b>
<b>Radio Altimeter Flight Restrictions</b>
When operating in U.S. airspace, the following operations requiring radio altimeter are prohibited in the presence of 5G C-Band wireless broadband interference as identified by NOTAM (NOTAMs will be issued to state the specific areas where the radio altimeter is unreliable due to the presence of 5G C-Band wireless broadband interference):
<ul style="list-style-type: none"><li>• Performing approaches that require radio altimeter minimums for rotorcraft offshore operations. Barometric minimums must be used for these operations instead.</li><li>• Engaging hover autopilot modes that require radio altimeter data.</li><li>• Engaging Search and Rescue (SAR) autopilot modes that require radio altimeter data.</li><li>• Performing takeoffs and landings in accordance with any procedure (Category A, Category B, or by Performance Class in the Rotorcraft Flight Manual or Operations Specification) that requires the use of radio altimeter data.</li></ul>

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

(1) The Manager, Operational Safety 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 Operational Safety Branch, send it to the attention of the person identified in paragraph (i) of this AD. Information may be emailed to: [AMOC@faa.gov](mailto:AMOC@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.

**(i) Related Information**

For more information about this AD, contact Dave Swartz, Continued Operational Safety Technical Advisor, COS Program Management Section, Operational Safety

Branch, FAA, 222 W. 7th Ave, M/S #14 Anchorage, AK 99513; phone: 817-222-5390;  
email: operationalsafety@faa.gov.

**(j) Material Incorporated by Reference**

None.

Issued on December 7, 2021.

Gaetano A. Sciortino, Deputy Director for Strategic Initiatives,  
Compliance & Airworthiness Division,  
Aircraft Certification Service.



U.S. Department  
of Transportation  
Federal Aviation  
Administration

# InFO

Information for Operators

InFO 23003  
DATE: 03/23/23

Flight Standards Service  
Washington, DC

[http://www.faa.gov/other\\_visit/aviation\\_industry/airline\\_operators/airline\\_safety/info](http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info)

*An InFO contains valuable information for operators that should help them meet certain administrative, regulatory, or operational requirements, with relatively low urgency or impact on safety. The contents of this document do not have the force and effect of law and are not meant to bind the public in any way. This document is intended only to provide clarity to the public regarding existing requirements under the law or agency policies.*

**Subject:** Terrain Awareness and Warning Systems (TAWS) Nuisance Alerts.

**Purpose:** This InFO serves to inform operators about the risks associated with distraction and complacency brought about by routine use of the TAWS' terrain inhibit feature. It is also intended to ensure operators understand the importance of having procedures and training for the use of the terrain inhibit aural warning switches associated with nuisance alerts.

**Background:** The National Transportation Safety Board (NTSB) has issued safety recommendations addressing controlled flight into terrain (CFIT). NTSB Safety Recommendation A-18-014 recommended the Federal Aviation Administration (FAA) work with Title 14 of the Code of Federal Regulations (14 CFR) Part 135 certificate holders that operate under visual flight rules (VFR) in mountainous terrain at altitudes below the required terrain clearance of the aircraft's required TAWS class to;

- Ensure that flight operations management and pilots are aware of the risks associated with distraction from continuous nuisance alerts and complacency brought about by routine use of the terrain inhibit feature;
- Review operators procedures to ensure they include risk mitigation for use of the terrain avoidance system inhibit switch.

**Discussion:** Controlled flight into terrain occurs when an airworthy aircraft under the complete control of the pilot is inadvertently flown into an obstacle such as terrain, or water. The pilots are generally unaware of the danger until it is too late. Most CFIT accidents occur in the approach and landing phase of flight and are often associated with non-precision approaches. Many CFIT accidents occur because of loss of situational awareness, particularly in the vertical plane. Many accidents occur when an aircraft is lined up on the centerline of an approach to an airfield. Lack of familiarity with the approach or misreading of the approach plate are common causal factors, particularly where the approach features steps down in altitude from the initial approach fix to the final approach fix.

Multiple CFIT accidents have occurred when pilots, who are flying VFR at low altitudes are presented with risks associated with rapid changes in weather resulting in loss of situational awareness. Alerts from TAWS can become a nuisance or a distraction to pilots when flying at altitudes below the alerting threshold of the system. This may result in the pilot's decision to inhibit the system. Inhibiting warning

systems and ignoring warnings, combined with deteriorating weather conditions leading to loss of visual surface reference and situational awareness, has been found to be the cause of some CFIT accidents. In some situations, aircraft impacted terrain that might have been avoided had the TAWS alert feature been uninhibited.

**Recommended Action:** Directors of Operations for (Part 135), Part 91 managers and Fractional Ownership Program Managers (Part 91, subpart K) should review their approved training programs to ensure procedures for the use of the terrain warning system inhibit switch is adequately addressed.

**Contact:** Questions or comments regarding this InFO may be directed to the Air Transportation Division's 135 Flight Operations Section, at 9-AFS-200-Correspondence@faa.gov.





**Federal Aviation Administration**

# **AIRCRAFT FIREFIGHTING FOAM TRANSITION PLAN**

Requirement: In December 2022, Congress directed the FAA, through documentation accompanying the Omnibus Spending Bill, to develop a Transition Plan to ensure the orderly transition from current aircraft fire fighting foam to a replacement firefighting foam.

This *Aircraft Firefighting Foam Transition Plan*, dated May 8, 2023, satisfies this directive.



**May 8, 2023**

# TABLE OF CONTENTS

Abbreviations and Acronyms .....	3
Introduction.....	4
Overview of the Transition Plan .....	5
Congressional Timeline and Authorizations.....	5
Fluorine-Free Foam Transition Workgroups.....	6
Summary of FAA Timelines for Policy & Guidance Related to Required Elements .....	7
Policy and Guidance Related to Part 139 Airport Implementation Plans.....	8
Tactic and Technique Differences .....	9
Foam Blanket Management .....	10
Responder Responsibilities and Considerations .....	11
Training Information Dissemination.....	12
EPA Guidance.....	13
Residual PFAS .....	14
Information Related to MILSPEC F3 Use and Decontaminating ARFF Equipment.....	14
Elements That Should Be Considered in an MILSPEC F3 Transition Plan.....	15
Impacts on Index Requirements and ARFF Vehicles.....	15
Environmental Considerations.....	15
Availability of MILSPEC F3 .....	17
Transition Costs and Other Considerations .....	17
Next Steps .....	18

This report was prepared in coordination with the Department of Defense, the Environmental Protection Agency, and industry partners.

## **ABBREVIATIONS AND ACRONYMS**

AAAE	American Association of Airport Executives
AAS	FAA Airport Safety and Standards
AC	Advisory Circular
ACI-NA	Airport Council International–North America
AEE	FAA Environment and Energy
AFFF	Aqueous Film Forming Foam
AGC	FAA General Council
ARFF	Aircraft Rescue and Firefighting
ATR	Airport Technology and Research
CERLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DoD	Department of Defense
DOT	Department of Transportation
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
F3	Fluorine Free Foam
MILSPEC	Military Specification
NAVSEA	Naval Sea Systems Command
NDAA	National Defense Authorization Act
QPD	Qualified Product Database
QPL	Qualified Product List
QRV	Quick Response Vehicle
PFAS	Per- and Polyfluoroalkyl Substances
Premix	A combination of water and firefighting foam mixed in a tank in either a 3% or 6% solution
Rinsate	Liquid generated from the cleaning process

## INTRODUCTION

Per- and Polyfluoroalkyl Substances (PFAS) are a group of manufactured chemicals that have been used in industry and consumer products since the 1940s. Many organizations worldwide mandate the use of firefighting foam that contains PFAS, known as Aqueous Film Forming Foam (AFFF). However, per the Environmental Protection Agency (EPA), certain PFAS can cause serious health problems, including cancer, if people are exposed to them over a long period of time, and they can also be harmful to aquatic and terrestrial organisms.

Because these chemicals potentially present health hazards to humans, the Department of Defense (DoD) and the FAA have partnered on a significant research project involving the testing of unfluorinated firefighting foam. Section 332 of the *2018 FAA Reauthorization Act* directed the FAA to not require the use of fluorinated chemicals to meet the performance standards referenced in chapter 6 of Advisory Circular (AC) 150/5210-6, *Aircraft Fire Extinguishing Agents*, and acceptable under Section 139.319(l) of title 14, Code of Federal Regulations. This mandate accelerated research for an alternative firefighting foam that did not contain PFAS and prompted the FAA to issue guidance intended to help reduce the existing foam's impact on the environment. Specifically, Part 139 Policy Guidance #108, *Discharge of Aqueous Film Forming Foam (AFFF) at Certificated Part 139 Airports*, dated June 20, 2019, advised FAA Airport Certification Safety Inspectors to no longer require the discharge of AFFF during the timed response drill.

On January 6, 2023, the DoD published a new fluorine-free foam (F3) military specification (MILSPEC) to comply with the requirements for the Secretary of Defense and Secretary of the Navy set forth by the *National Defense Authorization Act* for Fiscal Year 2020 (FY2020 NDAA). The next step is for foam manufacturers to submit their F3 agents for qualification by DoD. Once DoD certifies that a foam meets the new MILSPEC, it will be added to the Qualified Product List. The FAA considers the foams on the Qualified Product List as acceptable for satisfying the regulatory requirements of part 139.

The FAA will provide guidance to airport operators on MILSPEC F3 issues falling within the FAA's regulatory purview. For issues that are outside of its authority, the FAA will identify industry best practices as such practices become available. Examples of items that are outside of the agency's authority include the following:

- Aircraft rescue and firefighting (ARFF) vehicle cleaning procedures
- Acquisition of temporary vehicles during the cleaning process
- State environmental regulations for AFFF and MILSPEC F3
- Allowable amounts of residual PFAS in ARFF vehicles after the cleaning process
- Storage/destruction of AFFF after transition
- Fire suppression systems at airport hangars

## OVERVIEW OF THE TRANSITION PLAN

In 2020, well in advance of an MILSPEC F3 being identified, the FAA began working with critical stakeholders on a detailed national transition plan for part 139 certificated airports. In December 2022, Congress formally directed the FAA to develop a transition plan that would include all known legislative requirements, personnel training changes, and other operational aspects to be implemented for a certificate holder's transition to MILSPEC F3. This *Federal Aviation Administration Aircraft Firefighting Foam Transition Plan* (hereinafter referred to as the "Transition Plan") has been developed in coordination with the DoD, industry work groups, and the Environmental Protection Agency (EPA) to meet this directive.

The FAA does not expect to update this document, but going forward, the FAA will track publication of each policy and guidance document related to the Transition Plan and provide updates to airports as new information and research becomes available.

The FAA encourages the expeditious transition away from PFAS-containing AFFF and toward MILSPEC F3 in order to reduce potential human health and environmental impacts from PFAS contamination.

## CONGRESSIONAL TIMELINE AND AUTHORIZATIONS

In documentation accompanying the December 2022 Omnibus Spending Bill, Congress directed the FAA to create a Transition Plan by May 8, 2023, to "ensure the orderly transition from current to replacement firefighting foam" and stipulated it must include, among other information—

- Direction on obtaining EPA guidance
- Best practices for decontamination of equipment
- Timelines for releasing policy and guidance about an airport operator's implementation plan for obtaining approved F3 products

This Transition Plan uses the term "Required Elements" to identify these three requirements. The specific language from the House and Senate reports is as follows.

*From the House report 117-402 [December 12, 2022]:*

*Firefighting foam.—The Committee is encouraged by DOD's progress in developing specifications for firefighting foam and the FAA's long-standing research and testing thereof. The Committee urges the FAA to ensure an orderly transition from current to replacement firefighting foam for the safety of passengers and crew members, airport firefighters and workers, and the communities that neighbor airports. The Committee directs the FAA, in coordination with DOD and EPA, to develop a transition plan not later than 120 days after the date of the publication of the military specifications (mil-spec) for firefighting foam. The transition plan should, at a minimum, achieve the following goals: provide Part 139 airports with information on obtaining EPA guidance on acceptable environmental limits; best practices for the decontamination of existing*



*aircraft rescue and firefighting vehicles, systems, and other equipment previously used to deploy firefighting foam; and timelines for the release of policy and guidance relating to Part 139 airport implementation plans for obtaining approved mil-spec products and firefighting personnel training.*

*Joint Explanatory Statement [December 20, 2022]:*

*Transition plan to fluorine-free firefighting foam. Not later than 120 days after the date of the publication of the new military specification [MIL-SPEC] for firefighting foam, the FAA is directed to develop a transition plan for part 139 airports to use the MIL-SPEC. In addition to the requirements for the transition plan in House Report 117-402, the FAA shall also provide airports information on any supplemental equipment needed to utilize approved MIL-SPEC products.*

## **FLUORINE-FREE FOAM TRANSITION WORKGROUPS**

To develop the Transition Plan, the FAA worked with the Aircraft Firefighting Foam Advisory Group, an advisory group to the Airport Sub-Committee of the Research Engineering and Development Committee (REDAC), to establish three workgroups that met regularly to help the FAA address each of the three required elements of the Transition Plan. The workgroups included staff from the FAA, DoD, and industry groups; firefighters; research experts; environmental experts; and firefighting training personnel. Each workgroup met three to four times in late January and February 2023 to provide input for use in the development of this Transition Plan. The workgroups considered a wide-range of issues related to the transition to MILSPEC F3 by airports, although not all of the issues discussed fall within the FAA's jurisdiction. Workgroup members were also given an opportunity to comment on a draft version of the Transition Plan. The FAA used input from the three workgroups to prepare this plan.

### **Workgroup 1**

*Required Element Addressed: Provide timelines for the release of policy and guidance relating to part 139 airport implementation plans for obtaining approved MILSPEC products and firefighting personnel training.*

### **Workgroup 2**

*Required Element Addressed: Provide part 139 airports with information on obtaining EPA guidance on acceptable environmental limits.*

### **Workgroup 3**

*Required Element Addressed: Provide best practices for the decontamination of existing aircraft rescue and firefighting vehicles, systems, and other equipment previously used to deploy firefighting foam and provide airports information on any supplemental equipment needed to utilize approved MILSPEC F3 products.*

## SUMMARY OF FAA TIMELINES FOR POLICY & GUIDANCE RELATED TO REQUIRED ELEMENTS

**Required Element 1:** Provide timelines for the release of policy and guidance relating to part 139 airport implementation plans for obtaining approved MILSPEC products and firefighting personnel training

***FAA's Timeline:***

After DoD's qualification of new MILSPEC F3 products, the FAA will—

- Release a CertAlert to inform airport operators when the Defense Logistics Agency (DLA) QPL adds FAA-accepted MILSPEC F3 products to the list. The DoD is required by Congress to have products qualified and listed on the QPL no later than October 1, 2023.
- Update [AC 150/5210-6, Aircraft Fire Extinguishing Agents](#), to include pertinent information about new MILSPEC F3 products.
- Provide airport operators with the latest information via CertAlerts on any changes/impacts to existing certified firefighter training facilities and their training curricula.
- Provide any related guidance updates required as a result of new data from research and field demonstrations.

**Required Element 2:** Provide part 139 airports with information on obtaining EPA guidance on acceptable environmental limits

***FAA's Timeline:***

Upon DoD's qualification of new MILSPEC F3 products, the FAA will —

- Coordinate with EPA prior to releasing a new CertAlert that provides information on applicable environmental considerations for the MILSPEC F3 transition, including applicable EPA website links.

**Required Element 3:** Provide best practices for the decontamination of existing aircraft rescue and firefighting vehicles, systems, and other equipment previously used to deploy firefighting foam (and) provide airports information on any supplemental equipment needed to utilize approved MIL-SPEC products.

***FAA's Timeline:***

The FAA will—

- Release the most current information about vehicle/equipment cleaning practices, as soon as it becomes available.

- Release the most current information about necessary supplemental equipment, as soon as it becomes available.

## **POLICY AND GUIDANCE RELATED TO PART 139 AIRPORT IMPLEMENTATION PLANS**

The purpose of this section is to provide airports information on the fire suppression differences between MILSPEC F3 and AFFF and tactics/techniques to successfully apply foam. Based on several years of research and data collection, conducted by multiple federal agencies, the US Navy published [MIL-PRF-32725, Fire Extinguishing Agent, Fluorine-Free Foam \(F3\) Liquid Concentrate for Land-Based, Fresh Water Applications](#), on January 6, 2023. This specification outlines the performance requirements MILSPEC F3s must meet in order to be qualified to the specification and listed on DLA's QPL. Using the AFFF MILSPEC (MIL-PRF-24385) as the starting point for this MILSPEC development, the Navy added additional fire tests to the specification. In particular, the MILSPEC fire tests now include fire tests that use Jet A fuels, which better represents the primary hazard at military installations and other shore-based facilities. The existing unblended gasoline tests remain in the new standard because using lower flash point fuels adds additional rigor that better distinguishes the higher-performing products from the lower.

In [FAA CertAlert 23-01, New Military Specification for Performance-Based Standards for Fluorine-Free Aircraft Fire Fighting Foam](#), dated January 12, 2023, the FAA stated it will accept the use of the new MILSPEC F3s listed on the DLA's QPL for ARFF purposes at part 139 certificated airports in addition to the existing AFFFs. The Navy is required by Congress to have the new MILSPEC F3 firefighting agent available for use no later than October 1, 2023. Once MILSPEC F3s are posted to the QPL, civil airports can begin their transition to these new foams.

MILSPEC F3 products qualified under the new MILSPEC will only be available in concentrates of 3%. At this time, the MILSPEC F3s will be proportioned at a foam concentrate to water ratio of 3 gallons of foam concentrate to 97 gallons of water. The 2 gallons per minute (GPM) application rate in the F3 MILSPEC qualification tests is the same as in the legacy AFFF guidance. This quantity of foam solution has been proven to readily extinguish fuel fires, absorb heat, and smother vapors.

It is critical that ARFF departments fully understand the differences between the AFFFs and the new MILSPEC F3s. While both foams are very effective, training must be adjusted to emphasize the differences in MILSPEC F3 performance in extinguishing Class B, liquid fuel spill fires.

AFFF products extinguish fuel spill fires in three ways: (1) the foam blanket suppresses the combustible fuel vapors, (2) the water cools the fire, and (3) the fluorinated surfactant drains from the foam bubbles and creates a film between the foam and fuel layers. This film helps the foam blanket travel across the fuel spill and reseal itself when the foam blanket has been broken. Even when the foam blanket has degraded, the film from the fluorinated surfactant continues to provide vapor suppression.

MILSPEC F3s lack the fluorinated surfactant, and therefore do not have the film forming properties of AFFFs. As a result, MILSPEC F3s suppress the fire in only two ways: cooling it with water and suppressing vapors with the foam blanket. Without the film formation, the mechanical structure and maintenance of the foam blanket become a critical aspect to the success of the fire suppression. When a foam blanket is disturbed by a firefighter or passenger traversing through it or a fire hose being pulled through it, no resealing occurs, as it does with AFFF. The disturbance of the foam blanket has the potential to create a break through burn. Therefore, new tactics or techniques should be provided to firefighters to help them prevent this phenomenon.

FAA guidance on MILSPEC F3 implementation will focus on four main areas, as described below: application tactics and techniques, foam blanket management, responder responsibilities, and training information.

### **Tactic and Technique Differences**

Firefighters should review basic foam application and accepted methods of applying foam, since one of the most common failures in foam performance is human error. Incorrect firefighter application of AFFF does not always affect the fire extinguishment. This is because the fire suppressing characteristics of AFFF, as well as the fluorinated surfactants role in aiding the foam blankets ability to travel across the fuel spill, often compensate for incorrect firefighting technique. MILSPEC F3 does not have fluorinated surfactants, so there is no compensation for incorrect technique. Its use requires the correct application methods and foam blanket management. A firefighter cannot effectively fight a fire using MILSPEC F3 if improper foam operations, techniques, methods, and management are used. Poor application techniques can cause the foam blanket to break.

There are three basic foam application techniques: roll-on, bank-down, and rain-down.

- Roll-on uses the impact with the ground to further aerate the foam, and the velocity of the discharge pushes the foam blanket across the spill. The absence of the fluorinated surfactant makes MILSPEC F3 foam travel slower than with AFFFs.
- Bank-down application uses the impact with a hard surface like the fuselage of the airplane to further aerate the foam and allow the foam to drop onto the surface of the fuel spill.
- Rain-down involves a foam that is discharged in a high arc that gently drops onto the fuel spill. This technique may be very effective at foam blanket maintenance but is not as effective in fire extinguishment. In the rain-down technique, a large portion of the foam is consumed within the thermal column of the fire and never reaches the base of the fire and the fuel.

Testing has shown proper angle of attack is essential between downward plunging and rain-down. A discharge of the foam downward into the fuel spill (plunging) will cause fuel pick-up in the foam blanket, which results in small flickering flames across the foam blanket. These flames can travel across the blanket and find a vapor source from a hole in the foam blanket causing full



re-ignition. The oleophobic (oil repelling) characteristic of the fluorinated surfactant prevented this phenomenon from happening with AFFF.

A hybrid of foam applications may be the best solution to an effective fire attack and foam blanket management. More testing and practice in the field will be necessary to generate additional best practices. No one technique may single-handedly accomplish all goals on the incident scene. The best combination of techniques may be to use a lower angle, base sweep to first push the fire and initial foam application across the spill, followed by a bank-down generated foam blanket over to the fuel spill to build up added protection. A rain-down technique can also follow the initial fire attack by gently applying the foam to increase the blanket quality after the initial thermal plume has been knocked down.

From research and product demonstrations, the following basic foam techniques and skills are consistent best practices across all MILSPEC F3s used:

- Do not plunge the foam stream into the fuel spill.
- Slowly sweep the nozzle left to right and let the foam blanket build up.
- When using a variable stream, low expansion nozzle, consider using the bank-down and roll-on methods to create thicker finished foam.

A few topics related to application techniques require more research and demonstration, particularly as they relate to potential chemical mixing from multiple foam discharges onto the same fire area. Further research must take into consideration an ARFF department having assistance from a mutual aid department or at a dual-use airport where the same multiple foam concentrates are not being used throughout the fire attack. The FAA and DoD are already working together to address some of these questions in active research programs.

### **Foam Blanket Management**

Foam blanket management is critical when using MILSPEC F3s. As described earlier, the absence of a fluorinated surfactant in MILSPEC F3, to create the vapor sealing film, means the integrity of the foam blanket is the only means of containing the fuel vapors and preventing re-ignition.

The following factors can impact the quality of the foam blanket and should be constantly considered and monitored during foam applications.

- Foam concentrate to water ratio – poor proportioning will impact foam production
- Application rate – not achieving proper application density
- The presence of heated metals and fire – hot surfaces will degrade the blanket
- Walking and driving through the foam – no film formation to seal the opening in the foam blanket
- Weather – rain, snow, wind, etc.

- Water streams – dilute or break apart the foam blanket
- Dry chemical agents – break down the foam blanket if applied on top of the foam blanket
- Holes in the foam blanket – holes provide no protection so foam must be reapplied over openings in the foam blanket

In addition to the factors listed above, a phenomenon known as AFFF draindown can also impact the quality of the foam blanket. AFFF draindown is a combination of loss of foam blanket and building of the film formation for vapor suppression. Draindown times also affect the foam blanket. There are significant differences between the draindown times of AFFF and MILSPEC F3. AFFF draindown is much quicker than with MILSPEC F3. With AFFF, the liquid draining from the foam is cooling water, as well as the vapor sealing fluorinated surfactant. The draining of the surfactant from the foam creates the vapor suppression. MILSPEC F3s need to have a slower draindown as the mechanical structure of the foam blanket is the only vapor-suppressing characteristic of an MILSPEC F3.

There are multiple discharge nozzles available in the fire industry; however, research is ongoing to determine how different types of nozzles might interact with MILSPEC F3 specifically.

In the United States, the primary nozzles used on ARFF apparatus are variable stream nozzles. Variable stream nozzles are designed for water discharge; however, they have been found to perform adequately with AFFF applications. Variable stream nozzles provide the widest range of spray pattern options. They also provide the best throw range. The downside to variable stream nozzles is that they do not provide air aspiration and thus have lower foam expansion.

Variable stream nozzles can be used with the addition of a foam tube. Foam tubes are an easy clip-on accessory to the existing variable stream nozzle. They can, however, reduce the ability to effectively adjust the spray pattern. A benefit to the foam tube is that it adds aeration to the foam discharge and provides higher foam expansion. This added aeration, however, can severely limit throw distance of the foam.

Another method of making quality foam is the use of a compressed air foam (CAF) system. Currently, CAFs are not widely used in ARFF applications outside of small units with handline applications. CAFs use a smooth bore nozzle as opposed to a variable stream nozzle and add an air injection into the discharge solution to further aerate the foam solution. CAFs also have a shorter throw range compared to a variable stream nozzle. CAFs creates a thicker, drier foam which can be more impacted by winds.

### **Responder Responsibilities and Considerations**

As indicated throughout this document, MILSPEC F3 does not have the surfactant to effectively create a resealing vapor suppressing film. Without the film forming characteristic, the condition of the foam blanket becomes the critical factor. A poor-quality foam blanket can allow the fuel spill to reignite and wrap around behind responders. Failure to identify this hazard can be catastrophic, so fire departments should consider the use of a spotter. The spotter could be the

backup firefighter on the handline but slid further back to provide a clearer view of the foam blanket. The spotter function could also be provided by a second backup handline crew. This crew could monitor the conditions and maintain an effective foam blanket behind the initial fire attacking crew.

For truck operations, it is important for the driver/operator to maintain awareness of the foam blanket. The driver/operator can reapply foam to the blanket as handline operations are ongoing to provide added protection to the handline crew. Fire departments might consider conducting a new resource task analysis for emergency responses using MILSPEC F3s.

### **Training Information Dissemination**

As airport fire departments transition from AFFF to MILSPEC F3, they will need knowledge of the different characteristics of MILSPEC F3 to ensure successful emergency responses using these new foams. Initial training for ARFF departments will be through information dissemination such as journals, conferences, webinars, and similar formats. The most immediate means of disseminating training material will come from print and online sources. This material can consist of information released by the FAA via CertAlert, best practices, website updates, and email blasts. Other material can be disseminated through articles in the ARFF Working Group's *ARFF News* magazine and the National Fire Protection Association's *NFPA Journal*. The NFPA Research Foundation is also revising the *Firefighting Foams: Fire Service Roadmap*, which was published in May 2022. The latest available MILSPEC F3 training guidance can be included in this revision.

Aside from print and online distribution, other near-term solutions for sharing available training information with the industry are webinars and conference presentations at events such as ARFF Working Group Conferences, the International Association of Fire Chiefs (IChiefs) Conference, and the Fire Department Instructors Conference.

Firefighters may benefit from hands-on training using MILSPEC F3 to reinforce the knowledge of how these foams perform in comparison to the AFFFs. However, there are still outstanding questions about the use of MILSPEC F3 at training facilities that need to be answered, including— if fire fighters can use MILSPEC F3 during training. Such factors are:

- How many existing training facilities will have restrictions on MILSPEC F3 foam discharge?
- Will there be development of MILSPEC F3 instructional techniques for students using propane facilities?

In the longer term, there are other methods to provide MILSPEC F3 training to airport firefighters. In 2011, the FAA released training DVDs to airports that covered ARFF recurrency, high-reach extendible turret operations, cargo firefighting, and forcible entry. The FAA will create a similar video for MILSPEC F3 training and post it online for firefighters to review.

Modifications to existing ARFF training facilities may also be necessary. Software and algorithm modifications may be needed so propane training facilities can more closely mimic a Class B fire

attack using F3. Adding liquid hydrocarbon fire capabilities to existing propane training facilities would allow for more realistic fire training.

The FAA will provide ongoing updates about training changes as best practices are developed.

## EPA GUIDANCE

The FAA and EPA encourage the expeditious transition away from PFAS-containing AFFF and toward MILSPEC F3 in order to reduce potential human health and environmental impacts from PFAS contamination. Proceeding with this transition as quickly as possible—taking into account passenger, crew, and firefighter safety and the availability of funding and replacement MILSPEC F3—will reduce the potential for further environmental contamination from PFAS and future environmental liabilities.

Under the [PFAS Strategic Roadmap](#), EPA is pursuing a coordinated strategy to research, restrict, and remediate PFAS. Several actions EPA has taken or plans to take under the PFAS Roadmap have the potential to impact the AFFF/ MILSPEC F3 transition, including the following:

- [National Pollutant Discharge Elimination System Guidance](#): In December 2022, EPA provided guidance to states on how to use the Clean Water Act’s National Pollutant Discharge Elimination System (NPDES) permitting program to reduce PFAS discharges and to obtain comprehensive information on the sources and quantities of PFAS discharges. The guidance identifies airports as an industry category known or suspected to discharge PFAS and includes specific recommendations for best management practices to address PFAS-containing firefighting foams for stormwater permits, including eliminating PFOS- and PFOA-containing AFFFs.
- [Interim Guidance on PFAS Destruction and Disposal](#): In December 2020, in response to the FY2020 National Defense Authorization Act (NDAA), EPA released interim guidance that outlined the current state of the science on techniques and treatments that may be used to destroy or dispose of PFAS and PFAS-containing materials from non-consumer products, including AFFF. EPA scientists are working to improve scientific understanding of PFAS destruction and disposal technologies, and EPA plans to update the 2020 guidance to reflect both public comments and more recent published research results. Consistent with the FY2020 NDAA, EPA plans to issue updated guidance by December 2023.

EPA is pursuing additional regulatory actions with respect to PFAS under the Safe Drinking Water Act; the Clean Water Act; the Comprehensive Environmental Response, Compensation, and Liability Act; and the Resource Conservation and Recovery Act, but no final regulatory actions have been taken at this time. As noted above, however, compliance with any future regulatory requirements under these laws with respect to PFAS should be facilitated by the transition from AFFF to MILSPEC F3.



## Residual PFAS

In spite of the expected human health and environmental benefits from transitioning to MILSPEC F3, there is potential for detectable levels of PFAS to be released from an ARFF apparatus even after the transition, particularly in those that contained AFFF. The primary mechanism for this is residual PFAS present in the fire suppression system components of an ARFF apparatus, which can contaminate MILSPEC F3. See EPA's December 2022 NPDES guidance (noted above) for potentially relevant recommendations about monitoring and best management practices. The MILSPEC for F3 requires manufacturers to certify that PFAS has not been intentionally added to the concentrate (the MILSPEC allows up to 1 ppb concentration of PFAS in the concentrate) and that the PFAS content be below the method detection limit (MDL) of [EPA Draft Method 1633](#).

The FAA, in coordination with EPA, will post guidance on acceptable environmental limits, once it is available. This guidance, which will be available from the [FAA Aircraft Rescue and Fire Fighting \(ARFF\)](#) webpage, will highlight key environmental compliance considerations associated with the AFFF/ MILSPEC F3 transition. The EPA and the FAA will partner to ensure this webpage is kept current as new information, guidance, or regulations are issued.

## INFORMATION RELATED TO MILSPEC F3 USE AND DECONTAMINATING ARFF EQUIPMENT

Airports will need to decide whether to transition to MILSPEC F3 or to continue using AFFF as a firefighting extinguishing agent in the immediate future. At this time, the FAA has not mandated a transition to MILSPEC F3; however, airports need to be aware of applicable state laws and emerging Federal requirements, which may require a transition to MILSPEC F3. Airports may also want to transition to F3 to protect public health and manage future liability risk. Further, as foam manufacturers transition to producing MILSPEC F3, AFFF may become unavailable, which may force airports to transition sooner. Airports should develop a transition team for planning and executing a transition to MILSPEC F3<sup>1</sup>, which should consider both Federal and state requirements related to the handling, disposal, and cleaning of equipment contaminated with PFAS.

The FAA highly encourages airports to acquire input-based testing systems, which allows the testing of the proportioning system of their fire trucks to meet Part 139 requirements without dispersing AFFF ([CertAlert 21-01, Aqueous Film Forming Foam \(AFFF\) Testing at Certificated Part 139 Airports](#)). These testing systems can also be used with MILSPEC F3. Eligible airports may use Airport Improvement Program (AIP) grant funds to purchase one of the four qualified systems, and currently, there is no local match requirement so the equipment will be fully funded by the FAA.

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<sup>1</sup> Although airport hangars are outside FAA's regulatory jurisdiction, airports should consider hangar fire suppression systems as significant sources of PFAS-containing AFFF and include such systems, as appropriate, in transition planning and execution.



## **ELEMENTS THAT SHOULD BE CONSIDERED IN AN MILSPEC F3 TRANSITION PLAN**

The airport should begin transition planning prior to taking any action.

### **Impacts on Index Requirements and ARFF Vehicles**

The airport will need to identify its airport index requirements and plan accordingly so it can maintain the regulatory requirements to comply with part 139. Airports will need to take each ARFF vehicle out of service for five days or more to make the transition. Because of the need to take vehicles out of service, some smaller airports may need to borrow or rent an ARFF vehicle to maintain index requirements.

Because MILSPEC F3 concentrates cannot be stored in a pre-mixed water/foam solution, airports that have ARFF vehicles with a premixed solution of foam and water will need to purchase new vehicles if they decide to switch from AFFF to MILSPEC F3. Airports that rent ARFF vehicles in order to maintain their airport Index could also see significant delays due to the limited number of ARFF vehicles available for rent. Further, airports will need to ensure they are fully trained on the operation of the ARFF vehicles they rent.

Airports may have a combination of vehicles using AFFF and vehicles using MILSPEC F3 at the same time. This is allowed as long as all foam being used is or has been on the QPL.

As of May 8, 2023, no foam manufacturers have had a product qualified to the F3 MILSPEC standard, so no MILSPEC F3 options are currently available for purchase on the QPL. Prior to purchasing the MILSPEC F3, once it becomes available, airports should consult both the manufacturers of their ARFF vehicles and potential foam manufacturers about the use of the product and any supplemental equipment requirements. At this time, beyond the impact to premixed foam/water solution vehicles, the FAA is not aware of any ARFF supplemental equipment requirements for MILSPEC F3 products.

### **Environmental Considerations**

As airports continue their planning, they should consider the following:

- Has the airport's state mandated that airports make the transition?
- Are there state environmental regulatory requirements for airports? States regulate PFAS to varying degrees, and there is no single standard available across the board.
- Will the airport's state allow the discharge of MILSPEC F3 foam at the airport?

With respect to discharges regulated under the Clean Water Act, airports should contact their NPDES permitting authority (typically a state agency) to inquire about permit requirements, limitations, or other considerations associated with discharges from fire apparatus, particularly those that have used AFFF. There have been no national standards established for acceptable levels of PFAS discharged from ARFF vehicles after cleaning.

It is hard to determine the level of PFAS residuals in ancillary equipment, and a method of testing for PFAS in this equipment has not been identified. Therefore, when transitioning equipment, airports should take care that residual PFAS-containing foam is contained and not released into the environment.

As noted earlier, FAA encourages the expeditious transition from PFAS-containing AFFF to MILSPEC F3 to reduce potential human health and environmental impacts. However, following the transition to F3, there remains the potential for detectable levels of PFAS to be present in discharges from ARFF vehicles that formerly contained AFFF. The primary mechanism for this is residual PFAS present in the fire suppression system components of an ARFF apparatus. DoD has been conducting focused research on the demonstration and validation of environmentally sustainable methods to clean fire-fighting delivery systems through the [Environmental Security Technology Certification Program \(ESTCP\)](#)<sup>2</sup>. Results of the research available to date indicate the potential for varied levels of PFAS residual to be released following cleaning. Information about this research is available from the links below:

- [Supercritical Water Oxidation \(SCWO\) for Complete PFAS Destruction](#)
  - Lead Investigator: Marc Deshusses, Duke University
- [An Innovative Plasma Technology for Treatment of AFFF Rinsate from Firefighting Delivery Systems](#)
  - Lead Investigator: Selma Mededovic, DMAX Plasma LLC
- [Clean or Replace? Decontamination Framework for Firefighting Equipment and Hangers and Disposal of PFAS Contaminated Waste](#)
  - Lead Investigator: Matthew Magnuson, U.S. Environmental Protection Agency
- [Demonstration and Validation of Environmentally Sustainable Methods to Effectively Remove PFAS from Fire Suppression Systems](#)
  - Lead Investigator: Johnsie Lang, Arcadis
- [Remediation of AFFF-Impacted Fire Suppression Systems Using Conventional and Closed-Circuit Desalination Nanofiltration](#)
  - Lead Investigator: Christopher Bellona, Colorado School of Mines
- [Sustainable Firefighting System Cleanout and Rinsate Treatment Using PerfluorAd](#)
  - Lead Investigator: Zoom Nguyen, CDM Smith

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<sup>2</sup> Since FY 2011, DoD has invested in efforts to develop PFAS-free firefighting formulations and improve management of PFAS in the environment through the Strategic Environmental Research and Development Program (SERDP) and ESTCP. Additional information on these efforts is available at <https://www.serdp-estcp.org/focusareas/e18ec5da-d0de-47da-99f9-a07328558149/pfas-fff>.

- [ARFF Apparatus Disassembly and Characterization Demonstration](#)
  - Lead Investigator: John Anderson, Arcadis

### **Availability of MILSPEC F3**

Airports should ensure that sufficient quantities of the MILSPEC F3 products they have chosen are available when they are ready to make the transition. One of the most important considerations is the incompatibility of one MILSPEC F3 foam to other MILSPEC F3 products or AFFF. According to the new MILSPEC (MIL-PRF-32725), airports must NOT mix any F3 products together in a foam tank. Airports should attempt to transition all their vehicles consecutively over a short period of time.

### **Transition Costs and Other Considerations**

While it is possible to project the cost of the MILSPEC F3 necessary to be replaced, it is difficult to determine the time needed and cost to adequately clean equipment that contained AFFF. Of course, these costs should be compared to potential impacts and risks associated with continued AFFF use.

The following are just some factors airports will need to consider if they choose to transition to MILSPEC F3:

- New foam (availability, storage capability, brand requirements)
- Long-term storage containers for unused AFFF product and any generated cleaning rinsate (liquid generated from the cleaning process) and storage requirements for the new MILSPEC F3 product, including storage temperature requirements, for example.
- State collection or “take-back” programs for disposal of unused AFFF and cleaning rinsate
- Whether airports can hire a company for removal of AFFF, equipment cleaning, and installation of MILSPEC F3 product or will do it themselves
- Disposition of old AFFF and rinsate requirements/methodology
- Maintenance personnel requirements during the transition process
- Vehicle and foam manufacturers assistance with the selection of an MILSPEC F3 foam and during the transition process
- State law or local union requirements to provide a health and safety plan for the transition operation
- All federal, state, and local environmental regulations
- Location where the transition will take place and whether an indoor location is available to minimize exposure to precipitation (temperature and weather can have an adverse effect)

- Potential of contaminated equipment and facilities during the transitioning process
- If vehicles will be cleaned prior to installing a new MILSPEC F3 product, sufficient space for the vehicle, necessary cleaning equipment, new foam, and containers for old foam and rinsate
- Attention to foam manufacturers' recommended procedures and guidance on vehicle preparation and transitioning
- Confirmation that all AFFF has been removed and the system has been flushed
- Availability of a hazardous material company in the event a spill cleanup is necessary

Airports may want to consider working with their state environmental agencies or other entities to establish an AFFF take-back program. This will allow all airports within the state to have one process for the disposal of AFFF and allow the state to monitor the quantity and disposal of AFFF and potentially achieve economies of scale and reduced soft costs. States may also want to consider contracting with a single company for the cleaning of all ARFF vehicles within the state.

Conducting a cleaning program prior to new foam installation will help avoid future exposures to PFAS. As noted above, EPA has issued Interim Guidance on the Destruction and Disposal of PFAS and PFAS-containing materials, which EPA plans to update in December 2023.

## **NEXT STEPS**

DoD continues its research and is working toward identifying best practices related to the transition from AFFF to the MILSPEC F3 products. The FAA will continue to collaborate with DoD and will share with airport operators any best practices that are developed. Some airports may be mandated by their states or otherwise make a risk-based assessment to transition before formal guidance is available. If this occurs, the FAA encourages the airport operator to engage with the local regulatory authorities and suggests implementing best available methods that meet the individual airport's needs for removal of PFAS from ARFF vehicles.