

DEPARTMENT OF TRANSPORTATION**Federal Aviation Administration**

14 CFR Parts 1, 11, 43, 60, 61, 91, 97, 111, 135, 136, 141, 142, and 194

[Docket No. FAA–2023–1275; Amdt. Nos. 1–78, 11–69, 43–62, 60–8, 61–157, 91–379, 97–1340, 111–2, 135–147, 136–4, 141–26, 142–11, and 194–1]

RIN 2120–AL72

Integration of Powered-Lift: Pilot Certification and Operations; Miscellaneous Amendments Related to Rotorcraft and Airplanes

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

ACTION: Final rule.

SUMMARY: This final rule adopts permanent amendments and a Special Federal Aviation Regulation (SFAR) for a period of ten years to: facilitate the certification of powered-lift pilots, clarify operating rules applicable to operations involving a powered-lift, and finalize other amendments which are necessary to integrate powered-lift into the National Airspace System (NAS). In this final action, the FAA finalizes its alternate framework to stand-up initial groups of powered-lift pilots and flight instructors. Most notably, the FAA adopts alternate frameworks to facilitate the certification of pilots seeking qualifications in a powered-lift with single functioning flight controls and a single pilot station. In response to commenters, the FAA provides clarification for certain operating rules and adopts a performance-based approach to certain operating rules to enable powered-lift operations. In addition to finalizing provisions for powered-lift, this action also makes changes to practical tests in aircraft that require type ratings, including airplanes and helicopters, training center rotorcraft instructor eligibility, training and testing requirements, and training center use of rotorcraft in flight training.

DATES: This final rule is effective January 21, 2025, except for amendatory instruction 52 which is effective July 21, 2025.

The incorporation by reference of certain publications listed in this final rule are approved by the Director of the Federal Register as of January 21, 2025.

ADDRESSES: For information on where to obtain copies of rulemaking documents and other information related to this final rule, see “How to Obtain Additional Information” in the **SUPPLEMENTARY INFORMATION** section of this document.

FOR FURTHER INFORMATION CONTACT: For technical questions concerning this action, contact Christina Grabill, AFS–810, Federal Aviation Administration, 800 Independence Ave. SW, Washington, DC 20591; telephone (202) 267–1100; email 9-FAA-Powered-Lift@faa.gov.

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List of Abbreviations and Acronyms Frequently Used in This Document

Abbreviations and Acronyms Used in This Document

ACO—Aircraft Certification Office
 ACS—Airman Certification Standards
 APD—Aircrew Program Designee
 AIH—Aviation Instructor’s Handbook
 AQP—Advanced Qualification Program
 ATC—Air Traffic Control
 ATP—Airline Transport Pilot
 ATO—Air Traffic Organization
 CAMP—Continuous Airworthiness Maintenance Program
 CFIT—Controlled Flight Into Terrain
 CFR—Code of Federal Regulations
 CLOA—Certificate and Letter of Authority
 CVR—Cockpit Voice Recorder
 DPE—Designated Pilot Examiner
 GPS—Global Positioning System
 GPWS—Ground Proximity Warning Systems
 ELT—Emergency Locator Transmitter
 ERT—Extended Review Team
 FDR—Flight Data Recorder
 FFS—Full Flight Simulator
 FSB—Flight Standardization Board
 FSBR—Flight Standardization Board Report
 FSTD—Flight Simulation Training Device

FTD—Flight Training Device
 HAA—Helicopter Air Ambulance
 HTAWS—Helicopter Terrain Awareness Warning System
 ICAO—International Civil Aviation Organization
 IFR—Instrument Flight Rules
 IMC—Instrument Meteorological Conditions
 IOE—Initial Operating Experience
 IPC—Instrument Proficiency Check
 LOA—Letter of Authorization
 LOFT—Line Oriented Flight Training
 MDA—Minimum Descent Altitude
 MCTW—Maximum Certificated Takeoff Weight
 MEL—Minimum Equipment List
 MFD—Multifunction Display
 MGTOW—Maximum Gross Takeoff Weight
 MMEL—Master Minimum Equipment List
 NAS—National Airspace System
 NPRM—Notice of Proposed Rulemaking
 NM—Nautical Mile
 NSP—National Simulator Program
 NTSB—National Transportation Safety Board
 OEM—Original Equipment Manufacturer
 PA—Public Address System
 PDP—Professional Development Program
 PIC—Pilot in Command
 PFD—Primary Flight Display
 POI—Principal Operations Inspector
 PTS—Practical Test Standards
 QPS—Qualification Performance Standards
 RPA—Rules of Particular Applicability
 SARPs—Standards and Recommended Practices
 SFAR—Special Federal Aviation Regulation
 SIC—Second in Command
 SLF—Supervised Line Flying
 SOE—Supervised Operating Experience
 SVO—Simplified Vehicle Operations
 TAPL—Technically Advanced Powered-Lift
 TAWS—Terrain Awareness and Warning System
 TC—Type Certificate
 TCE—Training Center Evaluator
 TCDS—Type Certificate Data Sheet
 VFR—Visual Flight Rules
 VMC—Visual Meteorological Conditions
 VTOL—Vertical Takeoff and Landing

I. Executive Summary

This final rule establishes the requirements for pilot certification and operation of powered-lift. Powered-lift are defined in title 14 of the Code of Federal Regulations (14 CFR) part 1 as heavier-than-air aircraft capable of vertical takeoff, vertical landing, and low speed flight that depends principally on engine-driven lift devices or engine thrust for lift during these flight regimes and on nonrotating airfoil(s) for lift during horizontal flight. Powered-lift are capable of vertical takeoff and landing (VTOL) while being able to fly like an airplane during cruise flight. Currently, there are no type-certificated powered-lift in civil operations; however, there are several applicants seeking type certificates for such aircraft.

Several of the powered-lift that the FAA expects to enter the civilian market have complex and unique design, flight,

and handling characteristics with varying degrees of automation. The FAA anticipates that these aircraft will conduct an array of different operations, such as transporting crew and material to offshore oil rigs, transporting passengers from point-to-point as an air ambulance, and transporting passengers in concentrated urban environments.

To safely integrate powered-lift in the national airspace system (NAS), the FAA is making permanent changes to parts 61, 135, and 142 to train and certificate powered-lift pilots and instructors, as well as issuing a temporary Special Federal Aviation Regulation (SFAR) that supplements existing rules, creates temporary alternatives for airman certification, removes operational barriers, and mitigates safety risks for powered-lift. As discussed in section X of this preamble, the duration of the SFAR is 10 years.

Powered-lift will also be utilized to support the deployment of advanced air mobility (AAM) operations. AAM is an umbrella term for an air transportation system that moves people and cargo using revolutionary new aircraft. The AAM Coordination and Leadership Act defines AAM as “a transportation system that transports people and property by air between two points in the United States using aircraft with advanced technologies, including electric aircraft or electric vertical take-off and landing aircraft, in both controlled and uncontrolled airspace.” The FAA Reauthorization Act of 2024 updated the definition to mean “a transportation system that is comprised of urban air mobility and regional air mobility using manned or unmanned aircraft.”¹ Congress directed the Department of Transportation to establish an advanced air mobility working group to plan for and coordinate efforts necessary for maturation of the AAM ecosystem in the United States through the Advanced Air Mobility Coordination and Leadership Act. This rulemaking is an important step in facilitating the integration of powered-lift and AAM into the NAS.

A. Purpose of the Regulatory Action

This final rule addresses regulatory barriers to introducing powered-lift as a new category of aircraft into operations in the NAS. The final rule creates an

alternate pathway for pilot certification and enables operations under parts 91 (General Operating and Flight Rules), 97 (Standard Instrument Procedures), 135 (Commuter and On-Demand Operations), and 136 (Commercial Air Tours).

The existing regulations in part 61 for training and certificating powered-lift flight instructors and pilots do not adequately address the unique challenges of introducing a new category of aircraft to civil operations. First, the existing regulations did not anticipate the diversity in design of the powered-lift that are working through the aircraft certification process. Second, there are challenges with applying existing aeronautical experience requirements to train and certificate the initial cadre² of powered-lift flight instructors and pilots. In addition, part 135 regulations for certain commercial operations do not contain specific requirements addressing the qualifications for powered-lift pilots. Therefore, current part 135 pilot qualification requirements that apply to pilots of airplanes and helicopters need to be amended to include powered-lift pilots to close the safety gap.

In addition, to address an operational safety risk that exists because the current regulatory framework governing operations does not contemplate powered-lift, changes had to be made to certain operational rules. There are myriad operational rules under parts 91, 97, 135, and 136 that currently apply to “airplanes,” “helicopters,” and/or “rotorcraft” that should also apply to powered-lift.

Industry has expressed its intent to introduce these aircraft immediately into passenger-carrying commercial operations under part 135, making the need to reconsider the existing airman certification standards and operating regulations for powered-lift and address the absence of specific regulations for pilots in part 135 more urgent. The FAA requires and the public expects that commercial operations be conducted with the highest regard for safety and by pilots who have the requisite experience flying the particular category of aircraft in which paying passengers will be transported. As a result, this rulemaking is necessary to ensure that pilots for these aircraft are properly trained and

¹ FAA Reauthorization Act of 2024, Pub. L. 118–63 (May 16, 2024). The media often refer to these operations as “air taxis”; however, this term is used only in the context of 14 CFR chapter II (pertaining to DOT-specific regulations). Consequently, throughout this preamble, the FAA refers to these operations as passenger-carrying operations or air carrier operations.

² The FAA uses the term “initial cadre” throughout this preamble. In some instances, initial cadre refers to a sufficient number of instructors and evaluators to train and qualify pilots for powered-lift ratings under an approved training program under part 135, 141, or 142. In other instances, the term refers to a sufficient number of pilots who are rated in powered-lift to meet the demands of the market.

that these rapidly developing aircraft can safely integrate and operate within the NAS.

The following sections discuss the provisions being adopted in this final rule.

B. Aircraft Certification

The FAA did not establish any new requirements for the type certification of powered-lift, nor did it revise existing type certification requirements. The FAA determined that existing aircraft certification requirements are sufficient to type certificate powered-lift as a special class under § 21.17(b). The special class process allows the FAA to address the novel features of unique and nonconventional aircraft without the need for additional processes such as special conditions or exemptions that would be required if the FAA used the airworthiness standards already in place. The aircraft certification requirements and comments the FAA received are discussed in more detail in section IV.A. of this preamble.

C. Airman Certification

To maintain a level of safety commensurate with that expected for airplanes and helicopters, the FAA adopts new requirements for pilots to hold type ratings for each powered-lift they fly and qualification requirements for powered-lift pilots serving in part 135 operations. To address the obstacles to airman certification, the FAA provides alternatives to certain requirements in part 61 through the establishment of a new part 194, Special Federal Aviation Regulation No. 120—Powered-Lift: Pilot Certification and Training; Operations Requirements, to facilitate the training and certification of the initial cadre of powered-lift instructors and pilots. In addition to this alternate framework, the FAA adopts several pathways to certificate powered-lift pilots utilizing aircraft with a single flight control and single pilot station. The FAA is facilitating this through three options: (1) recognition of a single flight control that is accessible by both the student and flight instructor and allows for the instructor to immediately intervene if necessary; (2) expanded use of simulators to allow an applicant to train in a simulator and gain necessary experience solo in the aircraft; and (3) deviation authority for consideration of future advancements in technology that is not currently validated at this time.

1. Type Rating

The FAA did not establish classes within the powered-lift category because each powered-lift can have different configurations, unique

inceptors, diversified flight controls, and distinctive operating characteristics. Further, the FAA lacks sufficient operational data to identify commonality to establish classes within the powered-lift category because powered-lift are still in the development phase. The FAA finds that reasons for not establishing class ratings persist, and the final rule adopts the proposal for all powered-lift pilot in commands (PICs) to hold a type rating.

2. Flight Instructors

The FAA recognizes that, once the first powered-lift achieve type certification, there will be an insufficient number of qualified flight instructors to provide training to the pilots who will need to obtain certificates and ratings necessary to serve in powered-lift operations. For this reason, the FAA is allowing certain pilots employed by the manufacturer to obtain the necessary training and experience for powered-lift through the test flights and crew training activities necessary for aircraft certification. Once the manufacturer's personnel obtain the necessary ratings, they would form the initial cadre of instructors who could conduct certification training in the manufacturer's aircraft for certain instructor personnel at part 141 pilot schools, part 142 training centers, and part 135 operators. These instructors under parts 141, 142, and 135 would then develop the curricula for the initial powered-lift training at their respective organizations and conduct certification training at their respective certificate holders. The FAA finalizes this alternate framework for test pilots and instructor pilots to facilitate certification training as proposed.

3. Alternate Framework for Pilot Certification

Even with sufficient qualified flight instructors, the existing airman certification rules for powered-lift present barriers for persons seeking to accomplish the training and experience necessary to obtain the certificates and ratings for commercial operations. In response to industry concerns, the FAA adopts alternate requirements for meeting PIC flight time and cross-country flight time requirements in part 61 and expanding the opportunity for pilots to obtain powered-lift ratings at the commercial pilot certificate level through part 135 training programs. Most of the alternative requirements would be available only to pilots who already hold a commercial pilot certificate and an instrument rating for another category of aircraft. In addition, although no flight simulation training

devices (FSTDs) representing powered-lift are currently qualified, the FAA anticipates near-term qualification of such devices and proposed allowing increased flight training opportunities through simulation. This final rule adopts the alternate aeronautical experience and cross-country requirements, as proposed, with some minor alterations.

In addition, as explained more fully in section V.F., this final rule reduces the PIC flight time in a powered-lift at the commercial pilot certificate level from 50 hours to 35 hours, of which 15 hours may still be in a Level C or higher full flight simulator (FFS).

4. Part 135 Qualifications

The FAA adopts permanent changes to training and qualification requirements for pilots to align with the requirements for powered-lift with those established for pilots of airplanes and rotorcraft in part 135. The proposals included Airline Transport Pilot (ATP) certification and operating experience in the make and model of powered-lift for PICs in commuter operations, part 121 Advanced Qualification Program (AQP) training requirements for pilots who serve in commuter operations in certain powered-lift, and instrument ratings for all powered-lift pilots in part 135 operations. In addition to allowing a part 135 operator to develop and provide training for powered-lift pilot certification at the commercial pilot level, the FAA is permitting successful completion of part 135 pilot checks to be used to meet the practical test requirements for powered-lift ratings subject to certain conditions.

Overall, the FAA finalizes the proposed requirements regarding integration of powered-lift pertaining to part 135 qualifications without substantial changes from what was proposed in the NPRM. In response to commenters, the FAA made certain editorial changes to add clarification and better enable powered-lift training and testing that would have otherwise created obstacles.

5. Dual Controls

The FAA noted in its proposal that it was retaining the powered-lift category and proposed alternate aeronautical experience and logging requirements to allow certain groups of pilots to attain the necessary aeronautical experience. In accordance with flight training requirements under § 91.109 and the requirements for supervised operating experience (SOE) in § 61.64, the powered-lift would be required to have a dual set of controls to accomplish the

aeronautical experience required in an aircraft and SOE.

After consideration of the comments received, the FAA is adopting several pathways to enable the use of a powered-lift without dual controls. The first pathway permits flight training in a powered-lift with a single set of flight controls accessible by both student and instructor (e.g., a throwover control). The second pathway allows all flight training to be conducted in an approved simulator, culminating in solo aeronautical experience in a powered-lift with a single set of flight controls subject to certain conditions and limitations set forth in a new appendix to part 194. This pathway allows an Original Equipment Manufacturer (OEM) to utilize a Level C or higher FFS to conduct the required flight training in accordance with part 61 and part 194. The pilot can gain the necessary experience through a series of demonstration flights and solo experience, complete a practical test in a Level C FFS, and then conduct abbreviated operating experience in the powered-lift to become fully qualified and fly in the NAS. Finally, the third pathway permits the FAA to issue deviation authority to facilitate flight training in a powered-lift with a single set of flight controls in the NAS based on future demonstrated and validated advancements in technology.

The FAA makes conforming amendments in light of these alternate pathways to the supervised operating experience requirements and in part 135. Specifically, this final rule adopts certain alternate provisions to facilitate supervised operating experience in a powered-lift with a single set of controls and a single pilot seat. Additionally, this final rule revises current requirements for instructor training that is accomplished from either pilot station to provide a feasible pathway for approved part 135 training programs, pilots, instructors, and check airman operating only with one pilot station and/or set of flight controls.

6. Impacts to Rotorcraft Training at Part 142 Training Centers

The FAA adopts permanent changes that, in addition to establishing requirements for powered-lift, would affect certain part 142 training in FSTDs for rotorcraft. These proposed changes would harmonize requirements for airplanes, powered-lift, and rotorcraft in part 142, specifically for pilot training in an FSTD that represents an aircraft requiring a type rating. This final rule applies the ATP aeronautical experience requirements to FSTD instructors in airplanes and helicopters requiring a

type rating, powered-lift weighing over 12,500 pounds, and turbojet powered powered-lift rather than all aircraft requiring a type rating. In some instances, these adopted changes provide additional flexibility to training and qualification for rotorcraft instructors consistent with allowances for airplane instructors and provide training and testing for rotorcraft instructors that is more specifically focused on rotorcraft, instead of airplanes.

D. Operational Requirements

To mitigate the safety gaps that exist due to the absence of operational regulations specifically applicable to powered-lift, the FAA proposed, through the SFAR, to apply specific airplane, rotorcraft, and helicopter rules contained in parts 43, 91, 97, 135, and 136 to powered-lift as appropriate. In the proposal, the FAA determined that applying the airplane rules in most instances was a safer, more conservative approach, especially given the lack of powered-lift operational data. Notwithstanding, in some instances, for example under part 136, the FAA determined that applying the helicopter or rotorcraft rules were appropriate and provided an equivalent level of safety.

Specifically, the FAA initially proposed using the visual flight rules (VFR) fuel requirements specified for airplanes for both operations conducted under parts 91 and 135. After considering comments received, the FAA is adopting different requirements than proposed related to fuel reserves when conducting VFR operations. The SFAR now stipulates helicopter minimums for powered-lift capable of conducting a landing in the vertical-lift flight mode along the entire route of flight. Powered-lift that are not capable of conducting a landing in the vertical-lift flight mode along the entire route of flight must meet airplane minimums.

In addition, the FAA initially proposed using the instrument flight rules (IFR) fuel requirements specified for airplanes for operations conducted under parts 91 and 135. The SFAR now permits the use of helicopter minimums stipulated for powered-lift that are authorized to conduct Copter Procedures and that have the performance capability, as provided in the Aircraft Flight Manual (AFM), to conduct a landing in the vertical-lift flight mode for the entire flight. Powered-lift that do not meet these criteria will be required to meet the airplane minimums.

The FAA also proposed using the VFR visibility requirements prescribed for airplanes. The final rule states that

helicopter minimums are applicable if the powered-lift is operated in the vertical-lift flight mode and is operated at a speed that allows the pilot adequate opportunity to see any other traffic or obstructions in time to avoid a collision. If either of those requirements are not met, then the airplane minimums apply.

Finally, the FAA proposed using the general aircraft minimum safe altitudes for operations conducted under parts 91 and 135, rather than allowing powered-lift to utilize helicopter exclusions. The final rule provides that powered-lift operating in vertical-lift flight mode that have demonstrated a capability to autorotate or conduct an approved equivalent maneuver are allowed the same minimum safe altitudes as those afforded to helicopters. However, for part 135 operations, it is important to note that the minimum altitude cannot be lower than 300 feet above the surface. When a powered-lift is operating in the vertical-lift flight mode and is certificated to conduct an autorotation or an approved equivalent maneuver to a landing, then helicopter minimum safe altitudes or lowest altitude published in the AFM apply.

Under part 136, the FAA proposed applying the operational requirements specific to helicopter operations within part 136 to powered-lift operations because the FAA anticipated powered-lift will hover and operate similarly to helicopters when conducting air tours, except when relying on wing-borne flight. In the final rule, as addressed in section VI.E. of this preamble, "Part 136 Rules for Powered-Lift," the FAA applies some provisions in part 136 to powered-lift regardless of the flight mode in which the aircraft is operating because the FAA determined those provisions—such as requiring flotation equipment—should apply to powered-lift regardless of whether they are operating in the vertical-lift or wing-borne flight mode.

The FAA will allow powered-lift operators to use Copter Procedures as defined in part 97 if the aircraft has been type-certificated and equipped to utilize those procedures. That capability will be identified in the limitations section of the AFM along with any other specific limitations and procedures necessary for safe operation of the aircraft.

The FAA has made a permanent change to the regulatory requirements for the Pilot Records Database contained in part 111 to include powered-lift as a qualifying aircraft to meet the threshold requirement of whether a person operating in furtherance of a business needs to report pilot records to the Pilot Records Database.

For purposes of maintenance, preventive maintenance, rebuilding, and alteration, the FAA proposed to apply the current requirements under part 43, with only two modifications. First, the FAA proposed to apply the preventive maintenance requirements available to certificate holders operating rotorcraft under part 135 in remote areas to certificate holders similarly operating powered-lift. Second, the FAA proposed that in lieu of complying with § 43.15(b), each person performing an inspection required by part 91 on a powered-lift, must inspect “critical parts” (as defined under §§ 27.602 and 29.602) in accordance with the maintenance manual or Instruction for Continuous Airworthiness, or as otherwise approved by the Administrator. The FAA is adopting these requirements as proposed.

The operational requirements and comments the FAA received are discussed in more detail in section VI.F. of this preamble.

E. International Operation of Powered-Lift

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to conform to International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARPs) to the maximum extent practicable. In this final rule, the FAA amends part 61 to require powered-lift pilots to have a type rating, which meets the standards outlined in ICAO Annex 1, Personnel Licensing. Under parts 91 and 135, the FAA requires U.S. operators to comply with ICAO Annex 2, Rules of the Air, when operating over the high seas or when operating within a foreign country.³ ICAO Annex 8, Airworthiness of Aircraft, is silent on powered-lift; however, the FAA designates powered-lift as special class aircraft for type certification in accordance with § 21.17(b) and applies airworthiness criteria that meet an equivalent level of safety to the FAA’s existing airworthiness standards and are consistent with the intent of ICAO Annex 8 to the Chicago Convention. Accordingly, U.S. operators of powered-lift that are type-certificated with a standard airworthiness certificate and conduct their operations in accordance

³ See 14 CFR 91.703. To note, § 91.703(a)(2) requires each person operating a civil aircraft of U.S. registry outside the U.S. when within a foreign country to comply with the regulations relating to the flight and maneuver of aircraft there in force and, with narrow exceptions, comply with 14 CFR part 91 so far as it is not inconsistent with the applicable regulations of the foreign country where the aircraft is operating or Annex 2.

with the standards outlined in Annex 2 would be eligible to operate over the high seas. The requirements for the international operation of powered-lift and comments the FAA received are discussed in more detail in section VIII.B. of this preamble.

F. Summary of the Costs and Benefits

Operations with powered-lift are anticipated to offer benefits over traditional airplanes and rotorcraft. A report published by the U.S. Government Accountability Office (GAO) stated that many of these newer kinds of aircraft could be easier to design, simpler to construct, less complicated to maneuver, quieter to fly, and more economical to operate compared to traditional aircraft.⁴ Many use cases for these aircraft are envisioned, and this rulemaking is a step toward those use cases coming to realization.

Several problems exist absent this rulemaking. The first is that only operating rules applicable to powered-lift are those specific to “aircraft,” which introduces a substantial safety gap in part 91 and part 135 operations. This safety gap does not exist for parts 91 and 135 operations conducted with airplanes, helicopters, and rotorcraft because decades of FAA rulemaking has resulted in a continuum of rules establishing minimum safety standards for operations conducted with these aircraft. A similar suite of category-specific rules simply does not exist for powered-lift because these are new and novel aircraft that have yet to be type-certificated for operations in the NAS. Consequently, powered-lift would not be required to operate at the level of safety required of operations conducted with airplanes, helicopters, or rotorcraft.

The second problem is challenges presented by the existing airmen certification regulations. Unlike the extensive infrastructure in place for the training and certification of airplane and rotorcraft pilots and instructors, the resources to scale powered-lift training and certification of pilots and instructors is scant due to the lack of powered-lift flight instructors and FAA-certificated aircraft available for airmen training and testing (and operations). Without this rulemaking, civilian pilots will be unable to obtain powered-lift ratings necessary for industry to scale operations intended for these new and novel aircraft.

The third problem absent this SFAR are the requirements for acting as PIC of

⁴ Transforming Aviation: Stakeholders Identified Issues to Address for ‘Advanced Air Mobility’ | U.S. GAO, www.gao.gov/assets/gao-22-105020.pdf.

a powered-lift operation. Should type-certificated powered-lift become available before this rule is finalized, individuals holding an airmen certificate with a powered-lift category rating would be permitted to act as PIC of powered-lift operations. Taking into consideration the variation in operating characteristics for each powered-lift coming to the civilian market, a powered-lift category rating would not adequately prepare an individual to act as PIC of a powered-lift operation.

While operators choosing to conduct operations with powered-lift will incur costs to comply with regulations in this SFAR, these costs are on a scale equivalent to those incurred by operators choosing to conduct operations with airplanes or rotorcraft under similar regulations. Likewise, costs imposed on individuals that choose to accomplish the training and testing required to hold an airmen certificate with a type rating in the powered-lift category are on a scale equivalent to those incurred by individuals accomplishing training and testing to hold an airmen certificate with a type rating in the airplane or rotorcraft category. In other words, the costs imposed on operators and individuals that choose to comply with regulations finalized by this rule will be no more burdensome than the costs incurred by entities and individuals complying with corresponding airplane and rotorcraft regulations that are already in effect. Additionally, the FAA has provided some performance-based options in certain rules that could reduce the burden on industry as compared to the comparable prescriptive requirements of the proposed rule.

The provisions in this SFAR can generally be grouped by those rules affecting airmen certification and those rules enabling powered-lift to conduct operations under parts 91, 97, 135, and 136. For certification of airmen with a type rating in powered-lift, the FAA allows alternative aeronautical experience and logging requirements. For the operational rules, the FAA applies specific airplane, rotorcraft, or helicopter rules to powered-lift, as appropriate. The FAA has considered each finalized regulation in the SFAR to determine its economic impact. An overview of this analysis is included in the Regulatory Evaluation portion of this preamble. A regulatory impact analysis has also been prepared for the finalized SFAR and can be found in the docket for this rule.

The following table presents a summary of the primary estimate for which data was available to monetize

the costs of this rule, as well as estimates for a pessimistic and optimistic scenario. The monetized costs include incremental costs for individuals to hold an airman’s certificate with a type rating for the powered-lift flown, costs for the

minimum fuel reserve requirement, and costs for the provision of dual-control aircraft and full flight simulators for training. For the primary estimate, over a 10-year period of analysis, this rule would result in present value costs of about \$914.2 million at a two percent

discount rate with annualized costs of about \$101.8 million.⁵ Additional details are provided in the Regulatory Evaluation section of this SFAR and in the regulatory impact analysis available in the docket for this rulemaking.

TABLE 1—MONETIZED COSTS OF SFAR
[Millions \$]

Forecast scenario	10-Year present value	Annualized
Base—Primary Estimate	\$914.2	\$101.8
Pessimistic	865.5	96.4
Optimistic	966.1	107.6

G. SFAR Framework and Duration

This final rule enables powered-lift operations for a limited duration and provides the FAA an opportunity to assess the operations and establish a comprehensive regulatory scheme. This final rule adopts both limited permanent changes and a time-limited SFAR to facilitate powered-lift operations. The SFAR permits the FAA to gather data—via established approved information collections, regulatory requirements, and informal anecdotal information and observations—and better understand what a comprehensive permanent regulatory framework should look like.

Further, the FAA notes that section 955(c) of the FAA Reauthorization Act of 2024 (Pub. L. 118–63) mandates that the FAA establish an aviation rulemaking committee (ARC) no later than three years after the FAA issues the first commercial operating certificate to a powered-lift, to provide the Administrator with specific findings and recommendations for, at a minimum, the creation of a standard pathway for the performance-based certification of powered-lift aircraft; the certification of airmen capable of serving as pilot-in-command of a powered-lift; and operation of powered-lift in commercial service and air transportation. Section 955(d) requires the FAA to initiate a rulemaking no later than 270 days after the ARC submits its report. Not only does this language impose a timeline for establishing the ARC and subsequent rulemaking, it acknowledges that an ARC will first need real-world operational data from commercial powered-lift operations before it can provide informed

recommendations for a permanent rulemaking.

Because the SFAR will affect several parts of 14 CFR, the FAA has determined that the most clear and comprehensive regulatory approach is through the creation of a new part to wholly contain the SFAR. Specifically, the FAA is adding a new part 194, titled “Special Federal Aviation Regulation No. 120—Powered-Lift: Pilot Certification and Training; Operations Requirements,” to 14 CFR under new subchapter L, titled “Other Special Federal Aviation Regulations.” New part 194 utilizes the traditional regulatory structure to supplement existing rules, creates temporary alternatives for airman certification, removes operational barriers, and mitigates safety risks for powered-lift. As a result, requisite applicability revisions are made to parts 43, 60, 61, 91, 97, 111, 135, 136, 141, and 142 to clearly communicate that current regulations are intended to operate in tandem with part 194, as subsequently discussed in this preamble.

This SFAR will remain in effect for ten years after this final rule becomes effective. In selecting ten years as the appropriate duration for this SFAR, the FAA considered a number of factors including the time it will take to initiate operations after this final rule becomes effective and the type certification status of the powered-lift that are commercially viable. As discussed in section I.G. of this preamble (“SFAR Framework and Duration”), the FAA has determined that a ten-year period is an appropriate length of time to collect operational data from powered-lift operations. This data will inform a

subsequent rulemaking to implement permanent amendments.

II. Authority for This Rulemaking

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

The FAA is issuing this final rule under the authority described in Subtitle VII, Part A, Subpart i, Section 40113, Administrative, and Subpart iii, Section 44701, General Requirements; Section 44702, Issuance of Certificates; Section 44703, Airman Certificates; Section 44704, Type Certificates, Production Certificates, Airworthiness Certificates, and Design and Production Organization Certificates; Section 44705, Air Carrier Operating Certificates; and Section 44707, Examination and Rating Air Agencies. Under these sections, the FAA prescribes regulations and minimum standards for practices, methods, and procedures necessary for safety in air commerce, including the authority to examine and rate civil schools and prescribe regulations to ensure the competency of instructors. The FAA is also authorized under these sections to issue certificates, including airman certificates, type certificates, and air carrier operating certificates, in the interest of safety.

This rulemaking is also issued under the authority described in Subtitle VII, Part A, Subpart iii, Section 44712, Emergency Locator Transmitters; Section 44713, Inspection and Maintenance; Section 44715, Noise and Sonic Boom; Section 44716, Collision

⁵ Monetized costs for the rule stem from the cadence of aircraft deliveries. In the optimistic scenario, aircraft deliveries are forecast to begin in year 1 and continue through year 10. Aircraft

deliveries for the base scenario are forecast to occur during years 2–10, and in the pessimistic scenario during years 3–10. As a result, costs for the optimistic scenario accumulate over a period of 10

years versus the base and pessimistic scenarios, over which costs accumulate for a period of 9 years and 8 years, respectively.

Avoidance Systems; and Section 44722, Winter conditions. These sections direct the Administrator to prescribe regulations to govern the use of emergency locator transmitters and collision avoidance systems, the standards for inspecting and performing maintenance on aircraft, and regulations to control aircraft noise and safety risks related to winter conditions, respectively.

Section 955 of the FAA Reauthorization Act of 2024 (Pub. L. 118–63) requires that, within seven months of the date of enactment of the Act, the FAA publish a final rule finalizing the notice of proposed rulemaking entitled “Integration of Powered-Lift: Pilot Certification and Operations; Miscellaneous Amendments Related to Rotorcraft and Airplanes.” Section 955 requires that, with respect to any powered-lift aircraft type certificated by the FAA, the regulations must provide a practical pathway for pilot qualification and operations; establish performance-based requirements for energy reserves and other range- and endurance-related requirements that reflect the capabilities and intended operations of the aircraft; provide for a combination of pilot training requirements, including simulators, to ensure the safe operation of powered-lift; and to the maximum extent practicable, align powered-lift pilot qualifications with section 2.1.1.4 of Annex 1 to the Chicago Convention. Additionally, as required by section 955(a)(3)(B), the FAA must ensure coordination with the Department of Defense (DoD).

In this rule, the FAA provides practical pathways for pilots to qualify to operate powered-lift, establishing pathways for pilots with military experience, airline transport pilot and commercial experience, and flight instruction experience to gain experience in the operation of these aircraft, providing them with sufficient foundations to safely conduct passenger-carrying operations. These multiple pathways will give pilots of diverse backgrounds and prior experience opportunities to enter this emerging aviation sector. For further information on pilot pathways see section V. of this preamble.

Also, in recognition of the comments received, the FAA has revised requirements related to fuel and energy reserves to provide greater flexibility for operations conducted under certain parameters. Specifically, the SFAR outlines performance-based requirements that allow powered-lift operators to use certain helicopter operating rules as long as the operator

complies with the appropriate risk mitigations that are detailed in the rule. For example, an operator may use the helicopter fuel requirements under § 91.151 if the powered-lift is continuously capable of conducting a landing in the vertical-lift flight mode along the entire route of flight. For further information, see section VI. of this preamble.

Further, based on comments received to the NPRM, the FAA has significantly expanded the ability of manufacturers and operators to use flight simulation training devices in the training and qualification of pilots, recognizing the significant advancements in flight simulation technology and pilot training. This includes providing an opportunity for a pilot applicant to credit certain experience in a simulator in addition to outlining a pathway for pilot certification greatly expanding the use of simulation when a powered-lift has a single functioning flight control. For further information on these provisions, see sections IV. and V. of this preamble.

The FAA has considered the provisions of section 2.1.1.4 of Annex 1 to the Chicago Convention and ensured that the requirements in this rule related to pilot certification and operations are responsive to the intent of that section of the Annex. The FAA carefully considered implementation of section 2.1.1.4 and found it impracticable to disrupt the FAA’s traditional airman certification framework by the addition of a type rating within a wholly different aircraft category to an existing certificate with a different category rating. However, through this SFAR, the FAA chose to facilitate alternative measures for a pilot to directly receive a powered-lift category rating and a powered-lift type rating. Similar to the conditions set forth in ICAO’s transitional recommendation, these alternative measures to receive a powered-lift category and type rating would be completed during training provided under an approved or proposed training curriculum and would take previous experience of an applicant in an airplane or helicopter into account. Considering the flexibilities extended in the final rule, FAA believes it has aligned with section 2.1.1.4 to the maximum extent practicable while maintaining safety and consistency with its existing regulatory structure. For further discussion, see section V.A. of this preamble.

Based on the foregoing authorities, the FAA makes amendments to clarify the rule and corrects inadvertent errors contained in the NPRM. These are

explained in more detail throughout this final rule. Amendments correcting for clarity, correctness, and grammar are not substantive in nature and are a logical outgrowth of the NPRM.

The FAA also makes minor technical amendments to its regulations that are discussed throughout this preamble. The FAA finds that notice and comment is unnecessary for these technical changes.⁶

Additionally, in this final rule, the FAA revised certain sections of the proposed rule to account for FAA Test Pilots and Aviation Safety Inspectors (ASIs). Providing notice and seeking comment on these changes is not required as they are rules of agency organization, practice, or procedure under 5 U.S.C. 553(b)(A).

Finally, in accordance with § 955(a)(3)(B), the FAA has consulted with the DoD on a host of issues regarding powered-lift, including the United States Air Force Agility Prime program; powered-lift that are used for military purposes; and commonalities, differences, and handling qualities of various types of powered-lift. In addition to direct consultation, the FAA notes that because this final rule was designated significant under Executive Order 12866, it was coordinated with the DoD as well as other agencies during interagency coordination.⁷ This coordination serves as another opportunity for the FAA to consult with the DoD on this rule.

III. Background

A. General

Powered-lift are unique in their ability to take off and land vertically like helicopters and fly like an airplane during cruise flight. They can operate in different flight regimes utilizing features of helicopters or airplanes or both. The flight controls for such aircraft are also often unique to the individual aircraft design and can incorporate both traditional helicopter and airplane controls, or control systems that are dissimilar to either helicopters or airplanes. Likewise, the flight characteristics for powered-lift vary depending on the aircraft design and the different modes in which they operate.

⁶ Further, technical amendments are “a routine determination, insignificant in nature and impact, and inconsequential to the industry and to the public.” See *Mack Trucks, Inc. v. EPA*, 682 F.3d 87, 94 (D.C. Cir. 2012) | (quotation marks and citation omitted); See also *United States v. Mullins*, 2012 WL 3777067, at *4 (D. Vt. Aug. 29, 2012) (explaining that public comment is unnecessary if minor or merely technical amendments in which the public is not particularly interested were involved).

⁷ Section 3(f) of Executive Order 12866, issued on Sept. 30, 1993 (58 FR 51735).

Currently, the FAA has several powered-lift in the type certification process. The powered-lift coming to the civilian market have varied greatly in design, flight, and handling characteristics with varying degrees of automation.

While none of the powered-lift for which type certification is being sought have yet been approved for civilian use, the powered-lift industry has identified many potential uses for these aircraft. The FAA anticipates the introduction of aircraft that vary in size and passenger seating configuration and employ both new and traditional kinds of propulsion systems into the civilian market.

Manufacturers and initial operators of powered-lift indicate operations with powered-lift could offer many benefits over rotorcraft. For example, some powered-lift may be capable of transporting heavier loads at higher altitudes and faster cruise speeds than rotorcraft. Such capability may increase efficiency in transporting crew and material to remote locations such as offshore oil rigs and add diversity when considering landing points that are currently available to helicopters and not airplanes. Certificate holders seeking to take advantage of these capabilities may also seek to use powered-lift for transporting passengers from point-to-point; for example, such transportation could occur from a heliport and proceed at airplane airspeeds and ranges. Other opportunities may also exist in concentrated urban environments, where short point-to-point distances coupled with VTOL capability may allow for more efficient transportation of passengers than existing ground transportation methods.

B. Summary of the NPRM

In the NPRM, the FAA proposed permanent changes to the Code of Federal Regulations and a temporary SFAR to facilitate the safe integration of powered-lift operations into the NAS. Under this comprehensive approach, the FAA proposed to incorporate changes to pilot certification rules, operating rules, air agency rules, as well as other conforming proposals to maintenance requirements, pilot records database requirements, and FSTD qualification requirements. This section provides a broad summary of the NPRM.

Although the FAA did not propose any new type certification requirements or noise standards applicable to powered-lift, the FAA clarified that it would follow its existing aircraft certification process under § 21.17(b) to type certificate powered-lift. The FAA proposed a new process for an OEM to

attain qualification of an FSTD in accordance with part 60. Because the existing deviation authority in part 60 cannot be used to qualify an FSTD that represents a category of aircraft for which there is no standard under part 60, the FAA proposed to mirror the aircraft certification process under § 21.17(b) to similarly allow an applicant seeking to qualify a powered-lift FSTD to use a combination of requirements in appendices A through D to part 60 to form a basis to qualify an FSTD under that part.

Part 61 sets forth the aeronautical experience requirements to attain a pilot certificate, as well as a flight instructor certificate, with powered-lift ratings. The FAA noted in the NPRM that the broader powered-lift category requirement, without an established class rating or type rating, would not adequately prepare a pilot to fly the specific powered-lift moving through FAA aircraft certification, thus potentially creating a safety gap. To address this concern, the FAA proposed to require pilots in command hold a type rating for the powered-lift they seek to fly. Most significantly, the FAA proposed alternate aeronautical experience and logging requirements from the existing powered-lift requirements in part 61. These alternate requirements would be applicable to certain pilot groups that the FAA deemed have the most relevant experience to establish a base of powered-lift pilots and instructors. As proposed, the experience and logging provisions would create an alternative pathway to powered-lift certification for (1) OEM instructor pilots and test pilots; (2) initial cadres of flight instructors from certificate holders under parts 135, 141, and 142 receiving training at an OEM; and (3) pilots receiving training from the initial cadres of flight instructors under approved training programs under part 135, 141, or 142. Alternate aeronautical experience proposed by the FAA focused on giving allowances for flight training, including allowing the logging of PIC time when an applicant is the sole manipulator of the flight controls, and reduced distances to meet cross-country aeronautical experience. This experience, combined with meeting the alternate experience and logging provisions set forth in the FAA's proposed SFAR, would result in pilots attaining the required experience necessary to hold a commercial pilot certificate.

The FAA sought comment on existing requirements that dictate an aircraft used for flight instruction must have dual controls. The FAA outlined

expectations regarding these rules as they are currently applicable to all aircraft (except manned free balloons) and, therefore, are applicable to powered-lift. The FAA also discussed how the dual control requirement would affect a pilot's ability to act as PIC when the PIC has no access to flight controls (*i.e.*, supervised operating experience). The FAA acknowledged that manufacturers were in the midst of developing single flight control powered-lift and sought comment from the public on facilitating flight training and supervised operating experience in those aircraft.

In addition to the proposed revisions to part 61 and the temporary alternatives proposed in part 194, the FAA proposed changes to part 135, which does not currently stipulate which training requirements and experience requirements are applicable to powered-lift.⁸ Additionally, to further facilitate the certification of powered-lift pilots for the expected commercial operations, the NPRM proposed to allow part 135 operators to conduct training for their pilots seeking to obtain powered-lift category and type ratings for a commercial pilot certificate.⁹ The FAA also incorporated permanent and temporary amendments to pilot experience requirements, curriculum content, and part 135 instructor requirements to address the absence of powered-lift specific regulations in part 135. Finally, the NPRM proposed changes to parts 141 and 142 to facilitate the training of powered-lift pilots in accordance with those parts as well as the amendments set forth in the SFAR.

The FAA proposed in the SFAR which operating rules apply to powered-lift on a temporary basis under parts 91 ("General Operating and Flight Rules"), 135 ("Operating Requirements: Commuter and On Demand Operations"), and 136 ("Commercial Air Tours"). The FAA noted that this would enable the FAA to gather additional information and determine the most appropriate permanent rulemaking path for these aircraft. The FAA proposed the requirements that should be applicable to powered-lift based on its phase of operation, current requirements for

⁸ The FAA recently published a final rule amending the regulatory definitions of certain air carrier and commercial operations to enable powered-lift operations under part 135. See 88 FR 48072 (July 26, 2023).

⁹ After an initial cadre of instructors have completed training at the OEM, the FAA proposed that operators use their instructors to train and test additional pilots according to their approved part 135 training program.

airplanes and helicopters, and safety intent of the current rule.

Under parts 91 and 135, generally the FAA proposed applying the operating rules pertaining to airplanes; however, in some instances, the FAA proposed applying certain helicopter rules based on whether a powered-lift is anticipated to operate similar to a helicopter and subject to some performance-based standards. The FAA proposed exceptions, however, to account for the different modes of flight and applicable operational requirements. Under part 91, the FAA proposed applying helicopter rules during some instances of vertical flight. Under part 135, the FAA proposed applying helicopter rules related to overwater equipment and briefing, specified IFR and VFR requirements, operations in icing conditions, airport requirements, and operations in remote areas.

The FAA proposed to permanently amend part 111 (“Pilot Records Database”) to apply to operators and pilots of large powered-lift. Pilots of large powered-lift may go on to work for an air carrier in the future. Reporting these pilot records would be relevant to a future hiring air carrier.

The FAA determined that part 43 (“Maintenance, Preventive Maintenance, Rebuilding, and Alteration”) was applicable to powered-lift but proposed other amendments to clarify preventative maintenance requirements considering that powered-lift can operate outside of the airport environment.

Part 97 (“Standard Instrument Procedures”) outlines the current requirements for standard instrument approach procedures, obstacle departure procedures, and weather minimums for IFR takeoffs and landings at U.S. civil airports. Copter procedures are also outlined in this part. The FAA proposed that, as with airplanes and helicopters, powered-lift could also utilize these standard procedures during IFR operations if the powered-lift was capable in accordance with its type certification.

C. General Overview of Comments

The FAA received 81 comments in response to the NPRM from a variety of commenters, including aircraft manufacturers and operators, aviation training companies, other aviation companies, trade associations, civil aviation authorities, and individuals. Powered-lift manufacturers and operators commenting on the NPRM included: AIR VEV; Archer Aviation (Archer); Augusta-Westland Philadelphia Corporation (AWPC), a subsidiary of Leonardo Helicopters ;

BETA Technologies, Inc. (BETA); Bristow Group Inc. (Bristow); a joint comment from Eve Air Mobility and Embraer S.A. (Eve); Joby Aviation (Joby); Lilium GmbH (Lilium); Supernal LLC (Supernal); Vertical Aerospace Group LTD (Vertical Aerospace Group); Wisk Aero (Wisk); and XTI Aircraft Company (XTI). Other aviation companies commenting on the NPRM included: Airbus Helicopters, Alakai Technologies Corporation, ASR-Pioneer, CAE, Electra.aero, Ferrovial Vertiports, L3Harris Commercial Aviation Solutions—Advanced Air Mobility (L3Harris), Sabrewing Aircraft Company (SACO), and UPS Flight Forward (UPS FF). Trade association commenters included: Advanced Air Mobility Institute, Air Line Pilots Association International (ALPA), Aircraft Owners and Pilots Association (AOPA), Airlines for America (A4A), Association for Uncrewed Vehicle Systems International (AUVSI), FlightSafety International Inc., General Aviation Manufacturers Association (GAMA), Helicopter Association International (HAI),¹⁰ National Air Transportation Association (NATA), National Business Aviation Association (NBAA), and Vertical Flight Society (VFS). SAE International, a consensus standards-setting organization, commented on the NPRM. Civil aviation authorities, governmental agencies, and industry associations located outside the United States commenting on the NPRM included: ADS Group (ADS); European Aerospace, Security and Defence Industries (ASD); the European Union Aviation Safety Agency (EASA); and the National Civil Aviation Agency of Brazil (ANAC).

While the FAA received only 81 comments, each comment detailed a wide array of discrete issues and recommendations. Some commenters provided general, high-level comments on the NPRM. Archer applauded the FAA’s progress in its proposed powered-lift regulations, while Bristow said the proposed rules are a good start and will have a positive impact. An individual supported the proposed regulatory framework, which they said would enhance safety, efficiency, and innovation. Electra.aero stated the FAA should be proactive in powered-lift standards development to “help[] preclude unrealistic expectations of commercial market introduction of these technologies.”

¹⁰ The FAA notes that on February 26, 2024, the commenter announced the renaming of Helicopter Association International (HAI) to Vertical Aviation International (VAI).

Overall, the majority of commenters expressed general support for the FAA’s approach to integrating powered-lift into the NAS through expeditious rulemaking. However, they also recommended a number of revisions to the FAA’s proposal that they believed would provide greater ability to quickly and safely integrate powered-lift into the NAS. The following provides a high-level overview of key issues raised by commenters. Detailed discussions of comments received and FAA responses are found throughout this preamble.

Alignment With ICAO Requirements for Powered-Lift Airman Certification Category

The FAA received numerous comments on the proposal to retain the category requirement for powered-lift pilots. Commenters requested the FAA align its requirements with ICAO Annex 1 recommendations by requiring only a powered-lift type rating on an existing commercial pilot certificate with an airplane category or helicopter class rating (*i.e.*, no powered-lift category rating).

Aircraft Dual Controls Requirement

The FAA received many comments in response to the request for information on the existing requirement for dual controls to be installed on training aircraft and those used for supervised operating experience (SOE). Commenters requested: (1) no requirement for dual controls regardless of how the powered-lift will be used; (2) 100 percent simulator training, which would relieve any requirement for dual controls/aircraft training; and (3) non-traditional methods to accomplish SOE. However, EASA’s comment supported a requirement for dual controls/access as currently required by §§ 61.195 and 91.109.

Other Pilot Certification Comments of Note

Commenters broadly suggested aligning pilot certification requirements for powered-lift with those of helicopters.

Amount of FSTD Time Allowed for a Powered-Lift Rating

Commenters requested the use of a flight training device (FTD) instead of an FFS and requested to utilize the FTD to perform all 50 hours of PIC flight time required for a powered-lift category rating at the commercial pilot level. Several commenters expressed the need for FSTDs that are not Level C or higher FFS, stating the need for more avenues by which an equivalent level of training may be accomplished. Commenters

noted additional burdens of both time and resources to meet the proposed FSTD requirements. Other comments suggested using preexisting deviation authority mechanisms to achieve an equivalent level of safety.

VFR and IFR Fuel Requirements

The FAA received comments on parts 91 and 135 VFR and IFR fuel requirements. Commenters requested different variations of two comment themes: (1) performance-based fuel reserves, and (2) use of fuel requirements specified for helicopters. Several commenters noted that powered-lift incorporating innovative power sources could offer greater operational capability if they were able to use energy reserves lower than those currently prescribed for airplanes or helicopters. They asserted that by enforcing the requirements proposed in the NPRM, the FAA would limit the capability and scope of operations. Other commenters suggested applying helicopter fuel requirements to powered-lift, asserting that powered-lift, like helicopters, have the maneuverability and operational

flexibility to land in more varied locations.

Visibility Requirements

The FAA received comments on visibility requirements. Commenters requested to utilize the helicopter provisions existing in the regulations, as well as the adoption of a performance-based approach. Several commenters suggested applying helicopter weather minima rather than the airplane requirements. Several commenters also noted that technological advancements could enable powered-lift to safely operate in visibilities lower than currently prescribed for airplanes or helicopters. Furthermore, several commenters contended that since powered-lift could operate at speeds and maneuverability comparable to helicopters, they should be permitted to use the visibility requirements prescribed for helicopters or a performance-based visibility requirement.

Minimum Safe Altitudes for Operations Conducted Under Parts 91 and 135

The FAA received comments on parts 91 and 135 minimum safe altitudes.

Commenters requested: (1) the use of VFR minimum altitudes specified for helicopters (one variation proposed), and (2) performance-based minimum safe altitudes. Commenters suggested the FAA consider the operational capabilities of powered-lift, which are able to operate at low speeds and have the maneuverability similar to helicopters, and therefore apply the VFR minimum altitudes prescribed for helicopters. Commenters also suggested the FAA permit a performance-based approach when applying VFR minimum altitude requirements to powered-lift.

SFAR Duration (10 Years)

Commenters supported the temporary adaptability of the SFAR but stated that an approach with 2 to 3-year reviews within the 10-year period would ensure dynamic rather than static regulations.

D. Differences Between the NPRM and the Final Rule

The following table summarizes key changes from the NPRM made in this final rule.

TABLE 2—SUMMARY OF KEY CHANGES FROM NPRM

Proposed action in the NPRM	Adopted by this Final Rule	Regulatory citation (14 CFR)	Additional discussion in section of preamble
The NPRM did not propose to revise the definition of autorotation.	This final rule adds powered-lift to the definition of autorotation.	§ 1.1	XIV.D.
The NPRM proposed to revise § 61.64(a)(1) to specify the ratings that must be sought when using an FSTD representing an aircraft requiring a type rating.	This final rule does not adopt the proposed revision.	§ 61.64(a)(1)	V.I.5.
The NPRM proposed revising § 91.113 as a temporary change under part 194 and grouped powered-lift in the same right-of-way category with airplanes and rotorcraft.	The final rule adopts the proposed § 91.113 temporary change as a permanent change.	§ 91.113(d)(2)–(4)	VI.B.1.
The NPRM proposed amending the note in § 135.100 to replace the word “airplane” with “aircraft”.	The regulation now clarifies the definition of taxi to include VTOL aircraft and specifies the airspeed and height above ground level.	§ 135.100(d)	VI.D.2.
The NPRM did not address § 135.165, which contains an incorrect cross-reference to part 119.	The final rule corrects the cross-reference in § 135.165(d) to reference part 110 rather than part 119.	§ 135.165(d)	VI.D.3.
The NPRM did not propose revisions to § 135.339.	This final rule revises certain training regulations for check airmen to account for flight training in powered-lift with a single set of controls.	§ 135.339(e)(3) and (4)	V.J.11.
The NPRM did not propose revisions to § 135.340.	This final rule revises certain training regulations for instructors to account for flight training in powered-lift with a single set of controls.	§ 135.340(e)(3) and (4)	V.G.1.iv. & V.J.11.
The NPRM did not propose changing § 136.75(a) to reference “single-engine” rotorcraft.	The final rule corrects § 136.75(a) by adding “single-engine” before “rotorcraft” as a permanent change.	§ 136.75(a)	VI.E.5.ii.

TABLE 2—SUMMARY OF KEY CHANGES FROM NPRM—Continued

Proposed action in the NPRM	Adopted by this Final Rule	Regulatory citation (14 CFR)	Additional discussion in section of preamble
The NPRM did not propose revisions to § 141.37.	This final rule corrects the ratings that may be held on a ground instructor certificate.	§ 141.37(a)(3)(ii)	V.F.2.ii., V.G.2., & V.I.5.
The NPRM proposed to replace “airplane” requiring a type rating with “aircraft” requiring a type rating, thereby including all powered-lift, in regard to certain instructor qualifications under part 142.	This final rule applies the ATP aeronautical experience requirements to FSTD instructors in airplanes and helicopters requiring a type rating, powered-lift over 12,500 pounds, and turbojet powered powered-lift rather than all aircraft requiring a type rating.	§ 142.47(a)(5)	V.F.2.ii.
The NPRM did not propose any changes to the minimum aeronautical experience requirements in § 142.47(a)(5).	This final rule adds a qualification option of holding a commercial pilot certificate with the appropriate ratings or an unrestricted ATP with the appropriate ratings rather than meeting certain aeronautical experience requirements.	§ 142.47(a)(5)(ii) and (ii)	V.G.3.
The NPRM did not include FAA test pilots or ASIs in the population of pilots able to utilize the alternate requirements set forth by part 194.	This final rule adds FAA test pilots and ASIs to the alternate requirements for test pilots, accounts for both groups of pilots as it pertains to instructor pilots, and adds definitions for both groups of pilots.	§§ 194.103, 194.203(a)(3), 194.213(a)(1)(iii), 194.217, 194.219(b)(1)(i), 194.219(b)(3)(iii), 194.225, 194.227(b)(1)(i).	V.F.2.i.d., V.F.2.ii., V.F.7., V.D.3.ii., V.F.2.i.a.–d., V.F.7., V.F.3.i.a.–c., & V.F.3.i.
The NPRM did not account for persons receiving flight training in powered-lift type certificated for more than one pilot.	This final rule excepts applicants receiving flight training from § 61.55(a)(1), (a)(2), and (b)(2) in order to serve as Second in Command (SIC) in a powered-lift type certificated for more than one required pilot flight crewmember.	§ 194.209(c)	V.C.
The NPRM did not propose any relief to § 61.129(e)(2)(i), which requires 50 hours of PIC time in a powered-lift.	This final rule reduces the amount of required PIC time in a powered-lift to 35 hours for pilots under the SFAR.	§ 194.216(a)	V.F.2., V.F.2.iii.a., & V.G.3.
The NPRM proposed to only permit pilots at approved training programs to credit a maximum of 15 hours in an FSTD toward the PIC flight time requirement of § 61.129(e)(2)(i).	This final rule permits any applicant under the SFAR to credit a maximum of 15 hours towards the 35-hour PIC flight time requirement of § 194.216(a).	§ 194.216(b)	V.F.2. & V.F.2.iii.b.
The NPRM proposed to permit certain pilots to log up to 40 hours of PIC flight time as sole manipulator of the controls when the person is not rated.	This final rule reduces the number of hours that may be logged from 40 hours to 25 hours to account for the reduction in required PIC flight time in a powered-lift (see § 194.216(a)).	§§ 194.221(c), 194.223(c)	V.F.2.ii.b.
The NPRM proposed to mirror a part 141 section prescribing certain ratings that may be held on a ground instructor certificate.	This final rule corrects the ratings that may be held on a ground instructor certificate, mirroring the correction to § 141.37(a)(3)(ii).	§ 194.241(b)	V.I.5.
The NPRM did not contemplate retraining requirements for unsatisfactory performance on part 135 checks in lieu of a practical test.	This final rule adopts training and endorsement requirements mirroring § 61.49 for certain unsatisfactory part 135 checks under the SFAR.	§ 194.243(b)(4)	V.G.1.v.
The NPRM referenced the Aircraft Flight Manual as determining when two pilots are required.	This final rule corrects the reference to the type certificate as dictating when two pilots are required.	§ 194.247(b)	V.J.3.

TABLE 2—SUMMARY OF KEY CHANGES FROM NPRM—Continued

Proposed action in the NPRM	Adopted by this Final Rule	Regulatory citation (14 CFR)	Additional discussion in section of preamble
<p>The NPRM proposed to require a certificate holder conducting commuter operations with powered-lift in which two pilots are required to comply with subpart Y to part 121.</p>	<p>This final rule specifies §§ 121.903(c) and 121.921(a) in subpart Y will apply to powered-lift, notwithstanding use of the term “airplane” in the regulations.</p>	<p>§ 194.247(b)(1)</p>	<p>V.J.3.</p>
<p>The NPRM did not propose any relief to the requirement that a powered-lift must have dual controls for flight training.</p>	<p>This final rule adopts three options for flight training in powered-lift with a single set of controls.</p>	<p>§ 194.253, Appendix A to part 194</p>	<p>V.D.3.ii. & V.D.3.iii.</p>
<p>The NPRM proposed not allowing powered-lift to use the helicopter/rotorcraft criteria stipulated in the following part 91 sections: § 91.119 (minimum safe altitudes), § 91.151 (VFR fuel requirements), §§ 91.155 and 91.157 (VFR weather minimums), § 91.167 (IFR fuel requirements), § 91.169 (IFR flight plan), and § 91.175 (IFR takeoff and landing).</p>	<p>The final rule allows some powered-lift to use the helicopter/rotorcraft provisions as long as they meet the performance-based criteria outlined in part 194.</p>	<ul style="list-style-type: none"> • § 194.302(d) (pertaining to § 91.119). 	<p>VI.B.1., VI.B.2., VI.B.4., & VI.B.5.</p>
<p>The NPRM proposed not allowing powered-lift to use the helicopter/rotorcraft criteria stipulated in the following part 135 sections: § 135.93 (Autopilot minimum altitudes), 135.203 (VFR minimum altitudes), 135.205 (VFR visibility requirements), 135.209 (VFR fuel supply), 135.221 (IFR alternate airport weather minimums), 135.223 (IFR alternate airport requirements), 135.609 (VFR visibility requirements for Class G airspace), 135.613 (approach/ departure IFR transitions), and 135.615 (VFR flight planning).</p>	<p>The final rule allows some powered-lift to use the helicopter/rotorcraft provisions as long as they meet the performance-based criteria outlined in part 194.</p>	<ul style="list-style-type: none"> • § 194.302(l) (pertaining to § 91.151). • § 194.302(m) and (n) (pertaining to § 91.155). • § 194.302(p) (pertaining to § 91.157). • § 194.302(q) (pertaining to § 91.167). • § 194.302(r) (pertaining to § 91.169). • § 194.302(s) (pertaining to § 91.175). • § 194.306(c) (pertaining to § 135.93). 	<p>VI.D.2., VI.D.4., & VI.D.8.</p>
	<ul style="list-style-type: none"> • § 194.306(ss) (pertaining to § 135.209). 	<ul style="list-style-type: none"> • § 194.306(nn) (pertaining to § 135.203). • § 194.306(pp) (pertaining to 135.205). • § 194.306(tt) (pertaining to § 135.221). • § 194.306(uu) (pertaining to § 135.223). • § 194.306(qqq) (pertaining to § 135.609). • § 194.306(sss) and (ttt) (pertaining to § 135.613). • § 194.306(uuu) (pertaining to § 135.615). 	

TABLE 2—SUMMARY OF KEY CHANGES FROM NPRM—Continued

Proposed action in the NPRM	Adopted by this Final Rule	Regulatory citation (14 CFR)	Additional discussion in section of preamble
<p>The NPRM proposed applying the requirements of § 135.158 (pitot heat indication systems) to powered-lift.</p> <p>The NPRM did not address powered-lift that experience a “critical change of thrust.”</p>	<p>The final rule applies § 135.158 to powered-lift but allows the indication light to be other than an amber light.</p> <p>The final rule revises some language in part 194, pertaining to parts 135 and 136, to reference powered-lift that experience a “critical change of thrust” and adopts a definition for this term.</p>	<p>§ 194.306(t)</p> <ul style="list-style-type: none"> • § 194.306(z) (pertaining to § 135.168). • § 194.306(ii) and (jj) (pertaining to § 135.181). • § 194.306(kk) (pertaining to § 135.183). • § 194.308(d)(1) (pertaining to § 136.9). • § 194.308(d)(2)(ii) (pertaining to § 136.11(a)(2)). • § 194.308(d)(6) (pertaining to § 136.75(c)). <p>§ 194.306(nnn) (pertaining to § 135.603).</p>	<p>VI.D.3.</p> <p>VI.D.3., VI.E.2., VI.E.3., & VI.E.5.i.</p>
<p>The NPRM did not clarify the instrument and ATP certificate requirements under § 135.603.</p>	<p>The final rule outlines the instrument and ATP certificate requirements for powered-lift conducting air ambulance operations.</p>	<p>§ 194.308(d)(2) (pertaining to § 136.11).</p>	<p>VI.D.8.</p>
<p>The NPRM did not apply the flotation requirements under § 136.11 to single-engine powered-lift and applied the requirements only to powered-lift operating in vertical-lift flight mode while conducting operations beyond the auto-rotational or gliding distance from the shoreline.</p>	<p>The final rule applies § 136.11(a)(1) to single-engine powered-lift. It also applies § 136.11 to powered-lift operating in both vertical-lift and wing-borne flight modes. Finally, the final rule removes the redundant and unnecessary language pertaining to auto-rotational and gliding distances.</p>	<p>§ 194.308(d)(2) (pertaining to § 136.11).</p>	<p>VI.E.3.</p>

IV. Powered-Lift Type Certification and FSTD Qualification

A. Type Certification

In the NPRM, the FAA did not propose any new requirements for the type certification of powered-lift. The FAA determined it will use its existing regulatory process to type certificate powered-lift as a special class under § 21.17(b).

The FAA uses a tiered safety approach for minimum certification standards, with different levels for airplanes and rotorcraft. For certain unique aircraft for which the FAA has not established airworthiness standards in its regulations (e.g., gliders, airships, powered-lift), the FAA uses the special class aircraft process. For powered-lift, the FAA will designate airworthiness requirements and other criteria that match the safety levels of existing standards by considering factors like aircraft size, seating, and performance. The FAA will publish the proposed airworthiness criteria, along with an explanation of its equivalency determination, in the **Federal Register**

for public notice and comment for each powered-lift project.¹¹

In some cases, specific airworthiness requirements for issuance of type certificates might not fulfill the requirements of operational rules. Applicants seeking powered-lift type design approval should identify areas needing additional approvals to meet anticipated operational needs. Operational rules often reference airworthiness standards in part 23, 25, 27, or 29, but adaptations might be necessary for unique designs.

In the NPRM, the FAA proposed that powered-lift weighing more than 12,500 pounds would be required to meet

¹¹ E.g., see: Airworthiness Criteria: Special Class Airworthiness Criteria for the Joby Aero, Inc. Model JAS4-1 Powered-Lift, 87 FR 67399 (Nov. 8, 2022); 89 FR 17230 (March 8, 2024). Alternatively, the FAA may designate acceptable airworthiness criteria as the certification basis for powered-lift by publishing a future advisory circular (AC), as the agency has done for airships (AC 21.17-1A, *Type Certification—Airships*, dated Sept. 25, 1992), gliders (AC 21.17-2A, *Type Certification—Fixed Wing Gliders (Sailplanes), Including Powered Gliders*, dated Feb. 10, 1993), and very light airplanes (AC 21.17-3, *Type Certification of Very Light Airplanes Under FAR 21.17(b)*, dated Dec. 21, 1992).

certain operating regulations that currently apply to large transport category airplanes. The FAA also stated that this specific weight point would be an appropriate weight at which to apply certain transport category certification standards when type certifying powered-lift under § 21.17(b). The FAA further requested comments on whether the public believes there is a more appropriate weight at which to apply transport category regulations to powered-lift.

Two commenters generally supported the FAA’s proposed approach for type certification. HAI commented that older powered-lift designs are significantly different from those proposed by recent applicants and supported the FAA’s intended use of § 21.17(b) for the type certification of unique and novel designs. The commenter also recommended collecting information during the certification process of novel AAM aircraft before requiring type ratings for each make and model. SAE International generally supported the FAA’s intended use of performance-based regulations for powered-lift type certification airworthiness criteria.

An individual commenter highlighted specific concerns regarding powered-lift type certification and recommended that the FAA consider the unique aspects of each design when developing the type certification requirements. The commenter highlighted the need to consider all the various flight-mode unique aspects and that the regulations should focus on control law development instead of prescribing specific regulations based on specific design configurations. The commenter also identified technical areas that the FAA should consider when developing powered-lift airworthiness criteria. The FAA agrees that the novel aspects of powered-lift require an alternate approach to existing prescriptive airworthiness standards for airplanes and rotorcraft, which is why the FAA expects to largely employ performance-based airworthiness criteria. The FAA also agrees that the novel features identified by the commenter require evaluation during powered-lift type certification; however, this is beyond the scope of this SFAR and will instead be covered in each powered-lift airworthiness criteria publication.

An individual commenter requested clarification as to how the FAA would determine which airworthiness standards would be appropriate for use in the type certification of powered-lift and what criteria would be used to make this decision.

As described in the NPRM, when conducting the evaluation for determining an equivalent level of safety to existing standards, the FAA will consider the powered-lift's specific type design features (aircraft's size, passenger seating configuration, performance, etc.) and evaluate them against the applicable airworthiness requirements contained in parts 23, 25, 27, 29, 33, and 35. In addition, certain transport category (*i.e.*, 14 CFR parts 25 and 29) certification standards will be appropriate for powered-lift weighing more than 12,500 pounds.

EASA noted discrepancies in the type certification section of the NPRM. EASA stated that while the NPRM stated that no changes to type certification requirements were proposed, the FAA has separately published airworthiness criteria for two companies that propose changes to part 23 requirements and establish new requirements.

To clarify the FAA's statement in the NPRM regarding no new/changed type certification requirements, the FAA noted that the existing regulatory structure in 14 CFR part 21 already provides the means by which powered-lift can receive a type certificate. Specifically, § 21.17(b) provides for the

ability to type certificate powered-lift as a special class aircraft. As stated in the NPRM, under § 21.17(b), the FAA designates the applicable airworthiness requirements, which may include requirements from the existing airworthiness standards applicable to normal category and transport category airplanes, normal category and transport category rotorcraft, aircraft engines and propellers (parts 23, 25, 27, 29, 33, and 35), and it may also include unique airworthiness criteria developed specifically for the individual product.

Alakai Technologies Corporation stated the proposed entrants into the AAM industry include "special class rotorcraft"¹² and powered-lift, both of which would be type certificated under § 21.17(b). However, the commenter noted the proposed rule provides a framework for airman certification and operation only for powered-lift, and not for special class rotorcraft. The commenter contended that without providing a framework for airman certification and operation for special class rotorcraft, special class rotorcraft will be prohibited from operating in the NAS, thereby limiting the market to powered-lift special class aircraft AAM technology.

The commenter referred to a developing policy the FAA has not yet finalized that would designate certain rotorcraft as "special class rotorcraft." Although special class rotorcraft would be type certificated under the special class process in § 21.17(b), they still meet the regulatory definition of a rotorcraft in § 1.1. As such, special class rotorcraft would fall under the operating and airmen rules for rotorcraft (helicopter) in parts 61, 91, 135, etc. and would not need the same accommodations that were necessary for powered-lift. The FAA determined that the inclusion of special class rotorcraft in this SFAR was not needed for enabling those aircraft and that including special class rotorcraft is beyond the scope of this rulemaking to enable powered-lift.

¹² "Special class rotorcraft" are rotorcraft, as defined in § 1.1, that meet three or more of the following criteria: (1) for its support in flight, the rotorcraft depends principally on the lift generated by three or more rotors and creates directional control by varying the power at each rotor; (2) the rotorcraft utilizes electric or hybrid-electric propulsion; (3) the rotorcraft's design includes an advanced flight control system (*e.g.*, a fly-by-wire flight control system) that uses electronically operated controls such that the pilot has no direct mechanical link to the control surfaces or swashplate; and (4) the rotorcraft is not capable of traditional autorotation, but instead provides an alternate method of safe landing following loss of engine power. See *definition of rotorcraft in 1.1 and FAA Policy Statement PS-AIR 21.17-02*.

EASA asked how the FAA would consider operational alleviations for these type-certificated aircraft in the context of AAM. The FAA reviewed the SFAR language to determine where operational alleviations could be provided for powered-lift that meet certain performance criteria and made changes to the minimum safe altitude, visibility, and fuel reserves requirements. These accommodations are addressed within the respective sections of this preamble for each rule as applicable for powered-lift.

Vertical Aerospace Group commented that powered-lift should be built to the highest safety standards and that the combination of complex aircraft systems and complex commercial operating environment require a design safety target of 10⁻⁹ and Design Assurance Level (DAL) A for systems, software, and complex hardware, with respect to failure conditions classified as catastrophic. Additionally, the commenter requested the FAA provide details on what transport category airworthiness criteria would be used for powered-lift, including crashworthiness, gust loads, wind speeds, and performance criteria.

Currently, airplanes and rotorcraft type certificated in the normal category are permitted to perform commercial operations transporting passengers without meeting the more stringent transport category design requirements. As stated in the NPRM, for powered-lift, which are type certificated under § 21.17(b), the safety targets for each product are based on meeting an equivalent level of safety to the existing airworthiness standards. Rather than establishing a rigid "one size fits all" safety target or DAL for all powered-lift, which will be used in varied types of operations, the FAA separately considers each aircraft's unique design characteristics to ensure the selected airworthiness criteria are appropriate to the design, intended operations, and safety. The FAA will publish the proposed airworthiness criteria for each powered-lift, including an explanation of its equivalency determination, in the **Federal Register** for public notice and comment before issuing final airworthiness criteria.

ALPA responded to the FAA's request for comments on applying transport category regulations to large powered-lift, those weighing more than 12,500 pounds. ALPA disagreed with the FAA's proposal to use 12,500 pounds as the weight threshold for large powered-lift because ALPA asserted this cutoff is arbitrarily based on historical aircraft safety records that are not relevant to new aircraft being proposed in the

powered-lift industry. ALPA recommended that 7,500 pounds would be more appropriate for first-generation powered-lift, noting that this would allow the FAA to apply more appropriate sections of existing parts 135 and 136 to the majority of the first-generation powered-lift.

The FAA disagrees with the ALPA recommendation that 7,500 pounds should be used instead of 12,500 pounds as the weight at which transport category airworthiness standards would be appropriate. The FAA has determined that 12,500 pounds provides the appropriate level of safety and places the weight threshold between the weight limits for transport category airplanes and transport category rotorcraft.¹³ Imposing part 25/29 airworthiness requirements on powered-lift weighing 12,500 pounds or less would decrease the useful payload of the powered-lift and increase the cost of type certification.

XTI said that, in addition to wing-borne flight and vertical lift, some powered-lift will also operate in an intermediate configuration utilizing vectored thrust and wing-borne flight during takeoff and landing. This short takeoff and landing (STOL) mode, the commenter said, provides significant performance benefits and improves ranges. XTI requested clarification whether required runway distances would be calculated differently for powered-lift operating in STOL mode than the required distances for fully wing-borne flight.

The method by which the required runway distance is calculated would be the same for powered-lift and conventional takeoff and landing aircraft; however, the distance for powered-lift would be shorter. The specific configuration for takeoff and landing would need to be defined in the flight manual along with the respective takeoff and landing performance for those configurations. However, the particular details in calculating runway distances for a certain powered-lift are beyond the scope of this SFAR.

A helicopter pilot recommended that the FAA review its bird strike certification procedures when certifying powered-lift. The commenter cited concerns that powered-lift will be more prone to bird strikes than helicopters given they operate at lower altitudes and environments prone to more bird

¹³ The NPRM included a typographical error that identified the normal category weight limits for rotorcraft and airplanes as 7,500 lbs. and 19,500 lbs., respectively. The correct weight limits for those airworthiness standards are 7,000 lbs. and 19,000 lbs., respectively.

activity, generate less noise and rotor downwash that would normally keep birds away, and may travel at faster speeds. The commenter suggested powered-lift test pilots should use their experience to recommend methods of bird strike avoidance through training, emergency procedures, and system designs like detect-and-avoid systems.

The commenter's recommendations are beyond the scope of this SFAR. However, the agency notes that, to date, the FAA has included bird strike protection requirements in the proposed airworthiness criteria for the first three powered-lift applicants the agency has published for notice and comment under § 21.17(b).¹⁴

The remaining comments on type certification requested clarification on language used in the NPRM preamble or specific information on the type certification process or specific safety objectives required during type certification. These comments are beyond the scope of this rulemaking. As stated previously, the specific airworthiness criteria for each powered-lift project will be published in the **Federal Register** for public notice and comment.

B. Noise Certification

The FAA did not propose any new requirements for the noise certification of powered-lift. The FAA is mandated to establish noise standards and regulations that ensure public safety regarding aircraft noise. Recent advancements in electric motors and control systems have led manufacturers to develop novel aircraft that differ significantly from conventional ones covered by existing noise certification standards. The FAA will examine each application and determine whether the existing part 36 requirements are appropriate as a noise certification basis, as it does for all noise certification applicants. If the FAA determines that the part 36 rules are not sufficient for a particular powered-lift, the FAA may create rules of particular applicability for that powered-lift. Due to potentially diverse designs of these aircraft and limited data on their noise signatures, the FAA has not yet established broad noise standards for all powered-lift. However, powered-lift that are tilt-rotors

¹⁴ See Airworthiness Criteria: Special Class Airworthiness Criteria for the Joby Aero, Inc. Model JAS4-1 Powered-Lift, 87 FR 67399 (Nov. 8, 2022); Airworthiness Criteria: Special Class Airworthiness Criteria for the Archer Aviation Inc. Model M001 Powered-Lift, 87 FR 77749 (Dec. 20, 2022); Airworthiness Criteria: Special Class Airworthiness Criteria for the AgustaWestland Philadelphia Corporation Model AW609 Powered-Lift, 88 FR 37805 (June 9, 2023).

are currently subject to the noise regulations of appendix K of part 36.

If a manufacturer seeks certification for a powered-lift which could not be certificated using appendix K of part 36, the FAA would propose amending the SFAR to include operating noise limits in subpart I of part 91, which would be applicable to that powered-lift.¹⁵

HAI said that the certification process could reveal that AAM vehicles emit less noise than traditional aircraft, referencing the GAO report cited in the NPRM.¹⁶ HAI said that current standards may need adjustment but that the certification process should reveal any requirements and inform future rulemaking in this area. The FAA contemplated the need for future rulemaking in the NPRM. Rather than use the existing requirements for small propeller airplanes, jet transport airplanes, helicopters, or tiltrotors in part 36, such diverse conceptual designs and new aircraft types may require tailored noise certification requirements. As stated in the NPRM, the FAA will examine each application and determine whether existing part 36 requirements are appropriate as a noise certification basis, as it does for all noise certification applicants. If the current regulations cannot be applied appropriately, the FAA may promulgate a rule of particular applicability to establish a noise certification basis for these new aircraft designs. The noise sources from these aircraft have been shown to be complex, and the FAA does not yet have sufficient data on the aircraft types and noise signatures expected from these new entrants. Accordingly, until sufficient data are collected, the FAA would not be able to promulgate standards of general applicability for these aircraft.

C. Qualification of Powered-Lift Flight Simulation Training Devices (FSTDs)

Part 60 prescribes the rules governing the initial and continuing qualification of all aircraft FSTDs, which includes full flight simulators (FFS) and flight training devices (FTDs)¹⁷ used to meet the training, evaluation, or flight experience requirements for flightcrew member certification or qualification. In accordance with § 60.15, the FAA qualifies each FSTD at a specific level

¹⁵ Appendix K to part 36 outlines noise requirements for tiltrotors utilized by a powered-lift. The FAA notes that these would be applicable to powered-lift if it is determined during the aircraft certification process.

¹⁶ U.S. Government Accountability Office, GAO-22-105020, Transforming Aviation: Stakeholders Identified Issues to Address for "Advanced Air Mobility", published, May 9, 2022. Publicly released, May 9, 2022.

¹⁷ See 14 CFR 1.1.

if that FSTD meets the applicable Qualification Performance Standards (QPS). The QPS are published in the following appendices to part 60: appendix A for airplane FFSs, appendix B for airplane FTDs, appendix C for helicopter FFSs, appendix D for helicopter FTDs, appendix E for the quality management system for all FSTDs, and appendix F for definitions and abbreviations applicable to part 60. While appendices E and F will apply to powered-lift FSTDs, as discussed in the NPRM, part 60 does not set forth a powered-lift QPS similar to what exists for airplanes and helicopters. As discussed later in this section, the FAA maintains that creation and adoption of a new appendix as a permanent fixture in part 60 is premature given the wide variation of powered-lift and rapid pace of development. Additionally, as discussed in this preamble, one intent of the SFAR is to equip the FAA with operational data to implement future permanent regulations, to include that data necessary to develop a powered-lift QPS in the future.

In general, FSTDs qualified under part 60 are typically used to replace an aircraft for required air carrier or pilot certification training and proficiency checking. Because FSTDs are used for applications such as air carrier training and type rating training, detailed validation requirements are defined in the part 60 QPS to ensure that the FSTD performs equivalently to a specific make, model, and series of aircraft. Depending upon the qualification level of the FSTD, it may completely replace an aircraft for all training and proficiency checking events. As mentioned by one commenter who recommended caution on the use of simulators to replace an aircraft due to the ability to replicate complex aerodynamic environments, the FAA notes that rigorous objective validation requirements are applied to ensure the FSTDs perform equivalently to the aircraft in similar training and proficiency checking events. These validation requirements cover a wide range of training tasks, including takeoff, landing, hovering/low speed operations, and various other flight maneuvers that are required for pilot training and qualification. As described in the NPRM, the qualification of powered-lift FSTDs would be validated similarly in an objective manner to ensure the FSTD performs equivalently to the aircraft in required training and checking events.

Therefore, the FAA proposed the addition of new requirements in § 194.105 of the SFAR to enable the qualification of powered-lift FSTDs. The

FAA contended that § 194.105 would function to add flexibility to part 60 in proposed § 194.105 to permit qualification of FSTDs of powered-lift using components of existing standards for airplanes and helicopters in appendices A through D to part 60, where applicable and as determined by the FAA, that would provide an equivalent level of safety to existing QPS components. As written in the NPRM, the proposal was intended to follow the established process in § 21.17(b) for the certification of special classes of aircraft. This addition facilitates the FSTD qualification process by enabling FSTD sponsors to propose FSTD qualification standards where the current standards do not apply to new and novel aircraft designs. Particularly with objective validation testing, the ability to propose alternate testing methods is necessary to fully evaluate the FSTD's capability to provide pilot training for powered-lift.

The FAA received several comments on the proposed FSTD qualification process, to which it responds in the subsequent sections, and FAA adopts the rule text as proposed.

1. Publication of Proposed FSTD Standards

Several commenters noted the urgency to enable a means to ensure safety and efficiency of FSTDs. Specifically, several commenters disagreed with publication of the proposed powered-lift standards to the **Federal Register** for notice and comment. The primary concern was that adding a notice and comment process would introduce an unnecessary delay in approving such standards and qualifying FSTDs. Commenters suggested alternatives such as: expediting an independent SFAR consisting only of a powered-lift QPS for part 60; creating an alternate means of compliance for interim certification; allowing FAA principal operations inspectors (POIs) to approve FSTDs for use within the training organization they oversee; developing an expert panel with approving authority who would conduct a technical review; and providing notice and an opportunity to comment only for the first QPS, then utilizing it as a baseline for future QPSs absent **Federal Register** publication.

As discussed in the NPRM, the requirements proposed in § 194.105 will follow similar processes that are used to certify special classes of aircraft. The FAA understands commenters' concerns regarding the potential for delays; FAA is not required to, and does not plan to, adhere to all of the requirements for issuing generally applicable rules. The

notice and comment process for a project of this nature, a rule of particular applicability, does not necessitate a full regulatory impact analysis or going through the same level of review as a rule of general applicability. Rather, the FAA anticipates working closely and directly with the FSTD sponsor and manufacturer to develop the QPS, after which the FAA would announce the availability of, and request comment on, the proposed QPS. FAA would solicit comment for a shorter timeframe than it typically does for a generally applicable rule, consistent with the time required to complete the comment consideration and adjudication process for the certification of special classes of aircraft. Additionally, the FAA does not intend to publish every proposed QPS for those FSTDs/QPS that have already been published. In other words, the FAA intends to leverage precedent for similarly situated FSTDs. For example, if Sponsor A qualified FSTD A under § 194.105 (after notice, comment, and comment adjudication), and FSTD A was identical to FSTD B that Sponsor B wished to qualify, the FAA would apply FSTD A's QPS without public notice and comment, but after providing Sponsor B notice of the QPS and an opportunity to comment.

To effectuate this process, while also recognizing there are instances (like the previously described scenario) where the FAA will find it unnecessary to provide public notice and seek comment, the FAA adopts a new paragraph in § 194.105. Specifically, § 194.105 as it was proposed will be designated as paragraph (a), and new paragraph (b) will set forth the FAA's intent to publish proposed QPSs in the **Federal Register** for comment. Additionally, paragraphs (b)(1) and (2) will acknowledge that the FAA may find public notice and comment to be unnecessary in certain circumstances. The FAA finds this regulatory approach will address commenters concerns with timeliness in publication where extenuating circumstances exist and when similar simulators seek to enter into service.

The FAA anticipates that much of the existing FSTD standards in appendix A through appendix D to part 60 are applicable to powered-lift FSTDs with minor changes, including current general requirements, functions and subjective requirements, and certain cueing requirements for airplane and helicopter FSTDs. Additionally, portions of existing validation testing requirements may potentially be applied to powered-lift with adjustments of testing maneuvers, modification of applicable parameters, and the addition

of testing conditions to cover unique aircraft characteristics and associated training requirements. The FAA already maintains a framework for adjudication of special class airworthiness comments and intends to leverage that existing framework in the adjudication of comments after QPS notice.

While the FAA acknowledges that the notice and comment process may introduce some administrative burden and time delays, the transparent process and public participation benefits both the industry and the FAA. First, as previously mentioned, the FAA intends to use the SFAR to inform a permanent rulemaking to part 60 (*i.e.*, likely the addition of appendices to part 60 for powered-lift FFS and FTD QPSs). By treating QPSs under the same framework as special classes of aircraft, the FAA foresees the accumulation of requisite information to propose the most appropriate permanent amendment to part 60. This information may stem from industry, sponsors, FAA inspectors and subject matter experts, and the general public; public notice provides an efficient and familiar platform for such input. The FAA recognizes that public commenters may have limited technical and proprietary information on the design of these new and novel aircraft designs but maintains the benefit of improving efficiency over time for new aircraft entry into the NAS. Additionally, the nature of public notice, adjudication of comments, and issuance of final QPS will establish precedent whereby interested stakeholders will be able to view past approved proposals and base future proposals upon them. Rather than addressing multiple individual proposals in a non-transparent manner through a deviation process, the FAA anticipates that the public notice and comment process could have a converging effect on the powered-lift FSTD standards over time.

The FAA considered the various alternatives suggested by commenters. First, the creation of fixed QPS standards to part 60 through a permanent generally applicable rulemaking or through an expedited SFAR is premature given the lack of any certificated powered-lift and presentation of any powered-lift FSTD to the FAA. Primarily, the FAA lacks requisite information to develop a universal FSTD QPS applicable to the array of unique configurations of powered-lift. The SFAR approach facilitates a flexible and transparent process tailored to the specific powered-lift FSTD. The information and expertise accumulated during the pendency of the SFAR will position the

FAA and its industry counterparts in a more conducive position to future permanent regulations. Furthermore, under the SFAR public comment process, feedback from the well-established airplane and helicopter simulation and training industry and other interested parties can be leveraged in proposed powered-lift FSTD standards to incorporate past lessons learned in utilizing simulation to improve simulator fidelity, pilot training, and, ultimately, aviation safety.

Next, while POIs already approve the use of FSTDs for training,¹⁸ their responsibilities do not extend to the base qualification of the simulator. Rather, the Training and Simulation Group within the FAA's Office of Safety Standards is the office of primary responsibility for FSTD qualification and certification. The FAA Training and Simulation Group is comprised of aeronautical engineers, aviation safety inspectors, and analysts who specialize in the highly technical qualification activities for FSTDs. This existing branch and process resembles one commenter's suggestion to convene an expert panel with approving authority. Conversely, POIs and training center program managers (TCPM) maintain expertise in ensuring certificate holders apply appropriate regulations, policies, and procedures pertaining to use of the FSTD for training rather than the evaluation, approval, and oversight of QPS specifications. Where the Training and Simulation Group qualifies and assigns a specific level of qualification to the FSTD, the POI approves the FSTD for use by a certificate holder for a specific maneuver, procedure, or crewmember function. Due to the differing functions, training, and experience of the persons performing these separate job responsibilities, the FAA declines to expand POI responsibilities to include FSTD qualification as they do not have the specialized expertise required for such a duty.

The FAA comprehensively addresses alternate means of compliance and interim certification in subsequent sections.

2. Use of Deviation Authority

Several commenters stated that the FAA could incorporate powered-lift into part 60 through the already-existing mechanism of deviation authority set forth in § 60.15(c)(5). These commenters explained that the FAA erroneously excluded deviation authority as an option, indicating that § 60.1 gives the Administrator authority to designate an

appendix as applicable to a powered-lift and then to utilize deviation authority to amend that designation. Other commenters, such as GAMA, expressed concern that the FAA had previously approved part 60 deviations for FSTD projects, and the new proposed process could result in regulatory risk and might delay these projects.

The FAA acknowledges that some commenters believe there already exists a path to powered-lift FSTD qualification through part 60 deviation authority. However, the NPRM preamble explained why § 60.15(c)(5) deviation authority is inapplicable; the FAA maintains this position. Section 60.15(c)(5) states that an FSTD sponsor or manufacturer may submit a request for approval of a deviation from the QPS requirements as defined in appendices A through D to part 60. Thus, the deviation authority is explicitly applicable to the already existing appendices for airplanes and helicopters only. To further support this narrowly scoped authority, as explained in the preamble to the final rule adopting § 60.15(c)(5), the FAA added deviation authority to allow for FSTD sponsors to deviate from technical requirements in the part 60 QPS.¹⁹ Deviation may only be considered from minimum requirements tables, objective testing tables, the functions and subjecting testing tables, and other supporting tables and requirements in the part 60 QPS.²⁰ Therefore, the deviation authority was never intended to be utilized to create a brand new QPS for a new class of aircraft, nor does the plain language of the regulation support such a use. Rather, deviation authority in § 60.15(c)(5) is utilized for those unique instances where novel airplane or rotorcraft characteristics do not precisely fit within the common and technical criteria set forth in the respective appendices or where a published FSTD standard, such as ICAO Document 9625,²¹ may be substituted for the part 60 QPS.

Commenters are correct in noting that the FAA previously issued a deviation in accordance with § 60.15(c)(5) for a powered-lift FSTD. Specifically, the FAA approved one deviation for a set of powered-lift FSTD standards under § 60.15(c)(5) in 2018; however, an FSTD has not yet been qualified under this

¹⁹ *Flight Simulation Training Device Qualification Standards for Extended Envelope and Adverse Weather Event Training Tasks* final rule, 81 FR 18178 (Mar. 30, 2016); corrected at 81 FR 32016 (May 20, 2016).

²⁰ § 60.15(c)(5)(ii).

²¹ *Manual of Criteria for the Qualification of Flight Simulation Training Devices—Volume I—Aeroplanes* (9625–1).

¹⁸ FAA Order 8900.1, Vol 3, Ch. 54, Sec. 5.

approved deviation. While the FAA has since determined that the deviation authority is not the appropriate mechanism to approve FSTD standards for powered-lift, the FAA intends to work directly with that operator to facilitate FSTD qualification under this adopted process.²²

The FAA acknowledges that the adopted SFAR process may result in less timely decision-making by the FAA as compared to using a deviation process without public notice and comment. However, what commenters are proposing would essentially be establishing new standards, because the existing appendices are not appropriate for these new FSTDs. The establishment of new standards must comply with the informal rulemaking requirements of the Administrative Procedure Act. In addition, the FAA believes that public input will provide value in helping to ensure the safe and efficient integration of powered-lift into the NAS and that this regulatory approach is designed to be as broad and open to innovation as possible without sacrificing safety and effectiveness.

3. Interim FSTD Qualification

Lilium, CAE, NBAA, and others commented on the need for an interim FSTD qualification process for powered-lift FSTDs and advocated for the use of engineering/predicted data to support FSTD qualification. Some commenters urged the FAA to accept the engineering simulations and predicted engineering data from aircraft OEMs to expedite an interim qualification process.

Part 60 supports interim FSTD qualifications, which would be equally applicable in the case of a powered-lift FSTD. Specifically, § 60.21 sets forth the requirements for the interim qualification of FSTDs for new aircraft types or models and requires the sponsor to provide: (1) the aircraft manufacturer's data consisting of at least predicted data validated by a limited set of flight test data, (2) the aircraft manufacturer's description of the prediction methodology used to develop the predicted data, and (3) the Qualification Test Guide test results.²³ Because this regulation applies to all aircraft, interim qualification is an available option to powered-lift FSTDs even within the alternate qualification

framework set forth in the SFAR. As discussed in the NPRM preamble that adopted § 60.21, the intent of interim qualification is to facilitate training before final flight test data is available so the operator can put the aircraft into service swiftly, while maintaining necessary safety standards.²⁴ The regulation enables the use of the aforementioned predictive and/or engineering data that meets the reliability parameters set forth in § 60.21(a) to support interim FSTD qualification and properly trained flightcrew in accordance with FAA pilot training and qualification standards. The FAA notes that engineering simulation and predicted engineering data may be accepted for airplanes and helicopters as an alternative to flight test data in accordance with appendices A and C to part 60; however, this concept is not succinctly applicable to powered-lift interim qualification because powered-lift and their corresponding FSTDs are new and novel entrants into the aviation market.

Established practice and additional regulatory requirements in airplane and helicopter QPS clearly require the applicant to demonstrate past success by providing such data to support FSTD qualification.²⁵ While the SFAR utilizes a non-traditional mechanism of QPS formation, establishing past success at providing predictive data that will support FSTD qualification continues to be a necessary deliverable for interim qualification so pilots will be adequately trained and checked in an interim qualified FSTD. Particularly with new and emerging aircraft designs, the FAA anticipates significant challenges with establishing past success in predicting the behavior of these aircraft for the purposes of developing real-time simulation models for pilot training.

In sum, new § 194.105 does not prohibit a sponsor or manufacturer from pursuing interim qualification of an FSTD. The interim qualification requirements of § 60.21 apply to all aircraft, including powered-lift. While the FAA predicts challenges in the accumulation of powered-lift FSTD flight test data sufficient to meet the requirements for interim qualification, if

a sponsor or manufacturer could meet the standard as set forth in § 60.21(a), the SFAR does not foreclose interim qualification.

4. Emerging Technological Advances in FSTDs

Several commenters, including AWPC, CAE, Vertical Flight Society, Advanced Air Mobility Institute, and GAMA, stated that the FAA must consider new and innovative simulation technologies, such as virtual reality (VR), extended reality (XR), and mixed reality (MR) systems. The commenters emphasized that these technologies provide opportunities for safe, immersive training, as well as offer the potential to significantly reduce the hardware footprint of an FSTD flightdeck and visual system. Additionally, the commenters stated that integrating new and novel technology would reduce associated material cost to the operator. These commenters urged the FAA to update part 60 to account for novel technology, use "acceptability" standards to account for novel technology, or use § 61.4(c) to approve the novel devices that provide comparable fidelity and representation. The Advanced Air Mobility Institute recommended collaborating with the U.S. Armed Forces to understand their training regime, which includes desktop avionics trainers, mixed reality part-task trainer, and common software flight training devices. ALPA further commented that virtual reality and mixed reality technologies should only be used after qualification standards have been established and should not replace the in-aircraft training or minimum FFS used.

The FAA acknowledges the potential benefit of immersive simulation technologies like virtual reality, extended reality, and mixed reality in improving FSTD quality and reducing the overall cost of simulation for pilot training. In addition to powered-lift FSTDs, the use of immersive simulation technologies is an issue currently being addressed by the FAA under existing airplane and helicopter standards. The FAA is actively working toward encompassing these tools into the qualification regime for all aircraft, not just powered-lift. Because the current part 60 standards do not specifically address immersive technologies, such as virtual reality systems, the FAA recognizes the need to facilitate these technologies. Additionally, while the current part 60 standards do not yet address the use of such immersive technologies for FSTDs, this does not necessarily prevent an operator or training provider from using such

²² The FAA notes that commenters' concerns regarding regulatory risk did not include the specific regulations where risk would exist. As stated, the FAA intends to work directly with the operator issued a deviation in light of this final rule to avoid any noncompliance issues.

²³ Appendix F to part 60 defines the following terms: flight test data, predicted data, and qualified test guide.

²⁴ *Flight Simulation Device Initial and Continuing Qualification* NPRM, 67 FR 60284 (Sept. 25, 2002).

²⁵ *E.g.*, ". . . based on acceptable aeronautical principles with proven success history and valid outcomes for aerodynamics, engine operations, avionics operations, flight control applications, or ground handling," appendix A to part 60, Attachment 2, paragraphs 8 (Additional information about flight simulator qualification for new or derivative airplanes) and 9 (Engineering Simulator—Validation Data). See similar language in appendix C, Attachment 2, Paragraph 9.

technologies for training that does not require the use of an FSTD, such as for classroom instruction or providing flightdeck familiarization training to prepare students for formal flight training.

The FAA notes, however, a survey of past research work on virtual reality systems as applied to pilot training simulators has shown instances of significant degradation of pilot performance and increased simulation sickness in virtual reality-equipped simulators.²⁶ The FAA must understand the effectiveness, benefits, and shortcomings of these systems in conducting pilot training and evaluation before memorializing FSTD qualification with such systems in part 60, not just for powered-lift, but for any aircraft. The FAA recognizes that the aforementioned study likely does not represent the state of the art in virtual reality systems and that additional study on the latest advancements is needed. To inform future policy decisions and potential rulemaking, the FAA recently initiated an immersive simulation research study²⁷ to examine, for example, human factors, potential use cases, and technical standards for virtual reality and other systems. Currently, the FAA is engaging with sponsors and manufacturers to work toward qualification of lower-level helicopter FSTDs with virtual reality systems, as well as maintaining awareness of EASA's recent FSTD qualification with a virtual reality system.²⁸ In sum, the FAA remains committed to staying apprised of new and novel technology that serves as a benefit in pilot training and preparation.

Further, the QPS process adopted by this final rule will not prohibit a manufacturer or sponsor from proposing a QPS that includes new and novel technologies. For powered-lift FSTDs, applicants may propose the use of virtual reality systems under the SFAR process, similar to how airplane and helicopter FSTD manufacturers may propose, use, or require a deviation to facilitate these systems within their airplane or helicopter FSTD. Because

²⁶ E.g., Oberhauser, M., Dreyer, D., Braunstingl, R., & Koglbauer, I. (2018). "What's real about virtual reality flight simulation? Comparing the fidelity of a virtual reality with a conventional flight simulation environment." *Aviation Psychology and Applied Human Factors*, 8(1), 22–34.

²⁷ The FAA's Tech Center Acquisition & Grants Division in the Office of Finance and Management published an RFI to complete a feasibility assessment and to develop the requirements for Immersive Flight Simulation CRADA(s) on December 14, 2022. See *Government RFI for Immersive Flight Simulation Cooperative Research and Development Agreement*, available at SAM.gov.

²⁸ www.easa.europa.eu/en/downloads/137723/en.

the FAA has well-established standards for conventional simulation in appendices A through D to part 60, the applicant must include sufficient supporting data and justification that the virtual reality-equipped FSTD can satisfactorily provide relevant fidelity to an equivalent level or better than that of a conventional FSTD at the same qualification level to facilitate satisfactory pilot training and checking. In developing this justification, piloted experiments comparing performance, workload, simulation sickness, and transfer of training between a virtual reality FSTD and a conventional FSTD acceptable to the FAA should be considered.

5. Use of Consensus Standards

SAE International and CAE both urged the FAA to recognize consensus standards for powered-lift FSTDs when published. As discussed in the NPRM, the FAA intends to consider consensus standards during the qualification of powered-lift FSTDs under part 60. The FAA is aware of, and participates in, certain consensus standards subcommittees tasked with examining FSTD qualification standards for powered-lift. At the time of the publication of the NPRM, no publicly available consensus standards existed to reference; therefore, the FAA declined to include them as a compulsory basis for qualification. However, under the SFAR process, an applicant may propose the use of an industry consensus standard to support the qualification of a powered-lift FSTD.

While the FAA intends to leverage consensus standards as efficiently as possible for both industry and the FAA, the broad array of powered-lift features and inability to identify similar operating characteristics²⁹ render a universal approval akin to part 23 consensus standards challenging. However, the FAA intends to review proposed consensus standards for approval and determine the application of any necessary conditions or limitations upon availability. Because the FAA does not currently have a proposed consensus standard to review, consideration on the applicability of a future consensus standard will likely initially be made on a project-by-project basis. If a proprietary consensus standard is submitted for consideration, the FAA would not publish this standard in full to the **Federal Register** but would publish a summary of the proposed action and any applicable

²⁹ See section V.A.

differences or conditions and limitations.

6. Levels of FSTD Qualification

Archer, CAE, VFS, and others commented that there will be a need for FSTDs other than a Level C or higher FFS. The FAA agrees that many levels of FSTDs are currently necessary and available for both airplane and helicopter pilot training, and there will likely be a similar need for additional FSTD levels for powered-lift pilot training. For FSTD qualification purposes, § 194.105 will not limit FSTD qualification to only Level C FFS and above.³⁰ Under the FSTD qualification process in the SFAR, an applicant may propose standards for any FSTD qualification level in part 60 using the standards in appendices A through D to part 60 as a baseline. Where an applicant proposes unique FSTD configurations that are not consistent with established part 60 FSTD appendices, such as with virtual reality-equipped FSTDs or alternative motion platform, the sponsor or manufacturer must provide justification and supporting data demonstrating the capability of the FSTD to conduct approved pilot training and evaluation at the requisite level of qualification sought.

V. Certification of Powered-Lift Pilots

As outlined in the Executive Summary, the introduction of powered-lift as a new category of civil aircraft creates unique challenges for pilot training and certification, particularly when considering the lack of available certificated powered-lift in which a flight instructor would conduct flight training and the difficulty in obtaining flight training itself due to a lack of qualified flight instructors.

To address these barriers, the FAA finalizes alternate aeronautical experience requirements and expanded logging provisions, in section V.F. of this preamble. Additionally, section V.F.6. of this preamble provides tables summarizing the requirements for pilot certification to facilitate readability of the alternate experience and logging provisions.

A. Establish a Type Rating Requirement for Persons Seeking To Act as PIC of Powered-Lift

Part 61 prescribes the requirements for issuing pilot and flight instructor certificates and ratings, the conditions under which those certificates and ratings are necessary, and the privileges and limitations of those certificates and

³⁰ See Section IV.C.6.

ratings.³¹ The FAA issues six levels of pilot certificates (student, sport, recreational, private, commercial, and ATP) and assigns category, class, and type ratings on each pilot certificate.³² To act as PIC of any aircraft, a person must hold the category, class, and type rating (if class and type are applicable) on their pilot certificate.³³ Part 61 sets forth the requirements (*e.g.*, aeronautical experience, practical test) to obtain such certificates and ratings.

Part 1 of 14 CFR, which provides definitions and abbreviations for Title 14, defines category and class for the purposes of airman ratings. Specifically, “category” is defined as a broad classification of aircraft (*e.g.*, airplane, rotorcraft, powered-lift), while “class” is defined as a group of aircraft within a category having similar operating characteristics (*e.g.*, single engine, multiengine, helicopter).³⁴

In 1997, when the FAA established the powered-lift category in part 61, the FAA declined to create powered-lift classes or require type ratings for powered-lift beyond those established in § 61.31(a) (*i.e.*, large aircraft or as specified by the Administrator under aircraft type certificate procedures).³⁵

During the development of the NPRM, the FAA reconsidered whether (1) classes of powered-lift could be established and (2) type ratings should be required. In this final rule, the FAA maintains its position on the infeasibility of establishing powered-lift classes at this time and adopts the requirement for the PIC of a powered-lift to hold a type rating on their pilot certificate. This section briefly discusses the amendment and responds to comments.

Currently, pursuant to § 61.31(a), a person must hold a type rating to act as PIC of (1) a large aircraft³⁶ (except lighter-than-air), (2) a turbojet-powered airplane, and (3) other aircraft as specified by the Administrator through aircraft type certificate procedures.³⁷ To

obtain a type rating, a person must receive aircraft-specific training and pass a practical test in the aircraft for the type rating sought.³⁸ Currently, the FAA’s regulatory framework in part 61 allows for the issuance of a powered-lift category rating on a pilot certificate and does not specifically require a type rating to act as PIC of a powered-lift operation (unless a powered-lift specifically meets one of the parameters in § 61.31(a)).

In the NPRM, the FAA extensively discussed the lack of commonality between each design of powered-lift.³⁹ For example, powered-lift types are expected to vary in configuration from tilt-wing, tilt-propeller, lift plus cruise, and tilt plus cruise designs, as well as varying degrees of automation. Further, powered-lift have unique flight and handling qualities managed with indirect flight controls, meaning movement of the inceptor does not directly correlate to the movement of a specific flight control surface.⁴⁰ The divergence of characteristics between powered-lift drives, first, the infeasibility to create classes because there is not a discernable group of similar operating characteristics with which the FAA can create classes at this time. Secondly, it drives the need for specific training and testing in the powered-lift that a PIC intends to operate. Generalized training requirements based on a broad categorization of powered-lift alone would not adequately address the unique characteristics and operating requirements of each individual aircraft.

Therefore, to establish an appropriate level of safety by ensuring persons receive adequate training and are tested on the unique design and operating characteristics of each powered-lift, the FAA proposed to require a person who acts as PIC of a powered-lift to hold a type rating⁴¹ in new § 61.31(a)(3).⁴²

type rating and develop training objectives for the type rating.

³⁸ § 61.63(d), 61.157(b).

³⁹ 88 FR 38946 at 38956 (June 14, 2023).

⁴⁰ For purposes of this preamble, the term “inceptor” refers to a wide variety of non-traditional pilot controls through which pilot inputs are managed for the purpose of operating the powered-lift.

⁴¹ The FSB will evaluate each powered-lift on a case-by-case basis to determine whether the training recommended by the manufacturer will enable the pilot to safely operate the aircraft in the NAS. Additionally, the FSB will identify the unique characteristics of each powered-lift that require special training, which will be documented in the Flight Standardization Board Report (FSBR). Subsequently, these findings are utilized to determine the applicability of tasks within the appropriate powered-lift Airman Certification Standards for training, testing, and checking.

⁴² The FAA also proposed to redesignate current § 61.31(a)(3), which requires a type rating for other

These proposals necessitated conforming amendments within part 61. Section 61.5(b)(7) sets forth the aircraft type ratings that may be placed on a pilot certificate when the applicant satisfactorily accomplishes the training and certification requirements for the rating sought. These type ratings include the aircraft currently identified in § 61.31(a), as well as the SIC pilot type rating for aircraft that are type-certificated for operations with a minimum crew of at least two pilots. The FAA proposed to revise paragraph (b)(7)(iii) to reflect the proposed aircraft type rating for a powered-lift and to redesignate current § 61.5(b)(7)(iii) as new § 61.5(b)(7)(iv). The FAA also determined current § 61.5(b)(7)(iv), which allows for the issuance of a SIC pilot type rating, does not belong under § 61.5(b)(7). Section 61.5(b)(7) contains aircraft type ratings; however, a pilot type rating subject to “SIC Privileges Only” is not an “aircraft” type rating. To more accurately capture the SIC pilot type rating as a pilot rating independent of “aircraft,” the FAA proposed to relocate this provision to stand independently in new § 61.5(b)(9).

Comments in Support of a Type Rating

Several commenters expressed support for the FAA’s proposal to require a type rating for each powered-lift a PIC seeks to operate. AgustaWestland Philadelphia Corporation (AWPC),⁴³ BETA, Lillium, and Joby agreed with the proposed type rating requirement, citing the lack of commonality between powered-lift designs and their diverse capabilities. Likewise, ALPA and A4A endorsed the FAA’s proposed approach to require a type rating to recognize the uniqueness of powered-lift, diversity of aircraft handling characteristics, and operations relative to evolving aircraft designs. ALPA added that some reports list over 500 different designs of powered-lift under manufacturer development and stated that pilots cannot rely on the transferability of skills between powered-lift types. An individual commenter noted that, because powered-lift systems are complex and quite different from one another, pilots should be qualified similarly to jet type ratings, specifically emergency recovery procedures. HAI expressed general support for the type rating requirement at this time but urged a cautious

aircraft specified by the Administrator through aircraft type certificate procedures, as new § 61.31(a)(4).

⁴³ AgustaWestland Philadelphia Corporation is a subsidiary of Leonardo S.p.A Helicopter Division.

³¹ § 61.1(a)(1).

³² § 61.5.

³³ § 61.31(d).

³⁴ § 1.1.

³⁵ Flight Instructor, Ground Instructor, and Pilot School Certification Rules; NPRM, 60 FR 41160 at 41165 (Aug. 11, 1995).

³⁶ Section 1.1 defines “large aircraft” as “aircraft of more than 12,500 pounds, maximum certificated takeoff weight.”

³⁷ As discussed in the NPRM, FSBs are normally established when the responsible FAA Aircraft Certification Office issues a Type Certificate for large aircraft, turbojet powered airplanes, and other aircraft specified by the Administrator through the aircraft certification process (see § 61.31(a)). Powered-lift will be evaluated under the existing FSB process by the Aircraft Evaluation Division, which will determine the requirements for a pilot

approach, as subsequently discussed in this section.

ICAO Recommendation: Powered-Lift Type Rating on Existing Airplane or Rotorcraft Certificate

While these commenters supported a type rating, many supported the type rating framework specifically as recommended by ICAO Annex 1, section 2.1.1.4,⁴⁴ which permits a Licensing Authority to endorse a type rating for aircraft of the powered-lift category on an airplane or helicopter pilot license. Commenters supporting this position included: NATA, CAE, Eve, AWPC, Lilium, BETA, Supernal, the Vertical Flight Society, ADS Group, Vertical Aerospace Group, FlightSafety International, AUVSI, Ferrovial Airports, GAMA,⁴⁵ Joby, NBAA, Aerospace Industries Association, Helicopter Association International, L3Harris, and EASA.

Many commenters supported § 2.1.1.4 on two premises. First, commenters agreed with the premise that all powered-lift are unique enough to require a type rating which renders a category rating unnecessary. Therefore, given the similarity to airplanes and helicopters, commenters stated that removing the powered-lift category rating requirement and fully aligning with § 2.1.1.4 in the simple addition of the powered-lift type rating to an existing airplane or helicopter certificate would maintain an equivalent level of safety to the traditional certification framework. Second, commenters stated that alignment with § 2.1.1.4 would facilitate training and checking in Level C or higher simulators,⁴⁶ which commenters emphasized would standardize training and data collection

⁴⁴ ICAO Annex 1, 14th Ed. (July 2022). ICAO sets forth Section 2.1.1.4 until March 5, 2025.

⁴⁵ GAMA suggested amending part 194 (and revising SFAR references as appropriate) to say that the appropriate category and class for powered-lift is that found by the Administrator to be appropriate, as designated by the type certificate data sheet and FSB report. GAMA noted there was precedent for this approach when the FAA provided relief to Wing from § 135.243 rules with respect to “appropriate category and class ratings” for the operation of its powered-lift unmanned aircraft. See, Exemption No. 18163 issued to Wing Aviation, LLC (Mar. 28, 2019). Since the issuance of Exemption No. 18163 in 2019, the FAA has determined that it erroneously tied having a type certificate to the ability to define the appropriate category, class and type of aircraft. In actuality, the FAA has the ability to determine definitionally under 14 CFR 1.1 what category and class of aircraft it is. Additionally, the FAA notes that unmanned aircraft were not contemplated in the FAA regulations when they were conceived, and that unmanned operations are unique—autonomy, airspace, capability, people on board, etc.—and do not fit into the traditional category and class framework.

⁴⁶ § 61.63(d).

to support continuous training improvement.

ICAO Annex 1 contains a recommended transitional measure in section 2.1.1.4 that permits a licensing authority to endorse a type rating for a powered-lift category on an existing airplane or helicopter category pilot license (*i.e.*, certificate). Application of this optional transitional measure would require the endorsement of the rating on the license to indicate that the aircraft is part of the powered-lift category and the training for the type rating must have been completed during an approved training course incorporating all relevant aspects of operating an aircraft of the powered-lift category, taking previous experience of the applicant into account as appropriate.

Joby stated the FSB operational evaluation process is adaptable within the type rating framework by providing appropriate consideration of new technologies or unique training needs, including special emphasis areas (training requirements) and specific flight characteristics (checking requirements) unique to a type. Supernal said ICAO would add category and class ratings at a later date when such additions could be supported by data. L3Harris posited that once sufficient experience is gathered, the FAA could reevaluate the category requirement and implement permanent rules as needed.

GAMA resubmitted the “GAMA Manufacturer Consensus Recommendations for the FAA’s Powered-Lift Special Federal Aviation Regulation (SFAR)” providing insights from the powered-lift industry to the FAA regarding SFAR regulation.⁴⁷ Participants in the letter highly encouraged the FAA to reconsider the GAMA member consensus initiative aligned with ICAO,⁴⁸ as it promotes adaptability, harmonization with international standards, and

⁴⁷ As noted in the NPRM, on July 21, 2022, GAMA submitted a letter to the FAA providing its recommendations regarding consensus standards for powered-lift. The FAA has placed a copy of this letter in the docket for this rulemaking. On August 17, 2022, the FAA met with GAMA to discuss eVTOL Entry Into Service. The FAA did not take the recommendations contained in the letter or the contents of the meeting into consideration while developing the NPRM. GAMA resubmitted the letter and information related to the listening session to the docket in response to the NPRM. The FAA has incorporated responses throughout this preamble appropriate to the respective subject matter. FAA–2023–1275–0086.

⁴⁸ The FAA interprets GAMA’s broad reference to “ICAO guidance” in their comments, subsequently referenced throughout this preamble, as a reference to ICAO Doc. 10103 and recommendations in the applicable ICAO Annex.

collaboration with other aviation authorities. The commenters supported the ICAO guidance as recognizing that pilot qualification and training shall be based on an aircraft’s capabilities. GAMA further commented that the type rating for powered-lift should be defined in accordance with FAA’s existing Operational Evaluation Board Process in a manner appropriate for each aircraft. In sum, given the global nature of the eVTOL industry, GAMA stated adopting an approach that reflects the ICAO framework is imperative. The Advanced Air Mobility Institute suggested that harmonization and coordination with EASA would reduce bureaucratic hurdles and minimize duplication of efforts. Additionally, the Advanced Air Mobility Institute asserted that through a joint approach, seamless training and certification procedures can be facilitated, leading to enhanced efficiency and benefits for all stakeholders involved.

The FAA first notes that the transitional measure is a recommendation⁴⁹ and not a standard. Under Articles 37 and 38 of the Chicago Convention, the U.S. is required to comply with ICAO standards or notify ICAO of differences. However, because section 2.1.1.4 is a permissive recommendation, the FAA is neither required to comply with the transitional measure nor file a difference with ICAO when deviating from recommended practices.

As discussed in the NPRM, the FAA duly considered implementation of section 2.1.1.4 and declined to disrupt FAA’s traditional airman certification framework by the addition of a type rating within a wholly different aircraft category to an existing certificate with a different category rating. Since 1997, part 61 has included regulations for powered-lift pilot and flight instructor certification. The FAA concedes that those regulations do not adequately address the unique challenges of introducing a new category of aircraft to civil operations; therefore, through this SFAR, the FAA chose to facilitate alternative measures for a pilot to directly receive a powered-lift category rating and a powered-lift type rating. Similar to the conditions set forth in ICAO’s transitional recommendation, these alternative measures to receive a powered-lift category and type rating would be completed during training

⁴⁹ Annex 1 defines Recommended Practices, in pertinent part, as any specification of which the uniform application is recognized as desirable in the interest of safety, regularity, or efficiency of international air navigation, and to which Contracting States will endeavor to conform in accordance with the Convention.

provided under an approved or proposed training curriculum⁵⁰ and would take previous experience of an applicant in an airplane or helicopter into account, as appropriate.⁵¹

The FAA acknowledges commenters' suggestions to more strictly align with ICAO's recommended transitional measure in section 2.1.1.4, reiterated in section 955 of the 2024 FAA Reauthorization. The FAA notes that commenters generally disagreed with the FAA's proposal to keep the powered-lift as a separate category of aircraft. These commenters stated that ICAO's standard provides an equivalent or higher level of safety but failed to provide supporting rationale as to why the FAA should deviate from its generalized airman certification framework in existence or how the transitional measure would provide an equivalent or higher level of safety to meeting the longstanding aeronautical experience requirements specific to a category of aircraft. Additionally, the FAA notes that ICAO Annex 1 does not forego the powered-lift category completely but gives the temporary option of an alternate means for a member state to implement the powered-lift category.

The FAA maintains that while powered-lift vary widely within the respective category, they are essentially a hybrid between an airplane and a helicopter with a distinct foundational set of characteristics.⁵² Therefore, assurance of proficiency in those characteristics is an essential element of airman training that may be lost if a type rating, with no minimum flight hour or flight training requirement before testing for such rating,⁵³ is simply added to an existing airplane or helicopter rating, thereby rendering it impracticable for the FAA to wholly align with ICAO Recommendation 2.1.1.4, as explained throughout this section. While these pilots have significant prior experience operating in the NAS by virtue of holding a certificate with an airplane category rating or rotorcraft category, helicopter class rating, the experience is not tailored to powered-lift operations (the subsequent section of this preamble

explains the FAA's finding on the value of the category rating).

The FAA recognizes there is a fine line between a powered-lift being so unique that none resemble each other, thereby eliminating the similarities associated with a category of aircraft, and all powered-lift possessing similar fundamental characteristics such that a category rating remains essential. The subsequent section discusses additional comments received on the FAA's proposal to retain the powered-lift category and the safety benefit of doing so. This preamble also provides discussion of simulator time in section V.D. of this preamble.

Value of the Powered-Lift Category

Several commenters discussed the powered-lift category. As previously stated, the predominant position identified a perceived inconsistency between the FAA's statements about the uniqueness of powered-lift to support a universal type rating requirement and those statements supporting the powered-lift category rating as foundational. Additionally, commenters discussed the burden and barriers that a powered-lift category rating requirement would bestow on operators. CAE, NBAA, and Eve stated that a powered-lift category rating would create challenges in developing an initial cadre because it would require an FSB team to spend several months with the manufacturer to receive training compared to a type rating, which would only require a few weeks, according to the commenters. Joby and NBAA stated the category-based approach is potentially unsafe because it could lead to a negative transfer of skills between aircraft.⁵⁴ Similarly, an individual commenter noted that pilots of aircraft that operate primarily in wing-borne flight mode (e.g., F-35, AV-8) may not be properly trained to fly aircraft that possess the unique aerodynamic and handling qualities-related effects of aircraft that generate thrust via propellers.

Lilium suggested that, should the FAA maintain the requirement for a powered-lift category rating, the FAA should credit commercial pilot and ATP flying experience toward the powered-lift category rating. Specifically, Lilium stated an approach should focus on powered-lift type rating specifics with a combined check at the end of training. Finally, HAI generally expressed that the FAA should credit time logged in

both airplanes and helicopters in the qualification framework.

The FAA considers the aircraft category rating to be a key element of airman certification for ensuring persons exercising the privileges of their pilot certificate possess a common level of competency. To be eligible to obtain a category rating, a person must complete set hours of flight time and flight training in the category of aircraft. Moreover, unlike class ratings within a category, a pilot who holds a category rating and seeks to add a new category to their pilot certificate must meet all of the flight time and flight training as would be required for an initial category rating.⁵⁵ Nearly 30 years ago, the FAA identified the need to establish a new powered-lift category for emerging technology.⁵⁶ At that time, the FAA explained that these regulations were necessary to respond to the future needs of aviation because industry was developing powered-lift and the pilot certification standards did not adequately reflect the certification requirements for powered-lift.⁵⁷ Like airplanes and rotorcraft, modern powered-lift vary significantly in terms of operational capabilities and complexity. However, like airplanes and rotorcraft, the FAA has determined that the wide range of current powered-lift in development share enough design attributes to establish a common aircraft category and ensure that a new powered-lift pilot has the necessary aeronautical experience to safely operate that category of aircraft in the NAS.

The FAA notes that, for purposes of airman certification, an aircraft category groups similar aircraft that are designed to produce lift in a certain way. The characteristics of each category and how it produces lift lends itself to unique conditions a pilot would experience exclusive to the category of aircraft being operated. Powered-lift pilots operating a powered-lift may conduct operations that are similar to airplanes and helicopters, but the pilot's experience in either category is unique to that category and would not (1)

⁵⁰ See §§ 194.217, 194.219, 194.221, 194.223, 194.225, 194.227, 194.229, 194.231.

⁵¹ I.e., by virtue of the proposed eligibility prerequisites for pilots to utilize the relieving alternate framework that will be set forth in part 194.

⁵² See 14 CFR 1.1, *Powered-lift* definition: a heavier-than-air aircraft capable of vertical takeoff, vertical landing, and low speed flight that depends principally on engine-driven lift devices or engine thrust for lift during these flight regimes and on nonrotating airfoil(s) for lift during horizontal flight.

⁵³ § 61.63(d).

⁵⁴ The FAA acknowledges difficulties with entry into service for aircraft with single controls. Section V.D. of this preamble addresses these challenges.

⁵⁵ Under § 61.63(c)(3), a person who seeks to add a class rating in the same category of aircraft is not required to complete the prescriptive flight training requirements for an initial class rating but rather must only have a logbook or training record endorsement from an authorized instructor attesting that the person was found proficient in the appropriate areas of operation. Under § 61.63(b)(1), a person adding a category rating must complete all of the aeronautical experience requirements for the certificate level.

⁵⁶ *Pilot, Flight Instructor, Ground Instructor, and Pilot School Certification Rules*, NPRM, 60 FR 41160 (Aug. 11, 1995); final rule, 62 FR 16220 (Apr. 4, 1997).

⁵⁷ 62 FR 16220 at 16230 (Apr. 4, 1997).

completely prepare the pilot for what may be encountered in a totally unique category of aircraft and (2) would not have the same unique conditions as a result of the production of lift by just wings or engine or just a rotor system.

Pilots maintain proficiency on specific flight characteristics based on these differing categories of aircraft (*e.g.*, their unique production of lift), such that category flight experience is not a comprehensive fit to another category. For example, unique conditions specific to only an airplane or only a helicopter include engine failures and vortex ring state. During a loss of power in a multiengine airplane, a pilot must be cognizant of the speeds at which they are flying because a pilot of a multiengine airplane could encounter a loss of directional control attributed to operations below the airplanes published V_{MC} .⁵⁸ In a multiengine airplane, operations below V_{MC} result in a loss of directional control because the thrust is provided directly by the multiple engines. In a helicopter, the engines power a drive train that provides thrust through a rotor system. Since the thrust is not being directly provided by the engines in a helicopter there is no published V_{MC} . Therefore, a helicopter would not experience loss of directional control because of operations below V_{MC} as outlined for a multiengine airplane. Likewise, a pilot of a helicopter must be proficient in recovering from a vortex ring state, which is a transient condition of downward flight in which an aircraft descends through the air after previously ingested by the rotor system causing portions of the rotor blade to stall. If not corrected, the pilot experiences significant descent rates that require immediate intervention unique to a helicopter.⁵⁹ This condition is the result of the operation of a helicopter's rotor system producing downwash. As an airplane does not have a rotor system, this condition would not occur in an airplane.

These examples are specific to the category of aircraft in which they are encountered, of which, a powered-lift may or may not ever experience. Moreover, powered-lift are operationally capable of both vertical takeoffs and landings as well as horizontal flight. This increased transitional complexity means an aircraft, while perhaps having some similar characteristics as an

airplane or helicopter, has very unique and more novel conditions that may arise that would preclude crediting airplane or rotorcraft hours to count as comparable experience.

Given these characteristics, a pilot operating a powered-lift must be proficient in adverse conditions related to both horizontal flight and vertical take-off and landings (*i.e.*, certain airplane and helicopter characteristics), as all powered-lift have these capabilities regardless of the size, and any other powered-lift specific condition that may arise. A pilot who holds only a pilot certificate with an airplane category rating would lack proficiency in vertical takeoffs or landings and wouldn't be familiar with unique characteristics of flight that may be similar to a helicopter. Likewise, a pilot who holds a pilot certificate with only a rotorcraft category with helicopter class rating could lack proficiency in conditions related to horizontal flight similar to that of an airplane. Proficiency in both is required for any powered-lift, regardless of size, that may not be sufficiently covered in type rating training focused on a specific aircraft rather than universal category-shared characteristics. Therefore, the FAA disagrees with the notion that requiring a powered-lift category introduces safety risks into the NAS and maintains that the foundational characteristics necessitate a generalized powered-lift category rating.

In making this determination, the FAA also examined the areas of operation and tasks required to be performed to obtain a powered-lift category rating versus those required for a powered-lift type rating. The FAA found that the areas of operation covered when an applicant takes a practical test for a commercial pilot certificate with a powered-lift category rating are more expansive and include foundational concepts and skills necessary to operate any powered-lift in the NAS. In comparison, the areas of operation that are covered for a powered-lift type rating tend to be more narrowly tailored to a particular powered-lift, assuming the applicant would have the foundational category skills (or be concurrently attaining such proficiency). For example, broader Areas of Operation (AOO) such as airport and heliport operations (III), rapid deceleration/quick stop (AOO VI, Task A), slow flight and stalls (AOO VIII); high altitude operations (AOO X); and special operations (AOO XI) appear on the powered-lift category rating test

as foundational category elements,⁶⁰ but are not covered on the powered-lift type rating test, nor would some of these foundational elements be covered on an airplane category or rotorcraft category, helicopter class practical test.⁶¹ Comprehensive proficiency to facilitate safe operations in the NAS must include these foundational elements, among others set forth in the applicable ACS, that may be overlooked given a type-rating only training and practical test.

Additionally, the FAA also notes the practical complexities of subjective assignment of an aircraft category as suggested by GAMA. Without a clearly communicated standard under which powered-lift would be certificated, the regulated community would be at a disadvantage in (1) lack of advanced notice of certification requirements (*e.g.*, if a powered-lift was assigned in the airplane category during the type certification process, but the manufacturer only employed helicopter pilots), (2) arbitrary determination frameworks (*e.g.*, how close a powered-lift would be required to align with the helicopters or rotorcraft to be in that category, whether it was a key system determination driver, etc.), and (3) potential absence of consistency in operational requirements (*e.g.*, minimum safe altitude requirements⁶² and emergency equipment for overwater operations⁶³ differ for helicopters and airplanes).

Joby provided two examples of how the FAA's proposal to maintain a powered-lift category rating would introduce unanticipated safety risks. In Joby's first example, a person intends to operate a large, turbine-engine powered-lift. The individual seeks to meet the requirements of § 61.129(e)(1)⁶⁴ by

⁶⁰ Commercial Pilot for Powered-lift Category ACS (FAA-S-ACS-2).

⁶¹ The FAA notes that the Commercial Pilot for Powered-Lift Category ACS sets forth a table indicating the required tasks for each area of operation tested in accordance with the ACS for the addition of a powered-lift category rating to an existing commercial pilot certificate, which results in an abbreviated test for SFAR pilots where there is overlap in foundational elements between categories. For example, pilots who possess a commercial pilot certificate with an airplane category rating (and any airplane class rating) are not required to test again on high altitude operations (AOO X).

⁶² Section 91.119(d) permits a helicopter to operate at less than the minimums prescribed in § 91.119(b) or (c) provided the operation is conducted without hazards to persons or property on the surface and that each person operating the helicopter complies with any routes or altitudes specifically prescribed by the FAA for helicopters.

⁶³ §§ 135.167 and 135.168.

⁶⁴ Section 61.129(e)(1) requires an applicant for a powered-lift rating at the commercial pilot certificate level to obtain 100 hours of flight time in powered aircraft of which 50 hours must be in powered-lift.

⁵⁸ V_{MC} is a calibrated airspeed at which following the sudden critical loss of thrust the pilot would still be able to maintain directional control of the multiengine airplane. See *Airplane Flying Handbook*, FAA-H-8083-3C (2021), page 13-2.

⁵⁹ *FAA Helicopter Flying Handbook* FAA-H-8083-21B at 11-9.

operating a small powered-lift with a significantly dissimilar pilot interface, for economic considerations. Joby posits there is a negative transfer of piloting skills from the operation of the dissimilar aircraft. In Joby's second example, a person has obtained a powered-lift instrument rating in a powered-lift with airplane-like controls. The person then seeks to operate a powered-lift with helicopter-like controls. When the pilot encounters instrument meteorological conditions (IMC), they do not have the piloting skills or experience to operate the aircraft safely or experience negative transfer of pilot skills from operation of the dissimilar aircraft. Joby stated that the powered-lift instrument rating may give a pilot the confidence to fly in IMC when they are not prepared for the piloting task.

The central safety risk at issue in these two examples is cured by virtue of a type rating. If a person utilized a small powered-lift to build time for a powered-lift category rating to eventually fly a large, turbine-engine powered-lift, they will still be required under adopted § 61.31(a)(3) to obtain a type rating for the large powered-lift. The required type rating training and testing for a type rating intends to cover any operational proficiency gap between powered-lift types. Similarly, in Joby's second example, the person will be required to obtain a type rating both in a powered-lift with airplane-like controls and in a powered-lift with helicopter-like controls. While the instrument-powered-lift rating is not type-specific within the powered-lift category,⁶⁵ the type rating, which requires training and testing, will establish the pilot's proficiency in the specific aircraft which thereby addresses any possible safety gap.⁶⁶

In developing the NPRM, the FAA reconsidered whether to utilize the long-established powered-lift category as a means to integrate pilot certification of powered-lift pilots. The FAA determined that enabling the existing powered-lift category was the most logical means of establishing an existing cadre of powered-lift pilots without relying solely on pilots who received certification through existing military competency provisions. Therefore, the FAA will retain the requirement to obtain a powered-lift category rating as proposed.

⁶⁵ The FAA notes that the instrument rating is, likewise, not type specific within the airplane category or rotorcraft category, helicopter class.

⁶⁶ For example, AOO V in the ATP and Type Rating for Powered-Lift Category ACS requires the applicant to demonstrate certain instrument procedures.

Relatedly, as discussed in the NPRM, the FAA notes that some powered-lift have been issued special airworthiness certificates for experimental purposes in accordance with § 21.191 and foresees a need to continue this kind of certification in the future. In general, experimental aircraft are not subject to the same airworthiness standards as those aircraft holding standard airworthiness certificates (e.g., regulatory design, build, maintenance, and inspection requirements). In accordance with § 91.319(i), the Administrator may prescribe additional operating limitations for experimental aircraft where necessary for safety and risk mitigation with various hazards inherently introduced by experimental aircraft. The FAA has employed the operating limitations issued with an experimental airworthiness certificate to require pilots to hold category and class ratings for all experimental aircraft and additional authorizations for certain experimental aircraft even when no passengers are carried on board.⁶⁷ As with experimental airplanes and experimental rotorcraft, the FAA will apply category ratings and other authorizations (e.g., the authorization to act as PIC) through operating limitations for experimental powered-lift, as warranted.

Establishment of Powered-Lift Classes

Some commenters disagreed with the FAA's conclusion that the creation of powered-lift classes is infeasible at this time. One individual stated there is potential for different classes within powered-lift, expressing concern that restricting powered-lift and pilot designations to only a type within the category could impede progressive growth. The commenter suggested a basic class structure, such as a tiltrotor class. Another individual commenter added that it would be useful to have the option to delineate classes because powered-lift can have broadly similar characteristics (e.g., utilizing proprotors for thrust, fly by wire, and similar operating characteristics and performance).

The FAA contemplated establishment of powered-lift classes both in the 1997 rulemaking and in this rulemaking. Specifically, similar to the commenters' suggestions, the FAA considered tilt-rotor, tilt-wing, ducted fan, and vectored thrust classes. However, the FAA maintains that, given the lack of certificated powered-lift in the civilian market, establishing classes of powered-lift is infeasible because the powered-lift

anticipated to enter the civilian market vary in unique configurations, or possibly a combination of configurations (e.g., tilt-wing, tilt-propeller, lift plus cruise, tilt plus cruise). The purpose of a class is to establish enough commonality of operating characteristics⁶⁸ and flight controls to allow for pilot skills to transfer from one aircraft of that class to another.

For example, a multiengine airplane possesses ailerons, rudder, and elevator, all of which are controlled by flight controls in the flightdeck. Regardless of the make and model of the multiengine airplane being flown, these lifting surfaces will react similarly to flight control inputs by the pilot. This commonality of operating characteristics specific to airplanes allows for the transfer of pilot skills from one multiengine airplane to another. Additionally, many multiengine airplanes have feather propellers, propeller synchronization, fuel crossfeed, and other similar systems that pilots would recognize when operating a multiengine airplane from a broad perspective. Moreover, a pilot with proficiency in certain conditions arising from piloting an airplane with two engines would be similarly situated across this all-multiengine class of airplanes. For example, a pilot with a multiengine class rating would understand a published V_{MC} , which is a calibrated airspeed that is marked on an airspeed indicator with a blue line, to indicate a critical airspeed a pilot must avoid if encountering an engine failure regardless of the multiengine airplane the pilot operates within the class (i.e., a transfer of skills and knowledge within the common set of characteristics).⁶⁹ Unlike the multiengine airplane class example, the FAA is unable to identify commonalities, outside of those category-based characteristics, that will allow for transfer of pilot skills from one powered-lift to another within that group with certainty at this time.

The FAA acknowledges the suggestions of classes by commenters (e.g., tilt-wing, tilt-propeller, etc.). However, the FAA maintains that the lack of civilian powered-lift at this time impedes the FAA determining that common characteristics of two powered-lift overcome drastically different characteristics in another area. For example, under the commenter's suggestion, the Bell-Boeing V-22 Osprey

⁶⁸ See 14 CFR 1.1, Class (1).

⁶⁹ For additional information on V_{MC} see the FAA Airplane Flying Handbook, FAA-H-8083-3C (2021), page 13-2.

⁶⁷ See FAA Order 8130.2J, Appendix D, Table D-1, Operating Limitations.

and the AW609 would be of a common tiltrotor class; yet differences in inceptor arrangement, motion and effect of flight controls, and envelope protection strategies would result in substantially deviated operating characteristics such that a pilot's knowledge, skills, and proficiency may not transfer.

Therefore, because each powered-lift can have different configurations, unique inceptors, diversified flight controls, and complicated and distinctive operating characteristics, which are not traditionally present in overarching classes of aircraft to such a degree, the FAA maintains that type ratings best address the distinctive characteristics. A type rating will ensure the PIC possesses the requisite training and proficiency on each unique and central element of the powered-lift, regardless of broad characteristics that may be shared amongst certain powered-lift category. The FAA notes that this does not foreclose the possibility that classes could emerge at a later time.

Type Rating Determination

CAE stated that airman certification through the type rating, as determined by ICAO, should be tailored to the flight characteristics for each powered-lift as the aircraft may vary considerably depending on the aircraft design and the different modes in which they operate. Additionally, an individual requested that the FAA provide additional information as to the factors or standards that would be considered for type rating determinations. Specifically, the commenter asked how similarities or differences will be evaluated between two powered-lift, and what criteria will be used to deny or grant a type rating. The commenter provided a hypothetical, asking whether two powered-lift with different propulsion systems, control systems, or performance characteristics would require separate type ratings or whether they could be covered by a common type rating with differences training.

As discussed in the NPRM, the FAA initiates a Flight Standardization Board (FSB) during the aircraft certification process for aircraft that require a type rating. Since each powered-lift will require a type rating, as set forth by adopted § 61.31(a)(3), an FSB will be formed to evaluate each powered-lift to make recommendations for the pilot type rating training (*i.e.*, whether the training recommended by the manufacturer will enable the pilot to safely operate the aircraft in the NAS). Should a manufacturer later introduce a derivative or variant (*e.g.*, model, series) of a type-certificated aircraft, the FAA

will conduct another FSB of the new aircraft and make recommendations to determine whether certain aircraft warrant the same type rating and for any differences training and checking or special training necessary to operate the aircraft in the NAS. Difference levels specify FAA requirements proportionate to, and corresponding with, increasing differences between related aircraft.⁷⁰ These processes apply equally to all aircraft, including powered-lift. Therefore, in sum, the FAA notes that it is possible that a common type rating could emerge in the future if a single manufacturer produced multiple powered-lift sharing similar designs and operating characteristics; the FAA will procedurally apply the same steps to powered-lift as is currently implemented for the establishment of a common type rating.

As previously discussed, the FAA proposed that all PICs seeking to operate a powered-lift would be required to receive a type rating. A type rating is a one-time, permanent endorsement on a pilot certificate indicating that the holder of the certificate has completed the appropriate training and testing as required by the applicable section of the Code of Federal Regulations.⁷¹ Section 1.1 of 14 CFR provides the definition of "type," as it pertains to a rating, as a specific make and basic model of aircraft, including modifications thereto that do not change its handling or flight characteristics. Therefore, in some cases, a type rating includes the series of aircraft (*e.g.*, Boeing 747–400), if applicable, and in other cases the type ratings only apply to one aircraft. The § 1.1 definition of type will apply to powered-lift as it applies to any other type of aircraft in the establishment of a type rating. Therefore, if during the type certification process the FAA determined that a make and basic model of powered-lift was modified, but to a degree so as not to change its handling or flight characteristics, that type rating might include the series of powered-lift. In addition, the FAA has procedures to establish a common type rating. A "common type rating" is a term used in FSB reports to describe a relationship between type ratings for aircraft with

⁷⁰ Specifically, the FAA's differences training framework constitutes five levels, in order of the increasing training and checking requirements necessary to address the necessary knowledge, skills, and abilities a pilot must demonstrate as applicable to an aircraft for which a pilot is already qualified and current during the initial transition or upgrade training for other related aircraft at a commercial operator. See AC 120–53, as revised, for additional information on difference levels.

⁷¹ "Rating" is defined in 14 CFR 1.1 as a statement that, as a part of a certificate, sets forth special conditions, privileges, or limitations.

different type certificates that have no greater than Level D training differences. For example, the B–757 and the B–767 are separate type ratings determined to have commonality and, therefore, have a common type rating.⁷² The type rating for a certificated aircraft can be determined to be related to another type rating of another certificated aircraft of the same make provided the aircraft meet the criteria of the T1 (equivalence) or the T2 (handling characteristics) and T3 (core pilot skills with no greater than Level D differences).⁷³

Opposition to Removal of § 61.5(b)(7)(iii)

Airbus Helicopters expressed concern regarding the proposed replacement of current § 61.5(b)(7)(iii), which sets forth the ratings that may be placed on a pilot certificate when an applicant satisfactorily accomplishes the training and certification requirements for other aircraft type ratings specified by the Administrator through the aircraft type certification procedures. Airbus Helicopters stated that replacing current § 61.5(b)(7)(iii) with "Powered-lift" could impact the normal category helicopter requiring a type rating and is not consistent with the proposal in "Chapter V."⁷⁴ The commenter proposed replacing the current content of § 61.5(b)(7)(iv) (SIC pilot type rating) with "powered-lift" instead.

While the commenter did not clearly describe what consequences may result from the proposed changes, the FAA disagrees with the commenter that the proposed language will have consequences on normal category aircraft. The provisions are simply re-ordered; current § 61.5(b)(7)(iii) will move to paragraph (b)(7)(iv) and current § 61.5(b)(7)(iv) will move to paragraph (b)(9).

Simplified Flight Controls and Advanced Air Mobility

Several commenters raised the topic of AAM⁷⁵ aircraft and powered-lift with

⁷² See Flight Standardization Board Report, Revision 11 (12/07/2020).

⁷³ See, Advisory Circular, 120–53, as revised, Guidance for Conducting and Use of Flight Standardization Board Evaluations Appendix 1, Definitions and References.

⁷⁴ Given the context of the comment, the FAA believes that commenter intended to refer to the FAA's proposal in the NPRM preamble (88 FR 38946, June 14, 2023), specifically section V. Certification of Powered-lift Pilots.

⁷⁵ Public Law 17–203 defines the terms "advanced air mobility" and "AAM" as "a transportation system that transports people and property by air between two points in the United States using aircraft with advanced technologies, including electric aircraft or electric vertical take-off and landing aircraft, in both controlled and

simplified flight controls⁷⁶ as it relates to type ratings. HAI stated that many AAM aircraft will not need type ratings to be operated safely and that many aircraft used in air taxi⁷⁷ operations today generally do not require type ratings. HAI recommended a cautious approach to type ratings when considering aircraft under development to serve the AAM market, specifically comparing aircraft used in air taxi operations flying in low altitude, dense urban environments, and congested airspace, where pilots are not generally required to hold a type rating.

CAE generally echoed HAI's statements regarding AAM. Additionally, CAE stated that aircraft designs with later introductions to the NAS might be semi-autonomous and use more of a push-button interface, simplifying demands on the pilot. CAE cited discussion from the FAA's recently published NPRM commonly known as MOSAIC, where the FAA proposed to account for certain aircraft to use simplified flight controls.⁷⁸ CAE emphasized that this concept could apply to all aircraft, advancing operations toward uncrewed operations.

Similarly, AIR VEV disagreed with the type rating proposal as burdensome, specifically as it would apply to private pilots (discussed in the following section) operating simple powered-lift that do not possess complex characteristics and safety risk aspects of existing aircraft that require a type rating. AIR VEV disagreed with the FAA's assumption that all manufacturers intend to produce powered-lift for commercial purposes. Specifically, AIR VEV noted that, as an OEM, they seek to develop a powered-lift to be utilized for initial pilot certification at the private pilot certificate level and that their powered-

lift will not possess the same characteristics underlying the reason for a type rating as currently set forth by § 61.31. AIR VEV claimed that the type rating requirement is at odds with the MOSAIC NPRM because this powered-lift rulemaking would require a type rating for the entire category of light sport aircraft. AIR VEV urged the FAA to follow the MOSAIC proposal of training and an endorsement for those powered-lift with simplified flight controls rather than the type rating requirement.

An individual also supported a case-by-case type rating determination, citing a variety of autonomous factors including, in pertinent part: complexity and uniqueness of control laws (CLAWs), level of automation, control strategies, and ease or difficulty of recovery from failure modes and automation response to such failures. The individual stated that most machines employ highly automated flight controls, which would make it easier for pilots to operate different powered-lift once they understand the underlying system. The individual stated that several manufacturers are working on platform-independent CLAWs that are highly automated and inquired how the FAA would respond if industry standardization dominated powered-lift designs (e.g., a single type rating under this commonality).

In the MOSAIC NPRM, the FAA recognized the rapid advancements in aircraft automation and flight control technology and noted that interfaces and flight controls may no longer resemble those found in traditional flight decks specifically in the context of light-sport aircraft.⁷⁹ Section 1.1 of 14 CFR currently sets forth a definition for light-sport aircraft; the MOSAIC NPRM proposed to eliminate the definition in § 1.1 and instead proffer performance-based standards for aircraft, including powered-lift, to be certificated as light-sport category aircraft. To commenters' points, MOSAIC proposed § 22.180, which would facilitate the certification of aircraft designed with simplified flight controls subject to certain conditions.⁸⁰

⁷⁹ See 88 FR 47650 (July 24, 2023), see proposed § 22.180.

⁸⁰ Specifically, for an aircraft to be designated as having simplified flight controls, proposed § 22.180 would require: (1) the pilot could only control the flight path of the aircraft or intervene in its operation without direct manipulation of individual aircraft control surfaces or adjustment of the available power, (2) the aircraft would be required to be designed to prevent loss of control, regardless of pilot input, and (3) the aircraft would need to have a means to enable the pilot to discontinue the flight quickly and safely. See 88 FR 47674 (July 24, 2023) for additional discussion.

Additionally, in the MOSAIC NPRM, the FAA proposed certain part 61 qualification requirements to address pilots and flight instructors qualified to operate simplified flight control systems. Thus, the FAA proposed additional training specific to the particular make and model of aircraft with a simplified flight controls designation to ensure a pilot would be sufficiently proficient in the operation of that aircraft. Therefore, the FAA proposed qualification for simplified flight controls be attained by training and an endorsement and, in some cases, a practical test. Specifically, MOSAIC would permit any certificated pilot, regardless of certificate level,⁸¹ who holds the appropriate category and class to operate a simplified flight control-designated aircraft only after receiving the model-specific training and endorsement from an authorized flight instructor specific to the safe operation of each simplified flight control designated aircraft.

As stated in the MOSAIC NPRM, simplified flight control designs will vary from one aircraft to another (*i.e.*, model to model), necessitating the model-specific training. Similarly, powered-lift will vary from one aircraft to another (*i.e.*, type to type), regardless of whether they possess simplified flight controls. Where MOSAIC proposed to address the variance of simplified flight control handling characteristics via training and an endorsement, this final rule requires a type rating of all powered-lift to ensure proficiency in the aircraft. The FAA finds that applying only a vague amount of training verified by an endorsement requirement mirroring that proposed in MOSAIC, as urged by some commenters, would vastly underprepare a pilot to operate a wholly new category of aircraft. The FAA notes that the training and endorsement regime proposed by MOSAIC relies on the premise that a pilot would already hold a pilot certificate in that specific category. For example, should MOSAIC be finalized as proposed, a person who holds a sport pilot certificate with rotorcraft-helicopter simplified flight controls privilege with the model-specific limitation who seeks to operate another model of rotorcraft-helicopter with simplified flight controls would complete the training and endorsement required by the proposal. This scenario is not applicable to the emergence of a new category of aircraft for commercial,

⁸¹ The FAA chose not to consider powered-lift privileges for sport pilots, given the complexity and ongoing development of powered-lift designs and associated pilot certification considerations herein.

uncontrolled airspace." Public Law 17–203 (Oct. 17, 2022).

⁷⁶ "Simplified flight controls" here has the same meaning as the proposed definition contained and in the Modernization of Special Airworthiness Criteria (MOSAIC) NPRM. An aircraft with simplified flight controls meets three criteria: (1) the pilot can only control the flight path without direct manipulation of individual aircraft control surfaces or adjustment of the available power; (2) the aircraft is designed to prevent loss of control regardless of pilot input; and (3) the aircraft must have a means of enabling the pilot to discontinue flight quickly and safely and the means by which flight is discontinued is designed to prevent inadvertent activation. See MOSAIC NPRM: www.federalregister.gov/documents/2023/07/24/2023-14425/modernization-of-special-airworthiness-certification.

⁷⁷ The term "air taxi," as used by this commenter refers to AAM operations. It is not a reference to operations by an air taxi operator as defined in 14 CFR 298.3.

⁷⁸ Modernization of Special Airworthiness Certification NPRM, 88 FR 47650 (July 24, 2023).

passenger-carrying operations such that training and an endorsement establishes an acceptable level of safety in the NAS.

Furthermore, although many powered-lift coming to market employ some simplified flight controls, none have currently made it through the aircraft certification process. Based upon the understanding of the current industry and market, the FAA maintains that the powered-lift that are coming to market are sought to be used in commercial passenger-carrying operations. Considering the FAA's safety continuum,⁸² a higher expectation of safety exists for commercial operations with transport aircraft than for a 2- or 4-passenger general aviation aircraft, such as a light sport aircraft, for a variety of factors, including, but not limited to, complexity and performance, number of passengers, risk to persons and property on the ground, risk assumed by the pilot and flightcrew, and risk assumed by the passenger. Therefore, a powered-lift with simplified flight controls would still necessitate training and operational rules applicable to other similarly situated operators using helicopters and airplanes to achieve this level of safety (*e.g.*, the level of aeronautical experience, skill, and knowledge expected of a pilot engaging in commercial operations).

The FAA agrees that it has established a type rating for purposes other than are normally considered under § 61.31(a) and recognizes that a type rating for a private pilot certificate will result in a dissimilar training footprint for those operators who seek to provide training at the initial private pilot certificate level (*i.e.*, in airplanes and helicopters). However, as previously discussed, the FAA is unable to establish a class of powered-lift at this time and determined that a type rating is necessary, even at the private pilot certification level, to carry out the privileges of that certificate.

Additionally, the FAA sought to remove barriers and to ensure pilot groups training outside of the SFAR could take advantage of the distance reduction for aeronautical experience at the private pilot certificate level as discussed in section V.F.4. of this

preamble and does not mandate a private pilot also hold or concurrently obtain an instrument rating as discussed in section V.F.4. of this preamble to balance those operational considerations typical of a private pilot.

The FAA seeks to glean data and information from this approach to inform a future rulemaking. Once a base of pilots emerges via the flexibility enabled in this SFAR, pilots will be joining the industry through more conventional means and, if necessary, the FAA will be able to alter its approach when it pursues permanent regulations.

Miscellaneous Type-Rating Comments

HAI stated that the length of the SFAR, while intended to be temporary, indirectly creates a permanent type rating requirement because the implementation cost and company reliance on a 10-year regulation may not be recovered and may be used to justify the type rating in perpetuity. The FAA notes that it proposed to permanently amend § 61.31(a) to include powered-lift as a type rating that a pilot would need on his or her pilot certificate. Although the FAA is adopting this permanent change, this doesn't foreclose further amendments within the time frame of the SFAR. Future advancements in technology within the lifecycle of the SFAR, or possible emergence of a class, could prompt the FAA to initiate a rulemaking to enable that effect.

CAE stated that some powered-lift, particularly those intended for part 91 operations by private operations,⁸³ might not require a type rating at all because the FSB would determine that no type rating is necessary. Instead, CAE suggested that the FSB could require manufacturer-required training, mandated by the AFM, and developed in accordance with AC 61-137B through existing authority in § 61.31(h), which requires "type specific" training and endorsement. NBAA echoed CAE's comments.

The FAA's intent is to use the SFAR structure to provide enough time and operational experience to consider whether type ratings will be necessary for future AAM aircraft. At present, no powered-lift have obtained the amount of operating experience necessary to provide the FAA with enough information to justify an alternate approach from that which was proposed. However, the SFAR structure will provide the FAA the flexibility to reconsider the type rating approach to

certification in the future after aircraft certification and operational experience deem it possible to remove the requirement for a type rating without an adverse effect on operational safety. With respect to CAE's suggestion for the FSB to require manufacturer-required training utilizing the authority contain in § 61.31(h) rather than determine the applicability of a type rating, the FAA disagrees. Using § 61.31(h) to impose type-specific training requirements for all powered-lift would result in the imposition of requirements on industry outside the regulatory process without providing an opportunity for notice and comment. Furthermore, the FAA disagrees that requiring manufacturer required training mandated through the powered-lift flight manual would be an appropriate avenue to require type-specific training. A manufacturer is free to outline training in an AFM; however, there would be no regulatory requirement to ensure this training remained in the respective powered-lift flight manual past initial type certification. Requiring compliance with a training program in this manner would be a novel concept requiring FAA approval and oversight, which was not proposed in this rulemaking. While the FAA notes that part 91 operations are required to comply with the operating limitations set forth in the AFM, pursuant to § 91.9(a), the standing regulations do not require continued compliance or alignment with training programs or parameters should they be set forth in an AFM.

Amendment to § 61.31(l)

As discussed, § 61.31 sets forth requirements for type ratings, additional training, and certain authorizations. Paragraph (l) specifically provides exceptions to, first, the section as a whole in § 61.31(l)(1) and, second, the rating limitations of § 61.31(c) and (d) specifically in § 61.31(l)(2). Currently, § 61.31(l)(1) excludes operators of aircraft not type-certificated as airplanes, rotorcraft, gliders, lighter-than-air aircraft, powered-lift, powered parachutes, or weight-shift-control aircraft from § 61.31 applicability (*i.e.*, the requirement to hold category and class ratings). This provision is meant to create an exception for aircraft for which there is no established category or class rating (*e.g.*, hoverboards, jetpacks). The FAA determined that use of the term "type-certificated" could create confusion since not all aircraft that meet the regulatory definition of airplane or rotorcraft will be type-certificated. Further, the FAA determined the provision could be read as conflicting with more specific

⁸² The FAA evaluates hazards and risk, balancing between safety and societal burden. The FAA then determines its safety oversight responsibilities considering factors, such as complexity and performance, number of passengers, risk to people and property on the ground, risk assumed by the pilot/flightcrew, risk assumed by the passenger(s), engineering judgment. See www.faa.gov/sites/faa.gov/files/about/office_org/headquarters_offices/avs/AIR_principles.pdf, The Safety Continuum—A Doctrine for Application, September 2014, FAA Docket No. FAA-2015-1621-0018.

⁸³ By using "part 91 private operations" the FAA interprets the commenter to refer to operations conducted under part 91 by private pilots.

exceptions for experimental aircraft in § 61.31(l)(2). Therefore, the FAA proposed to clarify the intent of this exception in paragraph (l)(1) by specifying that the section does not require a category and class rating for operators of aircraft that are not identified as an aircraft under § 61.5(b). The FAA did not receive comments on this proposal and adopts § 61.31(l)(1) as proposed with minor non-substantive edits for clarity.

The FAA further analyzed this revision during the pendency of this rulemaking and determines that a conforming amendment is necessary to implement paragraph (l)(1) as intended and as it applies to the facilitation of powered-lift pilot certification. Many experimental aircraft have not yet achieved type-certification. As such, prior to removing the term “type-certificated” from paragraph (l)(1), the category and class exception in that paragraph would have applied to those experimental aircraft “not type-certificated.” Therefore, pilots utilizing experimental aircraft are excepted from holding a category and class rating for those aircraft “not type-certificated” set forth in current § 61.31(l)(1), provided no other rule or aircraft operating limitation requires them. The adopted revision to § 61.31(l)(1) clarifies that pilots of such experimental aircraft will, indeed, be required to hold category and class ratings, unless one of the exceptions noted in § 61.31(l)(2) applies. Specific to experimental aircraft, § 61.31(l)(2)(iii)(B) excepts a person operating an aircraft under the authority of an experimental certificate from the rating limitations of § 61.31(c) and (d), provided the person holds a pilot certificate and no passengers are carried. Effectively, a certificated pilot could operate without the relevant category, class, or type, if applicable, provided no passengers are carried, and provided no other rule or operating limitation requires them.

One purpose of the SFAR is to develop a pool of rated powered-lift pilots and instructors. As discussed in section V.F. of this preamble, test pilots and instructor pilots will operate the experimental powered-lift to provide the flight training set forth in new part 194. The FAA reviewed whether the revision to § 61.31(l)(1) could have an unintended consequence requiring the operator of an experimental powered-lift to hold category, class, and comply with any other ratings limitations of § 61.31, adversely impacting the development of the powered-lift fleet and initial pilot cadre by requiring instructors to hold a powered-lift category rating to provide flight training. Specifically, even though

the powered-lift will be experimental, it will still be identified as an aircraft under § 61.5(b) (*i.e.*, a powered-lift). While § 61.31(l)(2)(iii)(B) states that the rating limitations of § 61.31(c) and (d) do not apply to the holder of a pilot certificate when operating an aircraft under the authority of an experimental certificate, this exception only applies specifically when the operation does not involve the carriage of passengers.

With the recent publication of the Public Aircraft Logging of Flight Time, Training in Certain Aircraft Holding Special Airworthiness Certificates, and Flight Instructor Privileges final rule,⁸⁴ § 61.1(b) now defines “passenger” for purposes of part 61 as any person on board an aircraft other than a crewmember; FAA personnel; manufacturer personnel required for type certification; or a person receiving or providing flight training, checking, or testing as authorized by part 61. The FAA finds it unnecessary to further modify § 61.31(l)(2)(iii)(B) as it pertains to powered-lift because the definition of passenger excludes FAA personnel and manufacturer personnel associated with type certification. The regulation now explicitly allows these persons to be carried onboard without the PIC holding category and class ratings because they are onboard the experimental aircraft for specific purposes, generally to fulfill regulatory obligations, and possess knowledge of the risks associated with those purposes (*e.g.*, flight test engineers).⁸⁵ As written, § 61.31(l)(2)(iii)(B) will continue to enable pilots of experimental aircraft to operate without holding the relevant category or class rating in the circumstances previously described. Importantly, in accordance with § 91.319(i), the Administrator may prescribe additional limitations to experimental aircraft, including limitations on the persons that may be carried in the aircraft. These additional limitations may require pilots to hold category, class, or other ratings or limitations in certain situations. These additional limitations are issued as operating limitations at the time of airworthiness certification of the aircraft

⁸⁴ Public Aircraft Logging of Flight Time, Training in Certain Aircraft Holding Special Airworthiness Certificates, and Flight Instructor Privileges final rule, 89 FR 80310 (Oct. 2, 2024).

⁸⁵ For purposes of the SFAR, these individuals will be conducting these official duties in addition to complying with the SFAR for the purposes of receiving powered-lift ratings as FAA personnel or manufacturer personnel that are required for type certification. Definitions of these personnel for the purposes of this SFAR are further discussed in section V.F.2.i. of this preamble.

and must be complied with, in accordance with § 91.9.⁸⁶

B. Applicability of the Type Rating Requirement to Military Pilots

Currently, § 61.73(a) permits a military pilot or former military pilot⁸⁷ who meets certain requirements to apply based on their military pilot qualifications for a commercial pilot certificate with the appropriate category and class rating, an instrument rating with the appropriate aircraft rating, and a type rating.⁸⁸ Similarly, a military instructor pilot or pilot examiner (including a former instructor pilot and former pilot examiner) may apply for a flight instructor certificate with appropriate ratings, subject to certain requirements under § 61.73(g).

The NPRM did not propose any changes to these processes as it relates to powered-lift; in other words, military pilots with the appropriate experience and documentation may apply for a commercial pilot certificate with a powered-lift category rating, an instrument-powered-lift rating, a powered-lift type rating, and a flight instructor certificate with powered-lift category and/or instrument-powered-lift ratings under § 61.73. In fact, currently, the only FAA-certificated powered-lift pilots are those who have received their certificates through military competency. However, due to the absence of any type-certificated powered-lift,⁸⁹ military pilots who have received an FAA powered-lift category rating are currently limited in their ability to exercise those privileges in civil operations.

ALPA supported the FAA’s position that military experience in powered-lift should not by itself waive the requirement to obtain a type rating. ALPA also agreed that military pilots should be able to receive a military equivalent of a commercial powered-lift instrument certificate, but that experience should not exempt those pilots from completing the requisite training and certification required for

⁸⁶ See § 91.9 Civil aircraft flight manual, marking, and placard requirements.

⁸⁷ For purposes of this preamble, references to “military pilots” are inclusive of former U.S. military pilots.

⁸⁸ Military pilots who receive an FAA certificate through § 61.73 must continue to follow FAA regulations to exercise the resulting FAA certificate(s) (*e.g.*, recency of experience requirements in § 61.57).

⁸⁹ At the time of publication of this final rule, the only powered-lift that have entered civil operations are those issued an experimental airworthiness certificate. For those manufacturers currently developing powered-lift, operating limitations pertaining to pilot qualifications may be applied to experimental powered-lift. FAA Order 8900.1 Vol. 5, Chap. 9, Sec. 2.

civilian pilots for a powered-lift type rating. HAI stated that, if type ratings are required as proposed, military pilots should be allowed to obtain that rating for the aircraft the military pilot operated, or any civilian version of that aircraft, with requisite civilian pilot training provided by the employer. HAI stated this would make development of the initial cadre less dependent on manufacturers.

As previously discussed in section V.A. of this preamble, the FAA will require pilots to hold a type rating for each powered-lift they fly, which would equally apply to military pilots. Currently, a military pilot could apply for a type rating for certain aircraft on the basis of the pilot's military experience, and this final rule does not change that allowance extended to military pilots seeking to operate civilian powered-lift. Specifically, an aircraft type rating may be issued to a military pilot through § 61.73(e) only for a type of aircraft that has a comparable civil type designation by the Administrator. Because there are currently no military powered-lift for which comparable civil type ratings have been designated, military pilots with powered-lift experience are unable to obtain a powered-lift type rating pursuant to § 61.73 and, therefore, are limited to the issuance of a powered-lift category rating and an instrument-powered-lift rating. However, should a civil type-certificated version of a military powered-lift become available, pilots with the appropriate military experience, as identified in § 61.73, would be eligible to receive the type rating in the same manner that airplane and rotorcraft military pilots currently receive them. Those military instructors who have obtained or will obtain a flight instructor certificate with a powered-lift category and instrument rating through military competency would be permitted to conduct flight training in a powered-lift only after obtaining a type rating on their pilot certificate for the powered-lift in which they conduct flight training.⁹⁰

ALPA accurately noted that, as previously explained, the FAA's current regulatory framework does not restrict a military pilot from obtaining a powered-lift category rating on a pilot certificate provided the military pilot meets the requirements set forth in § 61.73. There are no civilian powered-lift to date that have completed FAA type certification, however, the U.S. Armed Forces

⁹⁰ Under § 61.195(e), a flight instructor may not give flight training, including instrument training, in an aircraft that requires the PIC to hold a type rating unless the flight instructor holds a type rating for that aircraft on their pilot certificate.

maintains and utilizes powered-lift in military operations (e.g., the Bell-Boeing V-22 Osprey, McDonnell Douglas AV-8 Harrier, F-35B Lightning II STOVL), where pilots establish experience operating these powered-lift. Should these military powered-lift transition into civilian operations and receive a comparable civilian type designation, the military pilot could apply to receive that aircraft type rating in accordance with § 61.73, as supported by HAI. While the FAA does not anticipate surplus military powered-lift to enter civilian operations during the period of this SFAR, if such a scenario occurred, the FAA would follow existing regulations, policies, and procedures to address military surplus powered-lift as the FAA currently evaluates surplus military airplanes and rotorcraft.⁹¹ Specifically, type ratings are designated for military surplus aircraft with civilian certificate type ratings through the FSB process, which would evaluate each respective powered-lift.

Because the allowances in § 61.73 apply equally to powered-lift as rotorcraft and airplanes and for the reasons previously discussed, the FAA determined there is no need for changes to military competency regulations in this final rule.

C. Applicability of the SIC Qualification Requirements of § 61.55 to Powered-Lift

Section 61.55 prescribes the qualifications for a person seeking to serve as second-in-command (SIC) of certain aircraft,⁹² requiring a person to hold (1) at least a private pilot certificate with the appropriate category and class rating, (2) an instrument rating or privilege that applies to the aircraft being flown if the flight is under IFR.⁹³ Additionally, unless the flight will be conducted as a domestic flight operation within the U.S. airspace, the person must hold at least a pilot type rating (SIC Privileges Only) for the aircraft being flown. Given the diverse characteristics of powered-lift, the FAA considered whether a person serving as SIC of a powered-lift should also be required to hold a powered-lift type rating on their pilot certificate and

⁹¹ See FAA Order 8900.1, Volume 5, Chapter 2, Section 19, Table 5–88.

⁹² The SIC qualification requirements apply to persons seeking to serve as SIC of an aircraft type-certificated for more than one required pilot flight crewmember or in operations requiring an SIC pilot flight crewmember in part 91 (excluding subpart K of part 91).

⁹³ See section V.H.2.i. of this preamble for additional discussion regarding a powered-lift category and type rating without an instrument rating. If a pilot held a "VFR only" limitation on their pilot certificate, the pilot could serve as SIC in VFR operations only.

found the SIC qualification requirements of § 61.55 to be largely sufficient to serve as SIC of a powered-lift in part 91 operations (excluding operations conducted under subpart K of part 91).⁹⁴ Specifically, a person seeking to serve as SIC would be required to hold the appropriate powered-lift category rating on their pilot certificate and complete familiarization training and certain pilot time⁹⁵ in the specific type of powered-lift for which SIC privileges are sought. Additionally, while the experience an SIC obtains in the powered-lift category may differ from type to type, for a pilot who has passed the practical test in a powered-lift capable of performing all the tasks required by the ACS, the existing SIC familiarization training would ensure persons seeking to act as SIC would gain sufficient experience operating the specific type of powered-lift before acting as SIC of that powered-lift. Therefore, despite adopting the requirement that a powered-lift PIC must hold a type rating, the FAA maintains in this final rule that there is no need to impose requirements beyond those contained in § 61.55 for persons seeking to serve as SIC of a powered-lift, except where a pilot does not receive training in a specific task as subsequently discussed.

The FAA recognizes that some powered-lift may not be able to perform all tasks required on the applicable ACS. When this occurs, proposed § 194.207 of this SFAR would enable an examiner to waive the task on the practical test. Therefore, a person may obtain a powered-lift category rating on their pilot certificate, thereby meeting the requirement in § 61.55(a) to hold at least a private pilot certificate with the applicable category rating, but not have performed all the tasks specified in the ACS. This person may then seek to serve as SIC of a powered-lift type that is capable of performing the task for which the pilot was never trained or tested. To ensure an SIC is trained and found proficient on any tasks that were omitted on the practical test prior to serving as SIC of a different powered-lift that is capable of performing that task, the FAA proposed new § 61.55(a)(4), which is adopted in this final rule. Specifically, § 61.55(a)(4) will require a person serving as an SIC of a powered-lift to satisfy the requirements as specified in new § 194.209(a). Section 194.209(a) will require additional

⁹⁴ The FAA notes that the provisions of § 61.55 would be applicable to operations conducted in accordance with part 91, while part 91, subpart K, and part 135 have additional requirements before a person may serve as a SIC in those operations.

⁹⁵ Section 61.55(b).

training and an endorsement to ensure the person seeking to serve as SIC of a powered-lift capable of performing tasks that were waived on the person's practical test (by utilizing a powered-lift precluded from certain tasks) is trained and found proficient. This amendment is intended simply to inform all persons seeking to act as SIC of a powered-lift pursuant to § 61.55 and ensure awareness of the new temporary requirements and the situation under which they would apply and is adopted as proposed.

Additionally, § 61.55 provides for the issuance of an SIC pilot type rating, which is required unless the flight will be conducted as a domestic flight operation within U.S. airspace. This requirement to hold the SIC pilot type rating outside U.S. airspace conforms the FAA pilot type rating requirements to the ICAO pilot type rating standards.⁹⁶ To obtain the SIC pilot type rating, a person may either complete the SIC familiarization training § 61.55(b) subject to certain conditions set forth in § 61.55(d) or may complete certain SIC training programs or checks as set forth in § 61.55(e). The FAA did not propose any revisions to this requirement or options to obtain the pilot type rating, as this rating is required to operate powered-lift in international airspace as it applies to any other aircraft. Therefore, this final rule continues to apply the current SIC pilot type rating requirements of § 61.55 to persons seeking SIC privileges in a powered-lift.

The FAA received several comments regarding the proposed §§ 194.207 and 194.209. HAI noted that SIC pilots would likely not be needed in operations conducted in many of the AAMs currently under development. HAI stated that aircraft under 12,500⁹⁷ with four to six seats do not require an SIC and additionally referenced that these aircraft will most likely be flown by part 135 operators required to provide pilots with training appropriate to the operations.

The FAA agrees that many anticipated powered-lift operations will not require an SIC and notes a second pilot is required to operate an aircraft if (1) the type certificate (TC) for the aircraft requires two pilots, or (2) an operating rule requires two pilots for the operation.⁹⁸ The FAA did not propose

any new operating requirements that would create additional scenarios under which a second pilot would be required to operate a powered-lift other than those already applicable to all aircraft.

ALPA disagreed that the current SIC requirements of § 61.55 sufficiently ensure safety for powered-lift. ALPA noted that powered-lift will not be designed to have similar controls or flight characteristics from type to type and recommended that SICs be type-rated to ensure required crew members are appropriately trained. ALPA also stated that only having basic familiarity with the type of powered-lift for which SIC privileges are sought is an insufficient safety assurance. Similarly, an individual commenter recommended that the FAA reserve the right to require SICs to be type-rated on specific powered-lift based on factors such as complexity, operating environment, adverse low airspeed handling qualities, and level of automation.

The FAA maintains that a person seeking to serve as SIC is sufficiently qualified by way of holding the powered-lift category on at least a private pilot certificate and completing familiarization in the specific type of powered-lift for which privileges are sought (and holding an instrument rating when the flight operates under IFR). First, because this SFAR enables a person to obtain a commercial pilot certificate with a powered-lift category rating, the initial pool of pilots serving as an SIC will hold a higher level of certificate than that minimum required by § 61.55(a).⁹⁹ Second, the regulations already account for the possible gap in proficiency with certain characteristics unique to a type of powered-lift: for example, operational procedures, performance specifications, and emergency procedures. Section 61.55(b)(1) requires the person seeking to serve as SIC of a powered-lift to become familiar with information for the specific type of powered-lift for which SIC privileges are sought. This familiarization must include the operational procedures applicable to the powerplant, equipment, and systems; performance specifications and limitations; normal, abnormal, and emergency operating procedures; flight manual; and placards and markings.

§ 91.531 specifies certain criteria that would be applicable when a second pilot is required to operate an airplane.

⁹⁹ Additionally, § 194.215(a) requires a person utilizing the SFAR and relief herein to hold certain non-powered-lift certificates prior to seeking a powered-lift category and type rating, which, by virtue of holding the certificates and ratings, includes the demonstration of certain skills in the NAS such as communication with ATC services, navigation, weather, communication.

Additionally, under § 61.55(b)(2), the person would be required to log pilot time in the type of powered-lift that includes the performance of three takeoffs and landings to a full stop as the sole manipulator of the flight controls, engine-out procedures and maneuvering with an engine out while executing the duties of PIC, and crew resource management training. Given these experience considerations, the FAA does not find a safety gap to warrant different treatment of powered-lift SICs than SICs for other categories of aircraft that may differ from type to type, as well. Therefore, the FAA maintains that the minimum qualifications of § 61.55(a), which will be exceeded in practice, in tandem with familiarization training on the particular type of powered-lift will adequately inform and prepare a pilot to serve as SIC without holding the specific type rating for the powered-lift.

The FAA recognizes the scenario where a person could hold a commercial pilot certificate with a powered-lift category and type rating for an aircraft that cannot perform certain maneuvers and seeks to serve as SIC of a powered-lift that is capable of performing the tasks that were waived on that person's practical test. In this case, the FAA does agree a safety gap exists. However, as previously referenced, the FAA finds that § 194.209(a) as proposed and adopted herein sufficiently addresses this safety gap. To the extent a pilot completes a practical test in a powered-lift that was precluded from performing each task required by § 61.43(a)(1) and, therefore, has not demonstrated proficiency on such task(s) before an examiner, § 194.209(a) will prohibit that pilot from serving as SIC of a powered-lift that is capable of performing the tasks that were waived on the person's practical test until certain requirements are met. Rather, to serve as SIC, the person must receive and log ground and flight training from an authorized instructor on the specific tasks that were waived, culminating in a logbook or training record endorsement from the authorized instructor certifying that the person has satisfactorily demonstrated proficiency in those tasks.¹⁰⁰ The FAA finds that these additional requirements combined with the SIC qualification requirements prescribed in § 61.55 (e.g., familiarization training) address a

¹⁰⁰ The FAA recommends the authorized instructor utilize the applicable ACS in determining whether a pilot has demonstrated proficiency of a task as the ACS specify the approved standard for tasks under an area of operation.

⁹⁶ See ICAO Annex 1, paragraphs 2.1.3.2, 2.1.4.1(b), and 2.1.4.1.1.

⁹⁷ The FAA notes that HAI's comment specifically referred to "1200" pounds, however, the FAA believes this was a typo and HAI intended "12,500."

⁹⁸ The following are operating rules that require a second pilot: §§ 91.5, 91.109(c), 91.189, 91.1049, 135.99, 135.101, and 135.111. The FAA notes that

possible safety gap in differing, new, or absent flight characteristics.¹⁰¹

However, in the NPRM, the FAA identified two instances where a person seeking to act as SIC should be excepted from the aforementioned training and endorsement requirements set forth by § 194.209(a).

First, some pilots may seek to obtain multiple type ratings on their pilot certificate. Under § 194.209(b)(1), a person seeking an additional type rating could forgo the training and endorsement requirements described previously if that person subsequently passes a practical test for a type rating in a powered-lift that is capable of performing all the tasks specified in the ATP and Type Rating for Powered-Lift Category ACS in accordance with § 61.43(a). For example, if a pilot is type-rated in powered-lift A that is not capable of performing stalls and, therefore, the task was waived during the pilot's practical test. That pilot then seeks a type rating in powered-lift B, which is capable of performing stalls and, therefore, the pilot demonstrates proficiency in that task during the practical test. If the pilot then seeks to serve as SIC on powered-lift C, which is also capable of performing stalls, the person would not be required to receive ground and flight training in accordance with § 194.209(a), because they will have already demonstrated proficiency on the task that was initially waived through powered-lift B's type rating practical test.

The second scenario applies to pilots operating under subpart K of part 91 and part 135. A person employed by a fractional ownership program as set forth in subpart K of part 91 or a person employed by a certificate holder authorized to conduct operations under part 135 may receive training and a competency check in a powered-lift that includes the tasks that were waived on the person's practical test for a commercial pilot certificate with a powered-lift category rating. In accordance with § 135.323, a part 135 air carrier or operator is required to establish and implement an approved training program that ensures each pilot is adequately trained to perform their assigned duties. Under § 135.323, the pilot must receive ground and flight training in the accompanying type of powered-lift and complete a competency check under § 135.293 every 12 calendar months. Similarly, under § 91.1073, each program manager

must establish and implement an approved training program that ensures each crewmember is adequately trained to perform their assigned duties, and § 91.1065 requires each pilot to pass a competency check every 12 calendar months.

In light of the previously discussed waiver authority, without relief, a situation may arise where a person receives training on the task that was previously waived on the person's practical test and subsequently completes a competency check that includes the task. Therefore, in § 194.209(b)(2), the FAA proposed an exception to the training and endorsement requirements for those pilots seeking to serve as an SIC who have received ground and flight training under an approved training program and have satisfactorily completed a competency check under § 135.293 or § 91.1065 in a powered-lift, provided the approved training program and competency check include each task that was previously waived on the person's practical test.

AWPC identified a situation where application of § 61.55 as written would not fully enable a pilot to receive training in a powered-lift type certificated with a minimum crew of two pilots. AWPC expressed concern that the FAA's position would mean that flight instruction could not be provided on an aircraft with a minimum crew of two pilots unless the pilot receiving training already meets the requirements of § 61.55 by holding a certificate with powered-lift category and instrument ratings. AWPC stated that the proposed SFAR should address entry into service for powered-lift that will be type-certificated with a minimum crew of two pilots and recommended providing relief to § 61.55 to avoid a scenario where only pilots qualified through military competency may serve as flightcrew members.¹⁰²

The FAA acknowledges the barriers that would be encountered for flight training in powered-lift type certificated for two pilots because, while the instructor will hold ratings to serve as PIC, the person receiving flight training will not have the powered-lift ratings required by § 61.55(a) to serve as SIC. Under the traditional airman certification framework, an applicant for a commercial pilot certificate will already hold the private pilot certificate

and ratings required by § 61.55(a) by having received flight training in (1) an aircraft that does not require more than one required pilot flight crewmember, or (2) an aircraft type-certificated for two pilots because they would hold the private pilot certificate and ratings necessary to receive the familiarization training that would qualify them as an SIC under § 61.55.

However, the lack of pilots with a powered-lift category rating at any certificate level (here, specifically, a private pilot certificate with a powered-lift category rating) creates a barrier in qualification as an SIC for any operation involving a powered-lift type certificated for two pilots, including training flights. The two affected populations of pilots under the SFAR would be (1) the initial cadre of pilots receiving flight training at the OEM, and (2) the pilots receiving training at the approved training program under part 135, 141, or 142. This would not be an issue to test pilots and instructor pilots because these pilots will be operating an experimental powered-lift (*i.e.*, not yet type-certificated for two pilots) and will be authorized to act as required crewmembers in accordance with a letter of authorization issued by the FAA for the conduct of flights during the powered-lift type certification process.¹⁰³

The FAA agrees that, without relief, powered-lift type-certificated for two pilots would only be able to utilize pilots already holding a commercial pilot certificate with a powered-lift category (and instrument rating when the flight is under IFR) from the military competency provisions of § 61.73, largely inapplicable to new powered-lift pilots engaging in flight training (*i.e.*, those pilots would already hold powered-lift ratings and, therefore, would not be engaging in the alternate framework of the SFAR). A lack of relief would essentially create a barrier to all flight training in powered-lift type certificated for two pilots for the initial cadre of pilots receiving training at the OEM and the pilots receiving training at an approved training program.

Therefore, the FAA finds it necessary to provide relief for the initial cadre of instructors and pilots receiving training under an approved training program who are seeking a commercial pilot certificate with a powered-lift category rating and an instrument-powered-lift rating in a powered-lift type certificated for more than one required pilot flight

¹⁰¹ Additionally, the PIC, who would hold a type rating, remains directly responsible for and is the final authority as to the operation of that powered-lift. 14 CFR 1.1 and § 91.3(a).

¹⁰² AWPC also emphasized that aligning with ICAO Annex 1 2.1.1.4 recommendation would alleviate the § 61.55 flight training dilemma. Section V.A. of this preamble addresses AWPC's ICAO comments, and the FAA trusts the relief adopted by this final rule, as subsequently discussed, adequately alleviates AWPC's concerns.

¹⁰³ This would also not be an issue for FAA test pilots or aviation safety inspectors, who are added to the alternate SFAR framework as discussed in section V.F.2.i.d. of this preamble, for the same reasons.

crewmember. The SIC requirements were initially codified to ensure sufficient experience prior to operating sophisticated aircraft,¹⁰⁴ taking into account the aircraft's specific operating characteristics. In that codification, the FAA found that the certificate prerequisites currently set forth in § 61.55(a) sufficiently addressed the operation of sophisticated aircraft, while the familiarization requirements of § 61.55(b) sufficiently addressed the aircraft's specific operating characteristics.¹⁰⁵ Likewise, the FAA finds that temporary relief in new § 194.209(c), in tandem with the mitigations set forth in the training program itself, will sufficiently address the unfamiliar operating characteristics an applicant would encounter during flight training in a powered-lift type certificated for two required flight crewmembers such that the flight maintains a high degree of safety.

Specifically, new § 194.209(c) will permit applicants receiving training in a powered-lift in accordance with §§ 194.221, 194.223, 194.229, and 194.231 to serve as SIC during those training flights without meeting the requirements in § 61.55(a)(1), (a)(2), and (b)(2). In sum, a person receiving flight training under certain provisions of the SFAR would be excepted from (1) holding a powered-lift category rating on the person's private pilot certificate, (2) holding an instrument-powered-lift rating (if the flight is flown under IFR), and (3) performing and logging flight pilot time in the type of aircraft or in a flight simulator for which SIC privileges are requested. However, the applicant would still be expected to meet § 61.55(b)(1) prior to flight time designated as the SIC (*i.e.*, the training flights), as subsequently discussed.

First, applicants receiving training in accordance with §§ 194.221, 194.223, 194.229, and 194.231 must possess the prerequisites set forth by § 194.215(a) (*i.e.*, at least a commercial pilot certificate with a category and class rating and the applicable instrument rating). By virtue of holding a

commercial pilot certificate and an instrument rating, the applicant would possess greater aeronautical experience than the current requirements set forth in § 61.55(a), which requires at least a private pilot certificate. The FAA recognizes that this aeronautical experience will not be in the applicable category in which the applicant seeks to serve as PIC (*i.e.*, the pilot will hold an airplane or helicopter rating on their commercial pilot certificate but seek to serve as SIC in a powered-lift). The FAA finds the possibility of a safety gap is mitigated both by the significantly higher amount of aeronautical experience that a commercial pilot must attain and standard of proficiency and competency a commercial pilot must demonstrate on the practical test as opposed to a private pilot. This includes valuable experience operating in the NAS, communicating with ATC, interacting with other air traffic, and acting as PIC of an airplane or helicopter, all of which generally translate to a degree to the basic duties and responsibilities of a SIC where other mitigations, subsequently discussed, exist for the purpose of flight training.

Additionally, under the SFAR, a person must also hold the corresponding instrument rating as part of the prerequisites in § 194.215(a). Again, the FAA recognizes this will not be the appropriate instrument rating as set traditionally required to act as SIC if the flight is flown under IFR as forth in § 61.55(a)(2). However, the same concept applies insofar as the person will possess experience and have demonstrated skill operating an airplane or helicopter under IFR. Further, many of the skill elements a person must demonstrate on the practical test for the instrument-airplane or instrument-helicopter exist on the instrument-powered-lift practical test as well. For example, a person with an existing instrument-airplane or instrument-helicopter rating is not required to demonstrate any of the tasks under AOO I, III, or V¹⁰⁶ on the instrument-powered-lift practical test, and only demonstrate a limited number of tasks under AOO II and VII.¹⁰⁷ Therefore, the FAA finds this foundational level of instrument experience, in tandem with the other mitigations described herein, provides a person with sufficient experience to serve as SIC in a flight training operation for which the person does not hold the "appropriate" instrument rating in the powered-lift.

As discussed, § 61.55(b) was implemented to ensure a designated SIC is sufficiently knowledgeable in the specific operational characteristics of an aircraft type certificated for more than one pilot flightcrew member. Specifically, under § 61.55(b), the applicant would be required to meet the familiarization requirements set forth under paragraph (b)(1). Additionally, the applicant would be required to complete the pilot time in the type of powered-lift, or in a flight simulator representing the type of powered-lift, set forth under paragraph (b)(2). The pilot time under § 61.55(b)(2) must include three takeoffs and landings to a full stop as the sole manipulator of the flight controls, engine out procedures and maneuvering with an engine out while executing the duties of PIC, and crew resource management training. The FAA finds this paragraph (b)(2) to present a barrier to the flights for the purpose of flight training, as the applicant cannot be expected to sufficiently demonstrate these maneuvers before receiving flight training on such maneuvers. Moreover, the applicant would be actively becoming proficient in these maneuvers by nature of accomplishing flight training for certification. Therefore, the person would not be required to meet § 61.55(b)(2).

However, while there are foundational skills and proficiency elements that translate between the prerequisite ratings and the duties of an SIC in a powered-lift for the purposes of the narrowly tailored flight training operations, the FAA finds it crucial for a person to be adequately familiar with the specific type of powered-lift on which the person will be serving as SIC. Therefore, to ensure an appropriate level of safety while simultaneously enabling operators of powered-lift certificated with more than one required pilot flight crewmember to train in the aircraft, the FAA will continue to require the person to meet § 61.55(b)(1). Specifically, before the person may serve as SIC for flight training in the powered-lift, the person must become familiar with the information set forth by § 61.55(b)(1)(i) through (v). The FAA notes that, like the application of § 61.55(b)(1) to any person seeking to serve as SIC regardless of aircraft, there is no minimum time or standardized delivery requirement for such familiarization. For example, because a person would be required to complete ground training for the powered-lift category rating,¹⁰⁸ the person could complete the requisite SIC familiarization as part of the ground

¹⁰⁴ At this time of this rulemaking, the SIC requirements applied only to large airplanes and turbojet powered multiengine airplanes type certificated for more than one required pilot flight crewmember. In 1986, the FAA extended the SIC pilot qualifications to include helicopters type-certificated for more than one required pilot flight crewmember (51 FR 40692, Nov. 7, 1986), citing the similar operating complexities of helicopters type certificated for more than one pilot and higher level of safety provided through specific training and flight testing of pilots (50 FR 10144, Mar. 13, 1985).

¹⁰⁵ NPRM, *Second-in-command qualifications and pilot-in-command proficiency checks*, 36 FR 5247 (Mar. 18, 1971), adopted in 1972 as a final rule (37 FR 14758). Renumbered from § 61.46 to § 61.55 in 1973 (38 FR 3161).

¹⁰⁶ Preflight Preparation, ATC Clearances and Procedures, and Navigation Systems.

¹⁰⁷ Preflight Procedures, Emergency Operations.

¹⁰⁸ §§ 61.63(b)(1) and 61.125(a).

training, as long as the subjects in § 61.55(b)(1)(i) through (v) specific to the powered-lift type to be operated were present.

D. Dual Controls Considerations Related to Flight Training and Supervised Operating Experience

1. Introduction

In the NPRM, the FAA did not propose any relief in the SFAR to the long-standing requirement that an aircraft must have dual controls for certain operations.

Section 91.109(a) stipulates that no person may operate a civil aircraft that is being used for flight instruction unless that aircraft has fully functioning dual controls.¹⁰⁹ This requirement is subject to limited exceptions including (1) manned free balloons¹¹⁰ and (2) instrument flight instruction in an airplane equipped with a single, functioning throwover control wheel, provided the instructor has determined that the flight can be conducted safely and the person manipulating the controls has at least a private pilot certificate with appropriate category and class ratings.¹¹¹ The prerequisite certificate and rating requirement ensures the person receiving instrument flight instruction in the airplane has previously demonstrated foundational knowledge and proficiency appropriate to the category and class in the airplane in which training occurs. The throwover control wheel also provides a means for the authorized instructor to directly intervene, when necessary, in the interest of safety.

Similarly, an aircraft must have dual controls if it is used to conduct supervised operating experience under § 61.64(g). Section 61.64 details requirements for certain situations when training or any portion of a practical test is conducted in an FSTD. Under § 61.64(f), if an applicant for a certificate or rating in a powered-lift uses an FSTD for any portion of the practical test and does not meet the experience requirements set forth in § 61.64(e) and does not complete the specific tasks on the practical test listed in § 61.64(f)(1) in an aircraft, then the applicant's pilot certificate is issued with a PIC

limitation.¹¹² Per § 61.64(g), the applicant may remove the limitation by, in part, completing 25 hours of flight time in an aircraft of the appropriate category, class (if a class rating is required), and type for which the limitation applies under the direct observation of a PIC, termed "supervised operating experience" (SOE). That PIC must hold a category, class (if a class rating is required), and type rating, without limitations, for the aircraft in which SOE is being conducted.¹¹³ While the FAA concedes there is no explicit regulation requiring an aircraft to be equipped with dual controls when a pilot is completing the 25 hours of required flight time in accordance with § 61.64, the PIC observing the flight is also acting as PIC of the operation and ensuring the safety of the flight. Therefore, the person observing the flight and acting as PIC must have access to a set of controls while the applicant is performing the duties of PIC while under the direct observation of the acting PIC.

However, as noted in the NPRM, some manufacturers have or intend to only design powered-lift with a single set of controls. Therefore, the FAA invited public comment on three specific points: (1) how a flight instructor would provide flight training in a powered-lift with only a single set of flight controls without adversely affecting safety; (2) how an applicant would meet the SOE requirements with a single set of flight controls in a powered-lift; and (3) how an operator would fully qualify pilots for air carrier operations in an aircraft without dual flight controls while meeting the enhanced standard expected of air carrier operations. Additionally, the FAA requested commenters provide any relevant data or technical analyses that could assist the FAA in evaluating the viability of pathways to single set of flight controls.

This section acknowledges comments received and describes the three alternate pathways that the FAA adopts in this final rule to facilitate airman certification in a powered-lift with a single functioning control and single

pilot station while upholding safety in the NAS.

2. Summary of Comments Pertaining to Flight Training and Dual Controls

The FAA received many comments pertaining to the situations under which dual controls are required, as outlined above. The comments generally opposed the current requirements that have existed for many decades, and the FAA grouped the comments into the subsequent general categories. The FAA addresses some comments in the same sections but finds that the alternates adopted in this final rule sufficiently address the remainder of comments (e.g., by adopting a commenter's suggestion in one of the alternate frameworks).

Support for Maintaining Only Dual Controls

ALPA supported the FAA's position in the NPRM pertaining to dual controls. Specifically, ALPA stated that allowing a pilot to operate an aircraft in the NAS with a single set of flight controls while receiving flight instruction in that specific powered-lift would result in a degradation of safety because the instructor would not have the ability to take control of the aircraft. While ALPA recognized that the military trains pilots in single-control configured aircraft, ALPA emphasized that flight instruction with a single set of controls has not occurred in any civil capacity. Further, ALPA stated that it is far too early to consider autonomous systems (e.g., simplified vehicle operations) as they have not been properly studied or analyzed through data collection. ALPA stated that existing studies with newly automated systems show that training must increase to ensure the pilot masters the use of automation and retains mastery of flying with the different combinations of automation due to various degrees of automation failure.

Neutral Over Dual Controls

EASA expressed neither direct support nor direct opposition to the NPRM's position pertaining to dual controls but provided situational awareness of their own regulations. Specifically, EASA stated that, according to the European requirements and standards for trainers, trainers require primary flight controls that are easily accessible by the student pilot and the instructor. EASA stated this may either be via dual controls or through a center control stick.

¹⁰⁹ Additionally, § 61.195(g)(1) references the requirements in § 91.109, stating that a flight instructor must perform all training from in an aircraft that complies with the requirements of § 91.109. Further, § 61.195(g)(2) requires the aircraft that a flight instructor provides flight training for a pilot certificate or rating issued under part 61 to have at least two pilot stations and be of the same category, class, and type, if appropriate, that applies to the pilot certificate or rating sought.

¹¹⁰ § 91.109(a)(1).

¹¹¹ § 91.109(a)(2).

¹¹² The applicant's pilot certificate will be issued with a limitation that states: "The [name of the additional type rating] is subject to pilot in command limitations," and the applicant is restricted from serving as pilot in command in an aircraft of that type. § 61.64(f)(2).

¹¹³ Additionally, the applicant must log each flight and the pilot in command who observed the flight must attest to each flight, the applicant must obtain the flight time while performing the duties of pilot in command; and finally, the applicant must present evidence of the supervised operating experience to a flight standards office to have the limitation removed. See § 61.64(g)(2), (3), and (4).

Align With ICAO Annex 1, 2.1.1.4

Many commenters urged the FAA to align with ICAO Annex 1, recommendation 2.1.1.4. Commenters, including GAMA, Eve, and L3Harris, stated this alignment with ICAO would eliminate the requirement for dual controls because the dual controls requirement is directly related to flight training requirements to achieve a powered-lift category rating and an instrument-powered-lift rating. Specifically, commenters stated that all flight training for the addition of a type rating to a commercial pilot certificate with an airplane category rating or rotorcraft category rating with helicopter class rating could be conducted in a high fidelity FSTD. These commenters further urged the FAA to acknowledge the aeronautical experience in one category of aircraft as creditably similar to the experience required for powered-lift qualifications, citing §§ 61.3(e)(3) and 61.159(a)(5)(ii).

As discussed in section V.A. of this preamble, the FAA is not implementing recommendation 2.1.1.4, which would permit a pilot to add a powered-lift type rating to an existing commercial pilot certificate with airplane category rating or rotorcraft category, helicopter class rating. This final rule maintains the traditional airman certification framework, even within the SFAR alternate requirements, to hold the powered-lift category rating. However, the FAA notes that, even if the FAA did align with the ICAO recommendation, barriers for single controls powered-lift would persist. Section 91.109 applies to civil aircraft being used for flight instruction generally; in other words, § 91.109 is applicable to flight training in the aircraft for a type rating. The FAA acknowledges that type specific flight training could occur in an FSTD, pursuant to § 61.31(h), which could alleviate the dual controls requirement.¹¹⁴ However, in the event there was not yet a qualified FSTD representative of that type of aircraft, the person would complete their type-specific flight training in the aircraft, which would fall under § 91.109 requirements (*i.e.*, a set of fully functioning dual controls). Additionally, a person who chose to complete the type rating practical test in

¹¹⁴ In this final action the FAA has determined utilizing § 61.31(h) in which a specific powered-lift would be subject to type specific training as determined by the FAA (as opposed to training for a type rating) would not adequately address the training necessary because of the unique differences inherently present in powered-lift being developed. Instead, the FAA has determined in the interest of safety that all powered-lift require a type rating as outline in adopted § 61.31(a)(3).

an FSTD pursuant to § 61.64 would be required to complete certain aeronautical experience requirements or complete SOE set forth by § 61.64, which, as discussed in the introduction to this section, inherently requires a set of dual controls.

Align With the U.S. Armed Forces' Approach

Commenters urged the FAA to utilize the U.S. Armed Forces' approach to qualifying pilots in powered-lift through high fidelity simulation, augmented flight controls, and endorsed solo experience. These commenters included GAMA, FSI, Archer, AUVSI, and Joby. Many comments specifically referenced the Department of Defense's F-35 Lightning Joint Strike Fighter program.¹¹⁵ Specifically, commenters stated that, in the case of the F-35 program, the DoD found that a two-seat trainer to be unnecessary largely due to the abilities of high-fidelity simulators. GAMA and Joby urged the FAA to utilize the F-35B training and readiness manual, NAVMC 3500.118B, as a reference point for civilian powered-lift training programs.

One individual commenter recognized the military's development of "T" version aircraft: single-seat aircraft that have been modified with two seats and dual flight controls specifically for the purpose of flight training. The commenter stated that a similar scheme could be followed for civil powered-lift rather than instituting training provisions for powered-lift with a single set of controls. Relatedly, HAI recommended that the FAA implement a performance-based structure that allows OEMs to develop appropriate training plans using acceptable methods, including advanced simulation, to meet training and qualification objectives, and specifically suggested the FAA collaborate with defense contractors who have already demonstrated the safety, effectiveness, and cost benefits of single seat aircraft

¹¹⁵ One commenter specifically referenced an opinion editorial article, (www.forbes.com/sites/mikehirschberg/2023/08/10/faa-should-heed-1990s-powered-lift-training-decision/), which discussed two DoD commissioned studies conducted by the Johns Hopkins University Applied Physics Laboratory and the Georgia Tech Research Institute. Both independent studies concluded a single-engine fighter aircraft could be just as safe as a twin-engine fighter aircraft. The article further stated that the decisions for the F-35 to have only one seat and for the program to forgo the development of a dual-seated trainer for new pilots was due to "[t]he expense of developing another variant—a two-seat trainer—was seen as completely unnecessary due to the high fidelity of flight simulators of the day and the capabilities of digital fly-by-wire flight controls." The author asserted the FAA could allow the same practice for civilian powered-lift without compromising safety.

simulators will yield similar results for OEMs developing powered-lift for the commercial aviation sector.

The FAA does not find the comparison of military aircraft to a wholly new category of aircraft to be an equivalent one. Military aircraft are not designed and built to the same safety standards as an FAA certified aircraft. Single-seat, military combat aircraft—with or without ejection seat systems—are not designed to comply with the robust statutory or regulatory standards as passenger-carrying aircraft that receive an FAA type certificate. The DoD operations are inherently characterized by different safety continuum considerations and liability thresholds. Additionally, regarding simulator training, the amount of technology and resources available to DoD differs greatly from that which is available to the civilian aviation sector. Specifically, before military pilots begin training on single seat aircraft or simulators, they traditionally have already received training and qualification in at least another category of aircraft. Taking the differences into account, as discussed further in section V.D.3.ii. of this preamble, the FAA is adopting a similar, though not identical, approach to that of DoD in this final rule to facilitate airman certification for powered-lift used in the civil operations.

Full Training and Testing in an FSTD

Commenters including FSI, NBAA, CAE, Archer, Lilium, Supernal, and Eve overwhelmingly advocated for the concept that pilots could be fully trained and tested in an approved FSTD; likewise, the Advanced Air Mobility Institute encouraged the FAA to engage in collaboration with industry to explore utilization.^{116 117} For example, Archer specifically outlined a program under which the applicant would complete ground training and all aeronautical experience training in the FSTD, receive a solo endorsement, and then complete solo time in the powered-lift. Additionally, ADS recommended that advanced aircraft technology be considered when developing training requirements for powered-lift and also

¹¹⁶ Generally, commenters advocated for an alternate pathway for pilots with the prerequisites as proposed under the SFAR (*i.e.*, a commercial pilot certificate with an airplane category rating or rotorcraft category, helicopter class rating and the corresponding instrument rating) rather than an ab initio applicant.

¹¹⁷ The FAA understands the commenter's phrase of "buddy box system" in this context as two radio systems whereby the control of the powered-lift could be released to the student and removed from the student by the instructor with the flick of a switch.

recommended that the FAA expand its credit of aeronautical experience in a simulator and subsequently require solo experience to be gained in the aircraft. Commenters relied on the comparative premise that training for a type rating may be fully completed in the simulator, with no time in the type of aircraft itself, which translates to the FAA's recognition that FSTDs are a commonplace means of delivering training, particularly as it pertains to abnormal and emergency situations.

In-Aircraft Monitored Training and Related Technology

Commenters including FSI, NBAA, CAE, Liliun, and AUSVI, urged the FAA to consider innovative technologies outside of a traditional FSTD that could facilitate in-aircraft training for those powered-lift with a single set of controls. Specifically, commenters cited artificial intelligence, virtual reality, mixed reality, augmented reality, headsets with camera systems, eye tracking technology, aircraft control movements, and keystroke and touchscreen inputs as options for instructors to train (for purposes of § 91.109) and supervise (for purposes of § 61.64) from the ground. Additionally, commenters stated the instructor could observe from the forward most passenger-seat, in tandem with the aforementioned remote technologies, for real-time monitoring. An individual commentor also urged the FAA to consider capitalizing on remote safety pilot technology or built-in autonomous systems that are able to swiftly take over full control of the powered-lift during in-aircraft training sessions. Liliun stated that automated fly-by-wire systems and advanced flight control laws provide safety measures and envelope protection enhance situational awareness and reduces complexity of aircraft. Liliun described these features as contributing to a safe flight training regime by preventing over-corrections and stalls, while hands-free hover positioning and altitude hold capabilities further enhance safety during flight training, negating the need for dual controls requirements.

Opposition to Dual Control Trainers

Commenters disagreed with the FAA's expectations as stated in the NPRM that powered-lift manufacturer's develop dual control trainers for their single control aircraft. Commenters opposed such development, first, on the grounds that the dual control trainer would not be an accurate representation of the single control aircraft, which would present an operational discrepancy when the applicant would

move from the dual control trainer to the actual powered-lift in the NAS. Additionally, many commenters emphasized that the development of a dual control trainer would be costly and create significant delays for manufacturers at this stage of powered-lift progress and certification, especially after relying on the FAA's original position that powered-lift would be certificated as airplanes, which held until changed in 2022.¹¹⁸ These commenters included FSI, NBAA, CAE, Archer, Eve, HAI, and the Honorable Jeff Van Drew.

3. Alternate Pathways

In light of the overwhelming support for innovative pathways to facilitate training in powered-lift with a single set of controls, the FAA analyzed the safety intent of the requirement for dual controls in flight training and SOE to determine whether nontraditional alternate pathways could achieve an equivalent level of safety to in-aircraft training. In this final rule, the FAA adopts three pathways to accomplishing flight training and SOE for powered-lift with a single set of controls. This section first explains the FAA's three adopted alternate pathways. The FAA trusts that these pathways will address the majority of commenters discrete issues; however, the second part of this section responds to certain comments that may not be enveloped in the three alternate pathways.

i. Alternate One: Powered-Lift Equipped With a Single Instantly Accessible Functioning Flight Control

As previously discussed, § 91.109(a) restricts a person from operating a civil aircraft that is being used for flight instruction unless that aircraft has fully functioning dual controls. However, there are some narrowly tailored exceptions to this restriction: (1) if the aircraft is a manned free balloon, (2) for the purpose of instrument flight instruction in an airplane equipped with a single, functioning throwover control wheel that controls the elevator and ailerons,¹¹⁹ and (3) for the purposes of a flight review under § 61.56 or to obtain recent flight experience or an instrument proficiency check under

¹¹⁸ The FAA acknowledges that certain manufacturers were of the understanding that they would be classified as an airplane. Commenters expressed that reliance on this position led manufacturers to believe they would not need dual controls in powered-lift even for training.

¹¹⁹ Pursuant to § 91.109(a)(1) and (2), to utilize this exception, the instructor must determine that the flight can be conducted safely and the person manipulating the controls must have at least a private pilot certificate with appropriate category and class ratings.

§ 61.57 in an airplane equipped with a single, functioning throwover control wheel that controls the elevator and ailerons.¹²⁰ Dual controls requirements can be traced back to the inception of the Civil Aviation Regulations in 1938¹²¹ and the FAA instituted the first two exceptions in 1978 to then § 91.21¹²² in response to a public solicitation for proposals in relation to an Operations Review Program. The FAA explained that the exceptions were appropriate in light of numerous exemptions allowing AOPA and the AOPA Air Safety Foundation to conduct simulated instrument instruction at flight training clinics using single-engine airplanes equipped with a single, functioning throwover control. The FAA instituted the third exception in 2011, again, in response to numerous exemptions that allow instructors to provide recurrent flight training and simulated flight training for the purpose of meeting recency of experience requirements and flight review requirements in airplanes equipped with a single, functioning throwover control wheel.¹²³

Notwithstanding the exception for manned free balloons, these exceptions share two characteristics. First, the flight instructors have access to a control such that if there exists a condition warranting immediate action (e.g., immediately taking the controls to maneuver the aircraft so as to see and avoid traffic or take controls to ensure a maneuver does not result in a mishap or exceed an aircraft limitation), the flight instructor can intervene. Second, in each of the two exceptions, the applicant pilot possesses a pilot certificate. In other words, the single, throwover control is considered sufficient in instances where the person manipulating the controls has prerequisite certificates and ratings (i.e., foundational aeronautical experience). Specifically, in the exception under

¹²⁰ Pursuant to § 91.109(b), the airplane must also be equipped with operable rudder pedals at both pilot stations; the pilot manipulating the controls must be qualified to serve and serves as PIC during the entire flight; the instructor must be current and qualified to serve as PIC of the airplane, meet the requirements of § 61.195(b), and have logged at least 25 hours of PIC flight time in the make and model of airplane; and the PIC and instructor have determined the flight can be conducted safely.

¹²¹ See 14 CFR 20.655 (1938), which stated, in pertinent part, that "no flying instruction shall be given in any aircraft, for or without hire, unless such aircraft is equipped with fully functioning dual controls and a certificate instructor is in full charge of one set of said controls."

¹²² General Operating and Flight Rules and Related Airworthiness Standards and Crewmember Training, 43 FR 46233 (Oct. 5, 1978).

¹²³ Pilot in Command Proficiency Check and Other Changes to the Pilot and Pilot School Certification Rules, 76 FR 54095 (Oct. 31, 2011).

§ 91.109(a)(1) and (2), the person receiving instrument flight instruction must have at least a private pilot certificate with appropriate category and class ratings. Similarly, in the second exception under § 91.109(b), the person manipulating the controls is a certificated and rated pilot who is receiving instruction for a flight review, recent flight experience, or an instrument proficiency check. These activities are conducted to maintain privileges, not to obtain them for the first time.

Therefore, the FAA finds extending mirrored relief to that as provided in § 91.109(a) and (b), and similar to that of EASA,¹²⁴ would not adversely affect safety for pilots seeking certification under the SFAR (*i.e.*, an instantly accessible, single, functioning flight control in an aircraft with single controls where two pilots are seated in the flightdeck of the aircraft). Both prongs of safety criteria will be met: (1) the powered-lift will have a control such that the flight instructor can immediately intervene in an emergency event, as well as maintain the ability to demonstrate a maneuver if necessary, and (2) the pilots under the SFAR will have at least a commercial pilot certificate with an airplane category rating or rotorcraft category rating with helicopter class rating and the corresponding instrument rating.

Under § 194.253(a)(1), this alternate requirement would be extended only to those pilots seeking a powered-lift category rating, powered-lift type rating, and instrument-powered-lift rating under the SFAR (*i.e.*, those qualified in accordance with § 194.215(a) who are instructor pilots, test pilots, FAA test pilots, aviation safety inspectors, the initial cadre of instructors, and pilots receiving training under an approved training program). Additionally, under new § 194.253(a)(1)(i) and (ii), the instructor must be an instructor pilot for the manufacturer of the powered-lift under the manufacturer's proposed training curriculum or a flight instructor under an approved training curriculum under part 135, 141, or 142, as applicable.

Under new § 194.253(a)(2), a person may operate a powered-lift for flight training without fully functioning dual controls provided it is equipped with a

single, functioning control¹²⁵ that is instantly accessible by both the applicant and the instructor.¹²⁶ As discussed in the NPRM, some powered-lift are equipped with inceptors, which encompasses a wide variety of non-traditional pilot controls through which pilot inputs are managed for the purpose of operating the powered-lift. The FAA notes that although this alternate pathway enables powered-lift with one flight control to be used in flight instruction, the two seats or pilot stations with access to this single flight control would be evaluated during the aircraft certification process using the certification standards for pilot stations. Additionally, instant accessibility means that the person providing the instruction would be able to take immediate corrective action and full control of the aircraft from their occupied seat. Finally, the instructor pilot must determine that the flight can be conducted safely.

ii. Alternate Two: Full Flight Simulator (FFS) Training for Powered-Lift With Single Functioning Controls and a Single Pilot Station

Overview

While an instantly accessible, single, functioning flight control, including a throwover control, presents a viable option for training in an aircraft with single controls where two pilots are seated in the flight deck of the aircraft (*i.e.*, where the control is accessible through virtue of side-by-side seats), the FAA acknowledges that some powered-lift will have a single pilot station. This would render the option of an instantly accessible, single, functioning flight control as inherently unfeasible. In light of commenters' recommendations for full qualification through FSTD training and testing, the FAA evaluated how to facilitate a path for full training and testing in an FFS for a powered-lift category rating, powered-lift type rating, and instrument-powered-lift rating, while maintaining an equivalent level of

safety to that of flight training in an aircraft equipped with fully functioning dual controls (or a single, functioning flight control that is instantly accessible to both the applicant and the person providing the flight instruction in their respective pilot station). To ensure an equivalent level of safety to that of in-aircraft training through this unconventional training and testing framework, the FAA evaluated six main factors and mitigations: prior piloting experience, FAA oversight of training programs, simulator fidelity, demonstration and familiarity flights, solo flight, and SOE. To this end, the FAA adopts in this final rule an alternate framework to facilitate training and testing for a powered-lift category rating, powered-lift type rating, and instrument-powered-lift rating. This final rule facilitates the framework through § 194.253(b) and the alternate framework process in new appendix A to part 194, mirroring a part 141 minimum curriculum appendix.¹²⁷ The following sections describe the linear framework, safety considerations, and mitigations to enable training in an FFS that represents a powered-lift with single controls and a single pilot station.

Applicability and Eligibility

The relief provided in the alternate framework will apply to only those pilots simultaneously seeking a powered-lift category rating, a powered-lift type rating, and an instrument-powered-lift rating in a powered-lift with single fully functioning controls and a single pilot station. Therefore, while the traditional airman certification approach under part 61 permits a piecemeal approach for a pilot to obtain a rating,¹²⁸ this alternate pathway for powered-lift ratings would require an applicant to train for all three ratings simultaneously.¹²⁹ Because an

¹²⁷ Specifically, § 141.55 requires training courses to meet the minimum curriculum requirements in accordance with the appropriate appendix of part 141. The appendices set forth the minimum curriculum requirements for that certification course under part 141 (*e.g.*, eligibility for enrollment, aeronautical knowledge training, flight training, etc.).

¹²⁸ For example, a person seeking an airplane or helicopter type rating has flexibility to take the type rating practical test independent of other practical tests and may obtain an instrument rating in an airplane or helicopter for which a type rating is not required prior to applying for a type rating in an airplane or helicopter. Additionally, because there exist airplanes and helicopters where a type rating is not required, a person could obtain the category and class ratings independent of a type or instrument rating.

¹²⁹ See section V.F.3. of this preamble for further discussion of the FAA's determination that a powered-lift-instrument rating is necessary to utilize this pathway.

¹²⁴ Pursuant to AMC4 to appendix 6 of EASA regulations, the airplane used for instrument flight training provided outside an ATO by an IRI(A) or FI(A) should be fitted with primary flight controls that are instantly accessible by both the student and the instructor, for example, dual flight controls or a center control stick. Additionally, the regulation states that swing-over flight controls should not be used.

¹²⁵ The FAA notes this relief is similar to that suggested by BETA Technologies, who recommended the FAA add additional requirements to § 91.109 to allow for shared controls for pitch and roll that may include devices other than control wheels. (A pilot uses a "control wheel" or "yoke" to control the attitude of an aircraft usually in both pitch and roll. Rotating the control wheel controls the ailerons and the roll axis.) The final rule as described herein will allow a shared control but does not require the shared control to be a control wheel device.

¹²⁶ The FAA notes that since both pilots have immediate access to the control and, therefore, the ability to manipulate the controls of the powered-lift, if supervised operating experience was required after a person's practical test via § 61.64 requirements, the aircraft could be used for supervised operating experience.

applicant utilizing this relief would be required to seek the three ratings simultaneously, § 194.211 inherently would not be applicable to this population of applicants training and testing via this alternative in a powered-lift with single controls and equivalent FSTD.¹³⁰

This training alternate pertains to the training requirements for powered-lift originally type certificated with single fully functioning controls and a single pilot station or a powered-lift undergoing the type certification process with these features. When opting for this alternate for initial and add-on ratings in a single flight control powered-lift, pilots are required to complete additional flight hours as stipulated in §§ 194.253 and 194.255 (e.g., the familiarization flight, demonstration flight, and supervised operating experience). As a result, this alternate is not applicable to those powered-lift originally certificated with dual controls and dual pilot stations or those with single functioning flight controls and dual pilot stations. Similarly, this alternate is not applicable to dual control powered-lift designs that are later altered to a single set of fully functioning controls and a single pilot station through a Supplemental Type Certificate (STC) or other means, such as disconnecting a removable set of controls.

When developing the FFS Training alternative, the FAA considered the level of experience that a pilot utilizing this alternative should possess. The FAA has long maintained the position of the importance of actual aircraft experience when an applicant uses flight simulation for training and testing, especially as it pertains to ab initio pilots.¹³¹ Where an ab initio pilot has little to no experience in an aircraft in the NAS, the FAA maintains that in-aircraft training and testing (or required SOE when an applicant accomplishes the entire practical test in an FFS) is paramount in ensuring pilot proficiency. Simulation offers many benefits to training, particularly as it relates to training abnormal and

emergency procedures, such as brown or white out conditions, engine inoperative procedures during critical phases of flight, and system malfunctions that cannot be safely replicated in actual flight. However, the actual flight environment requires certain knowledge and skills and provides experiences that may not be able to be comprehensively accomplished in a simulator (e.g., the experience of actually landing on a pinnacle, or conduct a steep approach into a confined area at night). Additionally, simulator training does not fully replicate the inflight environment in the flightdeck of an aircraft, taking into considerations such as realistic ATC communications, flightdeck distractions, temperature extremes and noise, unexpected interactions with traffic not communicating with ATC, or adapting to unexpected weather conditions to the degree expected in the actual flight environment.

A pilot utilizing the SFAR will be required to have the prerequisite certificate and ratings prescribed in § 194.215(a), which is a commercial pilot certificate with either an airplane category rating with a single-engine and/or multiengine land or sea class rating or a rotorcraft category rating with helicopter class rating, and the corresponding instrument rating.¹³² This requirement ensures the pilot seeking the powered-lift ratings via this appendix has extensive exposure to in-aircraft flight training and aircraft operations within the NAS,¹³³ including a variety of operational and environmental issues that cannot be fully replicated in an FFS. Additionally, to hold these ratings, the pilot would have demonstrated, at a minimum, a level of aircraft mastery required to achieve the commercial pilot certificate and instrument ratings and, therefore, be certificated at a level that enables them to serve as a pilot for compensation or hire. Therefore, the FAA has determined that holding such certificates and ratings will ensure that pilots utilizing the FFS Training

alternative will possess key knowledge, skills, as well as exposure and experience of operating an aircraft in the NAS, all of which cannot be fully replicated in a simulator for a pilot that lacks the required prerequisites for entry in this training alternative.¹³⁴

In addition to the prerequisites, an important aspect of this training alternative is the requirement for the training to be conducted by an FAA-approved program under part 135, 141, or 142. This ensures the training is conducted via an approved curriculum fostering quality, standardized training, which results in consistent, highly effective training. Additionally, these FAA-approved programs have a higher level of FAA oversight than training that is conducted outside of an FAA-approved training program. Requiring this training to be conducted under an approved program enables the FAA to evaluate the quality of the training and ensure the training course syllabuses are followed, and it affords the FAA the ability to work with the training provider to correct deficiencies. Another advantage of an approved program is that the provider and the FAA can gather data and monitor trends so that positive adjustments can be made to the program to ensure a high level of effective training continues to be provided. The FAA notes that the training curriculum submitted must encompass all the necessary training for a pilot to obtain a commercial pilot certificate with powered-lift category rating, an instrument-powered-lift rating, and type rating for the powered-lift that is being trained on that is equipped with only a single set of flight controls.

However, under this appendix approach, if a manufacturer is not one of the certificate holders mentioned, they will not be able to utilize this provision.¹³⁵ Although this necessitates

¹³⁰ Section 194.211 sets forth certain provisions permitting a person to obtain an initial powered-lift type rating without concurrently obtaining the instrument-powered-lift rating or an additional powered-lift type rating with a "VFR Only" limitation. The FAA is not extending the relief contained in § 194.211 to ensure that applicants utilizing this framework will be able to act as PIC while completing the cross-country requirements set forth in appendix A, section 8.(a)(iii).

¹³¹ E.g., Aircraft Flight Simulator Use in Pilot Training, Testing, and Checking and at Training Centers, final rule, 61 FR 34508 (Jul. 2, 1996); Pilot, Flight Instructor, and Pilot School Certification final rule, 74 FR 42500 (Aug. 21, 2009).

¹³² The FAA considered whether a lower certificate level (i.e., private pilot certificate) would be a viable alternative minimum level of qualification but finds that a private pilot's experience through their limited privileges may not adequately ensure the foundational knowledge, skills, and proficiency such that the person should bypass in-flight training elements and situational exposure.

¹³³ A pilot seeking an airplane category rating must have at least 250 hours (190 hours if training at a part 141 pilot school) and a pilot seeking a rotorcraft category helicopter class rating must have at least 150 hours to be eligible for a commercial pilot certificate.

¹³⁴ The FAA notes that there currently exist scenarios where fully rated pilots in other categories of aircraft with a similar level of experience as described herein seek to train on an aircraft with a single set of controls and a single pilot station. The relief adopted herein is a temporary measure meant to springboard the entry of a new category of aircraft and sufficient numbers of flight instructors and pilots to support this industry sector. Moreover, unlike airplanes and helicopters, the type rating requirement for each powered-lift creates a unique scenario where a pilot cannot first obtain category and class ratings before separately seeking a type rating. One benefit of this SFAR is to collect information and data to later educate the FAA when contemplating future permanent amendments for both powered-lift and aircraft in general, including dual controls requirements.

¹³⁵ The FAA has established a Flight Standards Certification Team (FSCT) to allow for the expedited processing of certifications. The process to complete certification of a new Air Agency

that an OEM become a certificate holder under one of these parts, this requirement will help ensure the FAA has the necessary tools and authority to conduct surveillance and gather data on this new and novel approach to certificating pilots in a single flight control powered-lift. In this respect, the appendix approach differs from the provisions set forth in the SFAR for aircraft equipped with dual controls under the current regulatory framework, which do not necessarily require a manufacturer to become one of the certificate holders mentioned. For example, the alternate aeronautical experience requirements in §§ 194.217 and 194.219 may be completed at a powered-lift manufacturer without the manufacturer having to become a part 135 operator, part 141 pilot school, or part 142 training center.

The first two sections of new appendix A to part 194 prescribe applicability and eligibility provisions in section 1. and 2., respectively. Specifically, appendix A, section 1.(a) sets forth the specific ratings for which a person may utilize the minimum requirements of the appendix to apply for a pilot training program in a powered-lift with a single control and a single pilot station and specifies that the powered-lift must be type certificated, or seeking type certification, with one set of controls and a single pilot station. Section 1.(b) requires that a person utilizing the pathway set forth in the appendix apply for all three ratings simultaneously. Section 2.(a) sets forth the prerequisite qualification requirements an applicant must possess as stipulated in § 194.215(a). Finally, Section 2.(b) requires the training and testing under the appendix to be provided under a part 135, 141, or 142 approved training program.

Ground Training

Ground training is an integral part of a training program that ensures an applicant has received the required instruction on the required aeronautical knowledge areas and has been found competent. Section 61.63 prescribes the requirements to apply for additional

certificate consists of five phases; Preapplication, Formal Application, Design Assessment, Performance Assessment, and Administrative functions in which the FAA combines into three gates. Gate I consists of the Final Preapplication Statement of Intent and completion of the Preapplication Meeting. Gate II consists of the Formal Application and Design Assessment and is allotted 90 days for completion. Gate III consists of Performance Assessment and Administration Functions in which the FSCT allots 30 days for completion. Therefore, if an applicant is prepared, the timeline for certification would take approximately 120 days to complete.

aircraft category, class, and type ratings other than ratings at the ATP certification level, and § 61.65 prescribes the requirements to apply for an instrument rating. A person who applies to add a powered-lift category and a type rating to a pilot certificate is required to complete the requisite ground training from an authorized instructor on the aeronautical knowledge areas specified in § 61.125(b).¹³⁶ Similarly, § 61.65 requires a person to receive and log ground training from an authorized instructor or accomplish a home-study course of training on the aeronautical knowledge areas set forth in § 61.65(b) that apply to the instrument rating sought.¹³⁷ The appendix will not alter the requirement to receive and log ground training on the applicable aeronautical knowledge areas, but section 3.(a) of the appendix will require the applicant to complete all the required ground training, which must be outlined in the certificate holder's approved training program, prior to starting the simulator training phase. To ensure a person's competency on the required aeronautical knowledge areas, including those for the specific powered-lift type, a person will be required to pass a knowledge check prior to starting the simulator training phase pursuant to new section 3.(b) of the appendix. However, because the person would already hold a commercial pilot certificate and an instrument rating, by virtue of the prerequisites in § 194.215(a), the person would not be required to take an FAA knowledge test.¹³⁸ Rather, the knowledge check will be within the purview of the training program to determine the processes and procedures (e.g., number of questions, scenario based questions, etc.) of the knowledge check, but it must comprehensively cover the required aeronautical knowledge areas. The required knowledge check may be administered using written or oral questions or a combination of both written and oral questions, and the outcome of the knowledge check will be documented in the applicant's training record. The method and content of a knowledge check must be submitted as part of the required documentation when a person submits the training program to the FAA for review and approval. A knowledge check should be similar to a progress or stage check commonly found in an operator's approved training program under parts 135, 141, and 142, the intent

¹³⁶ § 61.63(b)(2).

¹³⁷ § 61.65(a)(3), 61.65(b).

¹³⁸ §§ 61.63(b)(4), 61.63(d)(4), 61.65(a)(7).

of which is to ensure the applicant possesses the foundational aeronautical knowledge of a specific powered-lift type before commencing the next phase of simulator training.

Full Flight Simulator Training

In lieu of flight training in an aircraft, section 4. of the appendix will permit the flight training requirements referenced in § 194.217 through § 194.235 as well as any other applicable flight training requirements under part 61 to be accomplished in a qualified Level C or higher FFS. An operator will be required to submit their training program to the FAA for approval. The program must incorporate all the flight training necessary for an eligible applicant¹³⁹ to receive a powered-lift category, instrument-powered-lift rating, and type ratings under parts 61 and 194. At a minimum, the training program must include at least 20 hours¹⁴⁰ of flight training in an FFS for the commercial pilot powered-lift category and 15 hours¹⁴¹ of flight training in an FFS for the instrument rating.¹⁴²

This FFS training may only commence after the applicant completes the ground training portion of the training program as set forth by section 3.(a) of the appendix. As discussed in section V.F.2 of this preamble, to ensure the applicant receives training in an FFS that replicates flight in the actual aircraft as closely as possible, the FFS must be a Level C or higher qualification level. The fidelity, and therefore qualification level, of the FFS is a vital element of this alternative method of training since the applicant will receive no flight training in the aircraft, may not possess a powered-lift category rating and instrument-powered-lift rating, and will have little or no prior experience flying this powered-lift type. Additionally, after the completion of the FFS training phase, the applicant who is seeking a powered-lift category, powered-lift instrument rating, and powered-lift type rating concurrently for

¹³⁹ As noted, only certain pilots will be eligible for this training under section 2 of the appendix.

¹⁴⁰ §§ 194.217 (b)(1), 194.219(b)(1), 194.221(b)(1) and 61.129(e)(3).

¹⁴¹ §§ 194.225(b)(1), 194.227(b)(1), and 61.65(e)(2).

¹⁴² Of the 35 hours of flight training in the FFS, 15 hours is creditable toward the 35 hours of PIC flight time required by § 194.216(a). Additionally, the FAA notes that when instrument training is being logged toward a commercial pilot certificate with powered-lift category rating, the same training could be concurrently utilized and log toward the instrument training requirements required for a powered-lift-instrument rating. See Legal Interpretation to Ms. Kristine Hartzell- Airline Owners and Pilots Association (December 17, 2010).

the represented powered-lift, will transition to flight in the actual aircraft with only single controls and a single pilot station. Therefore, the applicant must have some experience with a closer degree of realism of the FFS, which is only characterized at these highest qualification levels. For those pilots who already possess a powered-lift category and instrument rating and are seeking only a type rating for the powered-lift, the required qualification level of the simulator aligns with established requirements to add a type rating for other categories of aircraft.

Therefore, as set forth in new section 4.(a) of the appendix, an applicant seeking all three ratings must complete all the applicable flight training requirements of § 194.217 through § 194.235, including the two instrument cross-country flights required by § 194.235, which will be conducted in the FFS, and the applicable flight training requirements under part 61. However, the cross-country requirements of § 194.233 will be accomplished during the solo segment of the training program. At the successful completion of the FFS training phase, as detailed in the approved training program, and prior to advancing to the in-aircraft phase, the applicant must satisfactorily accomplish a check administered by a person authorized to conduct this check. As set forth in 4.(b) of the appendix, a person authorized to administer the check can be a check pilot, a training center evaluator (TCE), an authorized instructor, an instructor pilot, an FAA aviation safety inspector (ASI), or another person authorized by the FAA to administer this check. Specifically, the check must consist of oral questioning and the satisfactory performance of all the maneuvers and procedures required for the issuance of a commercial pilot certificate with a powered-lift category rating, for the issuance of an instrument-powered-lift rating, and for the issuance of a powered-lift type rating.¹⁴³ Requiring the applicant to demonstrate the maneuvers and procedures required for the issuance of the rating(s) ensures the

¹⁴³ As is currently applicable, when an applicant is concurrently seeking a pilot certificate with instrument and type ratings, and there are overlapping tasks between the practical tests the applicant may conduct a task required for the multiple ratings sought a single time provided the task is performed to the higher standard. For example, if an applicant seeking a commercial pilot certificate with instrument-powered-lift rating, and type rating for the aircraft sought must conduct a precision approach for both the type rating and instrument rating, the applicant would only need to demonstrate the task once provided they perform it to the higher standard.

applicant has the knowledge and mastery of controlling the aircraft prior to advancing to the training segment where flight in the aircraft without a set of dual controls will occur (*i.e.*, when the applicant will have full control of the aircraft and the flight instructor may not have a method by which to intervene). This check requirement is also important since the applicant will not yet possess a powered-lift category or instrument rating, thereby possessing no prior experience flying this powered-lift type in addition to holding little to no category experience. The successful completion of the FFS check establishes a 90-day window in which the applicant must accomplish both the familiarity flight and demonstration flight as discussed in the following sections.¹⁴⁴ Failure to complete both the familiarity flight and demonstration flight within this 90-day timeframe will require the applicant to return to the FFS and successfully complete a demonstration of proficiency, of which the content should include, at a minimum, the maneuvers and tasks contained in section 10. of appendix A.

The FAA notes that because the FFS training would be provided under a part 135, 141, or 142 approved training program, the applicable requirements of those parts must also be met. This includes documenting the training and testing in accordance with the part under which the training program is offered, pursuant to the regulations within those parts.

Aircraft Familiarity Flight

The aircraft familiarity flight is the first of two in-flight training program segments required to transition the applicant from the FFS training phase to the aircraft training phase of the training program. Section 5. of the appendix will dictate the requirements of the aircraft familiarity flight. The purpose of this segment is to expose the applicant to the operation of the aircraft in actual flight in the NAS where the authorized instructor must demonstrate all of the maneuvers and procedures required for the issuance of a commercial pilot certificate with a powered-lift category rating, for the issuance of an instrument-powered-lift rating and for the issuance of a powered-lift type rating, pursuant to new section 5.(b)(1). Additionally, it will provide the authorized instructor an opportunity to familiarize the applicant with the local flight area to include practice areas and departure airport familiarization. The aircraft familiarity flight must be accomplished

¹⁴⁴ Appendix A to part 194, 4.(b), 5.(a) and 6.(a)(4).

in the aircraft with an instructor piloting the aircraft with the applicant having unobstructed visual sight of the controls and the instrumentation, and able to engage in active communication with the instructor during the entire flight under new section 5.(b)(2). During the aircraft familiarity flight, if the same task or maneuver is required for the issuance of a commercial pilot certificate with a powered-lift category rating, for the issuance of an instrument-powered-lift rating, and for the issuance of a powered-lift type rating that same task or maneuver does not have to be demonstrated more than once. Additionally, tasks or maneuvers that have been waived in accordance with § 194.207(c) are not required to be demonstrated (*i.e.*, tasks that the powered-lift physically cannot perform). Pursuant to new section 5.(c), the aircraft familiarity flight may involve one or more flights to accomplish a demonstration of all the required tasks.

After a person completes the aircraft familiarity flight, the authorized instructor may endorse the applicant in accordance with new section 5.(d) to act as PIC to accomplish the demonstration flight with an authorized instructor on board. However, this endorsement will be valid only for 90 days from the date of the check in the FFS was completed (*i.e.*, the check in accordance with new section 4.(b) of the appendix).¹⁴⁵ This timeframe is because the demonstration flight will be the first flight that the applicant pilots the actual aircraft in the NAS for which they do not have a category rating; therefore, the linear process of flights (proficiency check in FFS, aircraft familiarity flight, and demonstration flight) must be accomplished in a timely manner so the proficiency from the FFS training and the information obtained from the aircraft familiarity flight does not degrade.

Demonstration Flight

The next phase in the training program set forth in the appendix includes a demonstration flight. The purpose of a demonstration flight is to enable an authorized instructor to ascertain that an applicant possesses satisfactory proficiency in the operation of the aircraft to then act as PIC safely in solo flight. In other words, the FAA finds a safety gap would exist if the applicant went directly from the FFS to solo in the aircraft, even with an aircraft familiarity flight because the applicant

¹⁴⁵ The FAA has previously found this time-period to be an appropriate amount of time between proficiency retention between training and solo flights and aligns with limitations on student pilots operating an aircraft in solo flight. See § 61.87(n).

would have no supervised experience manipulating the controls before solo flight in the NAS. The demonstration flight under new section 6.(a)(2)(i) will require the applicant to pilot the aircraft and demonstrate all the maneuvers and procedures required for the issuance of a commercial pilot certificate with a powered-lift category rating, for the issuance of an instrument-powered-lift rating, and for the issuance of a powered-lift type rating while an authorized instructor observes the applicant. During the entire flight, the instructor must have (1) an unobstructed visual sight of the controls, (2) an unobstructed visual sight of the instrumentation, and (3) the ability to engage in active communication with the applicant, pursuant to new section 6.(a)(2)(ii). Like the aircraft familiarity flight, the demonstration flight may occur over one flight or multiple flights under new section 6.(a)(3). Upon successful completion of the demonstration flight, the instructor may endorse the applicant to act as PIC of the powered-lift in solo flight, subject to any conditions and limitations the instructor believes to be warranted.¹⁴⁶ This endorsement will be valid for no more than 90 days¹⁴⁷ from the day the demonstration flight is successfully completed. These endorsement requirements will be set forth in new section 6.(a)(4).

If the authorized instructor or instructor pilot finds they cannot endorse the applicant for solo flight, the applicant must acquire additional training to obtain the necessary solo flight endorsement within the 90-day window that begins from the successful completion of the check conducted in the FFS, as detailed in the FFS Training section above. The training program should have a procedure for determining how that additional training will occur (e.g., additional FFS simulator training, repeated familiarity flight, repeated demonstration flight, etc.) and what items must be retained.¹⁴⁸

Lapse in Endorsement To Act as PIC To Accomplish the Demonstration Flight

If the applicant has not successfully completed the demonstration flight within 90 days from the day the FFS

check was completed, then the applicant must return to the FFS and successfully complete a demonstration of proficiency, pursuant to new section 6.(b)(1). This demonstration of proficiency will not require all the maneuvers and procedures required for the issuance of a commercial pilot certificate with a powered-lift category rating, for the issuance of an instrument-powered-lift rating, and for the issuance of a powered-lift type rating to be demonstrated. Instead, under new section 6.(b)(1)(i), the approved training program should detail the minimum content of the demonstration of proficiency and should include, at a minimum, the maneuvers and tasks contained in section 10 of the appendix. The FAA already has minimum maneuvers and procedures contained in the regulations that must be completed successfully in order for a person to be endorsed for solo flight in a powered-lift. The minimum maneuvers and procedures contained in paragraph 10 of appendix A are those that the FAA has previously found to be necessary in order for the person to successfully operate a powered-lift in solo flight. For the training conducted under appendix A, this baseline of maneuvers and procedures is adequate to ensure applicants are found to be proficient to operate a powered-lift in solo flight. An additional mitigation is that the applicants utilizing this appendix would be already rated at the commercial pilot certificate level in accordance with § 194.217. Additionally, the check pilot, TCE, authorized instructor, instructor pilot, an FAA ASI, or other person authorized by the FAA to administer this check may add any additional maneuvers or tasks they believe should be demonstrated by the applicant to ensure the applicant has retained the proficiency in the powered-lift to continue to the in-aircraft segments of the training program. The FAA considers these individuals qualified to administer the demonstration of proficiency because they have been deemed qualified to conduct the full check required by 4.(b) of the appendix. A demonstration of proficiency in the FFS is more appropriate than a repeated in-flight demonstration flight, to ensure that the trainee is adequately knowledgeable and proficient in the operation of the aircraft before continuing to conduct solo operations in the aircraft in the NAS. This is especially important as the flight instructor does not have the ability to intervene should an unsafe condition arise. Additionally, using an FFS for the

demonstration of proficiency allows an instructor to provide additional guidance and training, if necessary, on items the trainee may require a refresher on due to the length of time since the original check was completed in the FFS (i.e., more than 90 days).

After the additional demonstration of proficiency, pursuant to new section 6.(b)(1)(ii), the applicant will be required to engage in another aircraft familiarity flight in accordance with the requirements of section 5.(b) of the appendix. Upon successful completion of the subsequent aircraft familiarity flight, the applicant may receive another endorsement for the applicant to act as PIC to accomplish the demonstration flight with an authorized instructor on board under section 6.(b)(2). This endorsement will be valid for 90 days from the day the demonstration of proficiency conducted in the FFS was successfully completed.

Solo Flights

Upon successful completion of the demonstration flight and after obtaining the endorsement to act as PIC of the powered-lift in solo flight, the applicant will begin the solo flight segment of the training program, as set forth in new section 6.(c) of the appendix. Specifically, the FAA finds that requiring the applicant to complete 20 hours of solo flight in the aircraft will sufficiently ensure the applicant gains an equivalent level of proficiency as that under traditional flight training, as subsequently discussed. First, the FAA notes that under the traditional flight training framework for a commercial pilot certificate, an applicant is required to obtain only 10 hours of solo flight time under § 61.129(e)(4). The FAA finds that the solo flight time parameters are equally as vital in this alternate framework for experience in solo operations integrating the areas of operation listed in § 61.127(b)(5), night VFR conditions, and certain takeoffs and landings. However, the FAA recognizes that the SFAR provides relief to the cross-country solo requirement of § 61.129(e)(4)(i). Therefore, under the appendix, the applicant may utilize the corresponding alternate provision for the cross-country time as set forth in §§ 194.217 through 194.231, as applicable.

The FAA finds that because the applicant will have completed all flight training in the FFS rather than receiving exposure to the actual flight environment, the applicant will be required to obtain another 10 hours of solo flight time. The FAA finds that 10 additional hours of solo flight time, which must include the maneuvers and

¹⁴⁶ For example, the endorsement could be limited to operation in cross-winds no greater than 8 knots. See Advisory Circular 61–65H.

¹⁴⁷ See footnote 139.

¹⁴⁸ This approach is no different from what occurs when a flight instructor determines they cannot provide the necessary two-month endorsement for a practical test. A person may not proceed until they obtain the necessary endorsement.

procedures required for the issuance of the three ratings, is an appropriate amount of time to expose the pilot to the realistic operating environment (e.g., weather conditions, air traffic, etc.). Additionally, because the SFAR reduces the amount of pilot in command in a powered-lift time from 50 hours to 35 hours¹⁴⁹ and permits 15 hours of those 35 hours to be attained in an FFS,¹⁵⁰ by the time the applicant completes the 20 hours of pilot in command time¹⁵¹ in a powered-lift, they will meet the eligibility requirements to take the practical test.

Finally, § 194.233, adopted herein, sets forth alternate means to satisfy the cross-country aeronautical experience requirement for a commercial pilot certificate with a powered-lift category rating, specifically prescribed by § 61.129(e)(3)(ii) and (iii) and (e)(4)(i). Section 194.233 replaces the requirements described in § 61.129(e)(ii) and (iii) and also requires an applicant to conduct an additional cross-country because of the reduction of the total straight-line distance from 100 nautical miles to 50 nautical miles. Although § 194.233(a) requires three cross-countries to be conducted as flight training, under appendix A, the FAA is requiring the applicant to conduct all cross-country experience listed in § 194.233 as solo flight in the aircraft. Although these cross-country flights will be conducted as solo flights, the applicant will already have conducted cross-country flights in the FFS representing the powered-lift as required by § 194.235. Therefore, the applicant will have demonstrated the ability to conduct a cross-country flight in the FFS and will be adequately prepared to conduct a solo cross-country in the NAS because of their extensive training in the FFS, and the prerequisites set forth by § 194.215. Requiring in-aircraft cross-country flights in the NAS would ensure the applicant is exposed to items that may not be adequately replicated in an FFS environment, such as pilotage, dead reckoning, realistic ATC communications, and unforecast weather events, thereby ensuring the applicant correlates all previous training in a powered-lift.

Lapse in Endorsement for Solo Flights

The FAA anticipates that applicants will accomplish all the required solo tasks and flight hours within the initial

90-day endorsement for the applicant to act as PIC of the powered-lift in solo flight. However, the FAA recognizes that there may be instances where an applicant is unable to complete those tasks and flight hours within the initial 90-day endorsement (e.g., prolonged weather activity). The FAA identified two distinct scenarios that will require endorsement: re-endorsement within the 90-day endorsement window and re-endorsement outside the 90-day endorsement window.

If an applicant identifies that they will be unable to complete their solo flights within the 90-day time period, but that period has not fully lapsed yet, the applicant will be required, at a minimum, to complete a demonstration flight with a check pilot, a TCE, an authorized instructor, an instructor pilot, an FAA ASI, or another person authorized by the FAA, as set forth in new section 6.(d)(1). However, because the 90-day period has not yet lapsed, the applicant will not be required to demonstrate all maneuvers and procedures required for issuance of a commercial pilot certificate with the applicable ratings, as is required of the typical demonstration flight. Rather, the abbreviated demonstration flight must include at least the maneuvers and tasks set forth in section 10 of the appendix.¹⁵² Additionally, the person administering the demonstration flight may require any other maneuvers or procedures necessary to satisfactorily ensure the applicant maintains proficiency such that they are qualified to act as PIC. When the applicant successfully completes of the abbreviated demonstration flight, the person who administered the demonstration flight may endorse the applicant again to act as PIC of the powered-lift in solo flight for a period not to exceed 90 days.

If the 90-day endorsement period has expired, an applicant will require a re-endorsement to act as PIC of the powered-lift in solo flight. Because more than 90 days will have lapsed since the applicant demonstrated proficiency, the FAA finds it is necessary for the applicant to demonstrate proficiency again before operating the aircraft in solo flight. Therefore, the applicant will be required to successfully complete, first, another demonstration of proficiency in the FFS and, second, another demonstration flight with a person authorized to administer the demonstration flight on board, as set

forth in new section 6.(d)(2). However, each of these modules may be abbreviated since the applicant has already completed a full check in the simulator and a full demonstration flight encompassing the maneuvers and procedures required for the issuance of the applicable rating(s). Using an FFS permits the person authorized to administer the demonstration of proficiency to provide training and allows for the applicant to regain proficiency, especially if any items are noted for which the applicant may lack proficiency. Conducting this demonstration of proficiency in the FFS gives the applicant an opportunity to practice maneuvers and procedures in an environment where no risk is posed to the applicant and the person administering the demonstration of proficiency, should the applicant's proficiency lapse and result in an unsafe condition without the ability for the instructor to intervene. As previously stated, demonstration of proficiency in the FFS must include, at a minimum, the maneuvers and tasks contained in section 10 of the appendix. Upon successful completion of the demonstration of proficiency conducted in the FFS, the person administering the demonstration of proficiency may endorse the applicant to act as PIC to accomplish the demonstration flight with an authorized instructor on board. This endorsement will only be valid for 90 days from the day the demonstration of proficiency conducted in the FFS was successfully completed.¹⁵³ The demonstration flight conducted in the aircraft must consist of at least the maneuvers and procedures as outlined in section 10 of the appendix because the applicant will have already demonstrated base proficiency in the original cycle of proficiency demonstration and have experienced a refresher through the demonstration of proficiency in an FFS. If the applicant does not successfully complete the demonstration flight within 90 days from the day the demonstration of proficiency in the FFS was completed, then the cycle would start over again with the applicant completing another demonstration of proficiency in the FFS. In this specific scenario (*i.e.*, an expired solo endorsement) the FAA finds that another aircraft familiarity flight should not be a requirement after a demonstration of proficiency in the FFS because the applicant would already

¹⁴⁹ § 194.216(a).

¹⁵⁰ § 194.216(b).

¹⁵¹ By virtue of being the sole occupant in the powered-lift, the applicant would be the pilot in command of the powered-lift in flight. § 61.51(e)(1)(ii).

¹⁵² The FAA expects that a certificate holder will detail these maneuvers and procedures in their submission when seeking approval of their approved training program incorporating this new method of training.

¹⁵³ This is similar to the original linear process of demonstration of proficiency in the FFS, aircraft familiarity flight, and demonstration flight, except the applicant will not be required to complete another aircraft familiarity flight and both demonstrations may be abbreviated in their content.

have some operational experience in the aircraft through, first, the original aircraft familiarity flight and, second, the original demonstration flight where the applicant demonstrated the applicable maneuvers and tasks to a person authorized to administer the demonstration flight. However, this does not preclude an instructor or a training program from requiring another aircraft familiarity flight if the training program or instructor determines it necessary in the interest of safety. Upon successful completion of the demonstration flight, the person who administered the demonstration flight may endorse the applicant to act as PIC of the powered-lift in solo flight, subject to any conditions and limitations the instructor believes are warranted. This endorsement will be valid for no more than 90 days from the day the demonstration flight is successfully completed.

For example, an applicant successfully completes the FFS check on January 1, 2025, and the applicant then completes the aircraft familiarity flight on January 15, 2025. Immediately following the aircraft familiarity flight, the applicant receives the endorsement for 90 days to complete the demonstration flight, which will expire no more than 90 days from the date of the FFS check. To reiterate, the reason the 90 days begins on the date of the FFS check is because it is the date upon which the applicant has last demonstrated proficiency in the aircraft, as the applicant is just observing another pilot during the aircraft familiarity flight. Therefore, the person has 90 days from January 1, 2025, to complete their demonstration flight (*i.e.*, the applicant acts as PIC while an authorized instructor observes). After the person satisfactorily completes their demonstration flight, the applicant will receive another endorsement by the authorized instructor to act as PIC on a solo flight even though the pilot is not appropriately rated.

This endorsement starts a new 90-day clock to complete the solo flight time requirements. Thus, suppose the applicant successfully completes the demonstration flight on February 1, 2025, and receives the endorsement to facilitate the solo flights. On April 25, 2025, the applicant realizes that completing the solo flights before May 2, 2025, (90 days from February 1, 2025) is unattainable. The applicant may complete an abbreviated demonstration flight with an authorized instructor, to include the maneuvers and tasks set forth by section 10. of the appendix because the original 90 days has not expired. The applicant will then receive

another 90-day endorsement to complete the solo flights. Conversely, suppose the applicant does not complete the solo flights before May 2, 2025, and realizes such on May 10, 2025. The applicant will be required to successfully complete both an abbreviated demonstration of proficiency in an FFS, successful completion of which will result in a 90-day endorsement for the demonstration flight, and after successful completion of an abbreviated demonstration flight, the applicant will receive a 90-day endorsement for solo flight.

Practical Test

After the applicant completes all required training, experience, and solo flight under the training program, the applicant will then complete the appropriate practical test(s). First, under § 61.129(e)(3)(iv),¹⁵⁴ to apply for a commercial pilot certificate with a powered-lift category rating, a person must complete three hours of training on the areas of operation listed in § 61.127(b) in a powered-lift with an authorized instructor in preparation for the practical test within the preceding two calendar months from the month of the practical test. Under new section 7.(a) of the appendix, a person may complete this training in a Level C or higher FFS. The FAA notes that it is possible a person could complete the full training program in a timeline that would allow the crediting of the FFS training in this new section to meet the requirements of both § 61.129(e)(3)(iv) and section 7.(a). In other words, if the training program in section 4 of the appendix is completed within the preceding two calendar months, the activity could be counted for purposes of both the 20 hours of flight training and the three hours of practical test preparation. If the applicant does not have the three hours of training in preparation for the practical test within the preceding two calendar months from the month of the test, the applicant

¹⁵⁴ The FAA notes specific stipulations to part 194 were necessary to ensure the requirements in § 61.129(e)(3)(iv) were attainable by the groups of pilots under the adoption of this SFAR (*e.g.*, instructor pilots, test pilots, FAA test pilots, FAA ASIs, and initial cadres of flight instructors). Therefore, the provisions in §§ 194.217(b)(2), 194.219(b)(2), and 194.221(b)(2) as adopted in this final rule provide parameters under which these pilot groups receive the necessary flight training toward the practical test. As described in section V.D.3.ii. of this preamble, the FAA notes all relative flight training requirements in parts 61 and 194 are still applicable to pilots receiving training under this appendix. Therefore, the FAA did not deem it necessary to add provisions in paragraph 7 concerning the training in preparation for the practical test, because these provisions would already be applicable under the sections listed or § 61.129(e)(3)(iv).

would be required to receive the required number of hours of instruction in an FFS to meet that three-hour requirement.

Section 61.45(e) permits the use of an aircraft with single controls to be used for a practical test if certain provisions are met. Specifically, the examiner must agree to conduct the test in the aircraft with a single set of controls and the examiner must be in a position to observe the proficiency of the applicant. Additionally, § 61.45(e)(2) bars a test involving a demonstration of instrument skills from being conducted in an aircraft with single controls. Although using the single control aircraft to conduct the practical test is a theoretically viable option, the demonstration of instrument skills (as required by the instrument-powered-lift rating practical test and other discrete tasks that will be on the powered-lift category and type tests, such as a precision and missed approach) could not be accomplished in that aircraft, thus requiring the use of the FFS to demonstrate instrument skills, resulting in an SOE limitation, as subsequently discussed. When developing the practical test, as is typical practice, the examiner must ensure that the practical test meets the requirements of § 61.43, thereby encompassing all the tasks and maneuvers in the applicable Airman Certification Standards.¹⁵⁵ However, since the practical test consists of tasks required for the issuance of the three ratings, if there is a duplication of a task, only a single demonstration of that task on the practical test is acceptable if the task is performed at the highest standard.

As previously discussed in this section, when an applicant for a certificate or rating uses an FSTD for any portion of the practical test and does not meet certain experience requirements set forth in § 61.64, the applicant's certificate will be issued with a PIC limitation.¹⁵⁶ Under § 61.64(g), the person may remove the limitation when the person performs 25 hours of flight time in the aircraft category, class, and type under the direct observation of the fully qualified PIC.¹⁵⁷ However, the FAA finds this

¹⁵⁵ See section XVI.

¹⁵⁶ Section 61.64(f). Section V.E.1. of this preamble discusses the amendments adopted in this final rule to § 61.64(e), where a person would not be required to have a limitation on their certificate if the person has 500 hours of flight time in the type of powered-lift for which the rating is sought.

¹⁵⁷ Section 61.64(g). The pilot must also log each flight and the PIC who observed the flight must testify in writing to each flight. Additionally, the pilot must obtain the flight time while performing the duties of PIC.

limitation would not permit a pilot to conduct supervised operating experience for a powered-lift with single controls and a single pilot station because the PIC limitation would restrict the pilot from operating the only set of controls (*i.e.*, acting as PIC). Therefore, to mirror the typical part 61 training and testing regime, new section 7.(b), will require that a person who uses an FSTD for any portion of the practical test in accordance with § 61.64(a) after training in accordance with the appendix will receive a limitation stating the certificate is subject to certain PIC limitations and will be restricted from the carriage of persons or property other than necessary for the conduct of the flight.¹⁵⁸ Additionally, the carriage of property for compensation or hire is not permitted, but the carriage of property under part 91 would be permitted, such as company materials. The FAA notes that if a pilot met the experience requirements of § 61.64(e), as adopted herein and subsequently discussed, the person would not receive the limitation on their certificate.¹⁵⁹

Under new section 7.(c), the limitation may be removed from the pilot certificate by meeting the requirements set forth in section 8. of the appendix, which prescribes the requirements for supervised operating experience for a powered-lift with single controls and a single pilot station mirroring that of § 61.64(g).

Supervised Operating Experience for a Powered-Lift With Single Controls and Single Pilot Station

The PIC limitation that the pilot receives under the alternate framework of the appendix functions to restrict the carriage of persons or property on board the aircraft, other than necessary for the conduct of the flight while under the observation of a pilot who holds a category and type rating without limitations for that powered-lift. In practical terms, this would occur while a pilot who holds a PIC limitation is carrying another pilot while conducting supervised operating experience. In such scenarios, the pilot with the PIC limitation can carry persons or property

¹⁵⁸ Because flight time must be under the observation of another fully rated pilot, but the fully rated pilot would not be at the controls (and, therefore, unable to act as PIC), the FAA cannot restrict all persons from being on board the aircraft. The observing pilot would be considered as necessary for conduct of the flight.

¹⁵⁹ The FAA expects the majority of test pilots and instructor pilots to meet § 61.64(e) with the comprehensive flight time they will accrue by virtue of the professional duties, which would springboard the first cadre of fully rated pilots to observe the flight activities in the appendix.

because it would be necessary for the flight's operation (*i.e.*, for obtaining SOE). As previously discussed, under § 61.64, a person receives a similar limitation under § 61.64(f), and § 61.64(g) provides an avenue to remove the PIC limitation by completing certain SOE. This final rule applies the same concept in section 8.(a) of the appendix. As discussed, an FFS cannot fully replicate the operational experience that the actual flight environment provides to a pilot, which requires the pilot to operate the powered-lift while simultaneously making decisions, communicating with ATC, and interacting with other aircraft. Because the pilot will have attained all flight training in the FFS, the FAA finds that a certain degree of in-flight experience is necessary before the pilot may conduct commercial operations involving the carriage of persons or property (*e.g.*, part 135 operations).

To remove the limitation, under new section 8(a), an applicant seeking a powered-lift category rating, instrument-powered-lift rating, and powered-lift type rating will be required to perform 10 hours of flight time in an aircraft of category and type for which the limitation applies under the observation of a pilot who holds a category and type rating without limitations for that powered-lift. The FAA notes this is a reduction from the requirements of § 61.64(g)(1), which requires 25 hours of SOE under the direct observation of the pilot in command who holds a category, class, and type rating, without limitations, for the aircraft. When setting the flight time requirement for SOE under this alternative, the FAA considered that the applicant will have been previously exposed to operating the powered-lift in the NAS while completing the training segment requirements through multiple flights atypical to the traditional training regime (*e.g.*, aircraft familiarity flight, the demonstration flight). Additionally, during the applicant's solo flight segments, they will have attained a minimum of 20 hours of PIC while conducting maneuvers, procedures, and cross-country flights as the sole occupant of the aircraft, rather than the option in § 61.129(e)(4), which permits the 10 hours of flight time to occur with an authorized instructor on board while performing the duties of PIC.

To ensure the pilot is proficient in specific key flight regimes that were fully trained and tested in the simulator rather than the actual flight environment, the FAA finds it necessary to require certain elements within the SOE. Specifically, the FAA will require a cross-country flight to be conducted

during SOE as stipulated in new section 8.(b). Although the applicant will have gained an ability to conduct IFR procedures in the specific powered-lift type while conducting the cross-country requirements of § 194.235 in an FFS, the applicant will benefit from the additional experience of interacting with ATC that cannot be fully duplicated due to the sterile nature of the simulator environment, such as interactions with ATC, other aircraft, and the full flight environment, which all can be unpredictable. The presence of a fully qualified pilot supervising this cross-country flight will facilitate the fully qualified pilot to provide feedback or guidance on the PIC's proficiency in cross-country elements in the actual flight environment. Therefore, this cross-country flight will mirror the requirements of § 194.235. This cross-country flight must be on an IFR flight plan, consist of a flight of 100 nautical miles along airways or by directed routing from an air traffic control facility,¹⁶⁰ consist of an instrument approach at each airport, and involve three different kinds of approaches with the use of navigation systems.¹⁶¹ Since there is only a single set of controls and a single pilot station, the applicant cannot conduct any portion of this flight with a view limiting device.

Deviation for Level C or Higher Full Flight Simulator

Many commenters discussed the use of novel technology (*e.g.*, virtual reality (VR), extended reality (XR), and mixed reality (MR) systems) in simulation that could be used as a replacement for in-aircraft flight training. However, those technological advancements have not yet been demonstrated to the FAA to ensure those novel technologies provide a level of fidelity equivalent to that which is currently applicable for a Level C FFS or higher qualification for any aircraft. However, the FAA recognizes that during the ten-year period of the SFAR, technological advancements might be developed and perfected, thus enabling the use of new technology to replicate the level of fidelity required for simulation to effectively replace all

¹⁶⁰ As discussed in the NPRM, the FAA considers cross-country experience as a foundational set of skills that is necessary for a pilot in a powered-lift. At the time of this final rule, the FAA evaluated certification project and the ranges that were reported to the FAA. The FAA is retaining this experience requirement and notes that a powered-lift capable of performing this cross-country flight must be used for issuance of an initial category rating.

¹⁶¹ The FAA notes that this cross-country flight may be credited to the overall 10 hours of flight time set forth in section 8.(a) of the appendix and is not a mutually exclusive requirement in addition to the 10 hours.

in-aircraft flight training. Currently, this level of fidelity is only attainable in a Level C or higher FFS.¹⁶² If such technological advancements occur, and in order to be proactive and agile, section 9. of the appendix will facilitate deviation authority to enable training to be conducted in the new technology simulation device. Therefore, to authorize a deviation from the simulator qualification requirements in section 4. of the appendix, the Administrator must determine that the alternative training device is of adequate fidelity to be used as a substitution for in-aircraft flight training, and the effectiveness and objectives of the training program can be met utilizing the alternative training device.

The FAA notes the deviation authority is only applicable to the level of fidelity necessary to replace flight training in the aircraft and, therefore, is only applicable to the FFS training for powered-lift with single functioning controls and a single pilot station alternative permitted under appendix A. For a deviation, the FAA currently provides direction on how to submit a deviation to the Administrator through policy in FAA Order 8900.1.¹⁶³ The applicant must submit an application in writing and detail the specific regulatory section from which a deviation is requested, include the specific reasons for why the deviation is requested, demonstrate how an equivalent level of safety will be maintained, and any other information requested by the FAA based on the rule in which deviation is sought and the complexity of the operation to which the deviation would apply. The FAA sees that an evaluation of fidelity is critical to ensure the flight training environment is adequately replicated because this training device is replacing actual experience gained in flight.

iii. Alternate Three: Deviation Authority

While the FAA finds the two preceding options will facilitate opportunities for pilots to obtain powered-lift ratings in powered-lift that are not equipped with a full set of dual controls, the FAA acknowledges the potential development of technological advancements that could further enable flight training in a powered-lift equipped with single flight controls and a single pilot station. Specifically, these technological advancements may sufficiently facilitate flight training for

powered-lift ratings but may not fit squarely into the frameworks set forth by new § 194.253(a) or (b). Such technological alternatives have not yet been demonstrated or validated at a level or with sufficient reliability that would be required to replace dual controls and two pilot stations in a powered-lift used for flight training. As such, permanent changes to the regulations are not appropriate at this time. However, given feedback from commenters, the FAA recognizes that during the ten-year period of the SFAR, current technological advancements could be perfected and integrated into the training footprint, including technologies not yet envisioned. To encourage innovation and provide a pathway for technological advancements that could achieve an equivalent level of safety as the purpose of §§ 91.109(a) and 61.195(g), the FAA will adopt deviation authority as a third alternative to allow for flight training in a powered-lift equipped with a single set of fully functioning controls to be used for flight training.

First, this deviation authority will be limited to powered-lift equipped with a single set of fully functioning controls in an approved training program under part 135, 141, or 142. As previously discussed, programs under these parts have a higher level of FAA oversight than training that is conducted outside of an FAA-approved training program (*i.e.*, through part 61). Additionally, this oversight provides the FAA the opportunity to ensure the quality of the training is maintained. It also allows the training provider and the FAA to gather data and monitor trends after approval of a novel system to be used in lieu of dual controls. In turn, this enables quicker detection and more responsive actions to correct deficiencies when those novel systems are used.

When the training provider applies for a deviation to utilize a new technology or flight training plan to replace dual controls in a powered-lift used for flight training, the plan of action must incorporate characteristics that provide an equivalent level of safety that meets or exceeds the safety margin currently provided by a second set of controls in the same or similar powered-lift used for flight training. Flight training carries a higher risk compared to many other forms of flight operations because the maneuvers being taught may require the aircraft to be flown, for example, close to the ground, in a high-traffic environment, or at the limits of aircraft performance. Compounding these factors, powered-lift is new to flight operations outside of the military, and training in powered-

lift is currently non-existent outside of the military. Flight training requires an instructor to be actively engaged in how the applicant is operating the powered-lift, to see and be aware of the flying environment, including other nearby aircraft, weather, terrain, class of airspace, etc., and all while providing high-quality instruction. Since, during flight instruction, the applicant is not rated or is inexperienced in an aircraft the responsibility for making the immediate corrective action falls on the person providing the flight instruction.

Other than the flying skills necessary to make those corrective actions, recognition, and ability to make corrective actions are required. One important recognition factor to take into consideration for a system in lieu of a dual control aircraft, is that the instructor has the same visual cues available to them as the person flying the aircraft from their pilot station. This includes the field of view outside of the aircraft as well as inside the aircraft, to include the instrumentation and controls. This provides the instructor with the visual cues so they can determine if intervention is required. When intervention is required, the instructor must be able to take immediate corrective action and full control of the powered-lift to prevent a mishap. In addition, to provide effective instruction and timely and correct intervention, the FAA and the people using the technology needs to consider and understand how the advanced technology works and what its limitations are. Therefore, in the preceding example, the Administrator would consider the level of field of view the flight instructor will have outside the aircraft, as well as the one inside aircraft, including instruments and flight controls while conducting flight training.

Another key element the Administrator will consider in granting deviation authority includes that the flight training and supervised operating experience requirements that can be effectively conducted using the system in place of dual controls installed on the aircraft. Although the system may provide the instructor or the pilot observing SOE with the required visual cues and the ability to take control of the powered-lift, effective flight instruction or SOE might not be possible, especially when considering all the maneuvers that can be required for flight training or any limitations of the system replacing the requirement for dual flight controls. Additionally, the instructor or pilot observing SOE would need the ability to see outside the aircraft what is normally visible from

¹⁶² Level C FFS technical standards are defined in part 60 under Appendix A (airplanes) and Appendix C (helicopters), See *14 CFR part 60 Appendices A and C*.

¹⁶³ FAA Order 8900.1 Volume 3, Chapter 2, Section 1, paragraph 3–41.

the pilot station, thereby enabling them to intervene or provide guidance when appropriate. It would logically follow, that if the instructor had no way to observe the student's performance or what should be visible from a pilot station in the aircraft, they could not provide effective training or supervision. Continued effectiveness of the training provided under this deviation, and monitoring of such, also justifies why this deviation may only be granted to FAA approved training programs under part 135, 141, or 142. The additional FAA oversight will recognize deficiencies with a training program's system and require corrective actions to continue to use the system permitted by the deviation.

Therefore, the FAA adopts in this final rule a third option to facilitate the use of technological advancements that would replace the requirement for fully functioning dual controls when conducting flight training. Under § 194.253(c), the training provider under part 135, 141, or 142 must demonstrate certain elements, as subsequently discussed, in a form and manner acceptable to the Administrator. As discussed in section V.D.3.ii. of this preamble, the FAA currently provides direction on how an applicant must submit an application for a deviation.¹⁶⁴ During review of the deviation request, the FAA may request more information from the applicant to assist the FAA in determining if granting the deviation is warranted. Additionally, the applicant can provide revised information as necessary to address any deficiencies noted by the applicant or the FAA. Upon approval, the FAA will issue the certificate holder under part 135, 141, or 142 paragraph A005 detailing the deviations approval as is currently done today. Additionally, as this technology evolves or the need for deviation further emerges, the FAA will update guidance as necessary.

The first provision of § 194.253(c) allows for a deviation to be made to §§ 91.109 and 61.195 that considers the ratings held by the pilot and the certificate holder's approval of a course of training that incorporates factors that would provide for an equivalent level of safety and afford for an instructor to immediately take control of the aircraft

¹⁶⁴ See FAA Order 8900.1 Volume 3, Chapter 2, Section 1, paragraph 3–41, which details that the request must be in writing, with the specific regulatory section from which a deviation is requested detailed, and include: the specific reasons for why the deviation is requested, how an equivalent level of safety will be maintained, and any other information requested by the FAA based on the rule in which deviation is sought and the complexity of the operation to which the deviation would apply.

and recover from an unsafe condition. Therefore, § 194.253(c)(1) will require the certificate holder to demonstrate in a form and manner acceptable to the Administrator that the person providing flight training and the PIC observing any applicable SOE can take immediate corrective action and full control of the powered-lift and that the flight training and any applicable SOE can be effectively conducted in the powered-lift. Additionally, under § 194.253(c)(2), the alternate flight training and applicable SOE may not adversely affect safety. This demonstration could be done through a flight training versus solo complement, or even the development of a certificated system that would provide for an instructor to take control of the aircraft remotely. The FAA will not set strict parameters around this operational capability to allow for innovation that meets the safety intent of the existing sections requiring dual pilot stations with dual controls for flight training or SOE. The FAA notes that this provision is only applicable to operators of a powered-lift and only for the purposes of an initial cadre of pilots. The strict approvals provided by parts 135, 141, and 142 would act as a safety mechanism by providing oversight to supplement the equivalent level of safety determination. Specifically, the deviation will be approved through the use of the operator's operations specifications issued by the FAA.

Under § 194.253(c)(3), the Administrator may cancel or amend a letter of deviation authority at any time the Administrator determines that the requirements of section 9 of appendix A are not met, or if such action is necessary in the interest of safety. Given the novel approach underpinning a deviation, it is especially important for the FAA to be able to require changes or rescind deviations upon a determination that the new approach results in safety concerns. In the case of a rescission, training in a powered-lift with single controls will need to proceed under another available regulatory avenue.

E. Supervised Operating Experience of § 61.64

1. Amendment to § 61.64(e)

Section 61.64 addresses the use and limitations of FFSs and FTDs for training or any portion of a practical test for certificates and ratings, including aircraft type ratings. Specifically, under § 61.64, an applicant for an aircraft type rating may accomplish the entire practical test (except for the preflight inspection) in a Level C or higher FFS.

To ensure the applicant has sufficient experience operating the aircraft prior to serving as PIC, an applicant must satisfy certain aeronautical experience requirements set forth in § 61.64(b) through (e), as appropriate to the type rating sought. If the applicant meets one of the aeronautical experience requirements, then the applicant receives a type rating without limitation. If an applicant does not meet one of these requirements, the applicant receives a PIC limitation on their certificate in accordance with § 61.64(f)(2).¹⁶⁵ The limitation may be removed from the certificate upon completion of the SOE requirement set forth in § 61.64(g): 25 hours of flight time while performing the duties of PIC in an aircraft of the category, class, and type for which the limitation applies under the direct observation of a qualified PIC who holds the appropriate ratings, without limitations, for the aircraft.

As discussed in the NPRM,¹⁶⁶ the FAA evaluated whether the requirements in § 61.64 would adequately implement the operation of powered-lift into the NAS. As it pertains to powered-lift, an applicant may accomplish the entire practical test for a powered-lift type rating in a Level C or higher FFS and obtain the powered-lift type rating without a PIC limitation on their pilot certificate if the applicant satisfies one of the experience requirements set forth in § 61.64(e). These options include: (1) hold a type rating in a powered-lift without an SOE limitation; (2) have been appointed by the U.S. Armed Forces as PIC of a powered-lift; (3) have 500 hours of flight time in the type of powered-lift for which the rating is sought; or (4) have 1,000 hours of flight time in two different types of powered-lift. Upon comparing the experience requirements for powered-lift type rating applicants in § 61.64(e) to those experience requirements for airplane and helicopter type rating applicants in § 61.64(b), (c), and (d), the FAA determined during the development of the NPRM that the category-specific experience requirements for powered-lift type ratings in § 61.64(e)(1), (2), and (4) do not achieve the same objective as the class-specific experience requirements for airplane and helicopter type ratings in § 61.64(b)(1) through (3); (c)(1)

¹⁶⁵ An applicant would not receive the limitation if the completed tasks of preflight inspection, normal takeoff, normal instrument landing system approach, missed approach, and normal landing on the practical test in an aircraft appropriate to the category, class, and type for the rating sought, pursuant to § 61.64(f)(1).

¹⁶⁶ 88 FR 38946 at 38962 (June 14, 2023).

through (3); and (d)(1), (2), and (4). Therefore, the FAA proposed the removal of § 61.63(e)(1), (2), and (4).

However, the FAA proposed to retain § 61.64(e)(3), 500 hours of flight time in the type of powered-lift for which the rating is sought,¹⁶⁷ consolidated into § 61.64(e) and adopts the provision as proposed.¹⁶⁸ Powered-lift type rating applicants who do not use a powered-lift during the practical test and do not satisfy proposed § 61.64(e) (current § 61.64(e)(3)) will be required to accomplish SOE in the type of powered-lift for which they obtain a type rating, pursuant to § 61.64(g). Pursuant to § 61.64(g)(2), the SOE must be under the direct observation of the PIC who holds the category, class,¹⁶⁹ and type ratings, without limitations, for that aircraft (as it applies to a powered-lift, a powered-lift category rating and a type rating). The alternate pathways adopted by this final rule will enable persons to obtain powered-lift ratings without a limitation on their commercial pilot certificates by training and testing in a powered-lift, therefore creating the initial cadre of qualified PICs to directly observe SOE.

As previously stated, because the applicant would have a limitation on their pilot certificate that prohibits the applicant from serving as PIC in an aircraft of that type, the applicant is not acting as PIC of the aircraft during the SOE. Rather, the qualified PIC is observing the applicant performing the duties of PIC and is the only person who is directly responsible for and final authority as to the operation of the aircraft.¹⁷⁰ Therefore, while SOE is not considered flight training so as to require dual controls by § 91.109(a), the supervising PIC must have access to controls in the aircraft to fulfill their responsibility to maintain direct responsibility for the operation and safety of the flight. The FAA explained in the NPRM that each powered-lift

would be required to have a version of the aircraft that contains fully functioning dual controls, consistent with those expectations for flight training in airplanes and helicopters that require a type rating. Additionally, the FAA acknowledged a movement toward Simplified Vehicle Operations (SVO) whereby automation coupled with human factors best practices may reduce the quantity of skill and knowledge training that a pilot must acquire¹⁷¹ as an alternate way to perform SOE in a powered-lift with single controls and a single pilot station.

2. Alternate Requirement for Powered-Lift Without Fully Functioning Dual Controls Used in Supervised Operating Experience When Adding a Type Rating

The FAA continues to lack sufficient operational data to analyze and implement the use of the SVO technology that was noted in the NPRM. Without this information, it is not possible to codify permanent relief enabling SOE on an aircraft without dual functioning controls. However, as previously discussed, the FAA invited public comment specifically pertaining to how an applicant would meet the SOE requirements with a single set of flight controls in a powered-lift. ALPA generally agreed with the provisions of the proposal that rely on the use of an FFS¹⁷² and that the pilot would receive a limitation on the grounds that SOE would ensure the pilot has adequate experience and competence operating the powered-lift in the actual flight environment.

GAMA, NBAA, CAE, Eve, Joby, and L3Harris provided comments specifically pertaining to this question. Generally, commenters reasoned that SOE should only apply to newly rated PICs to ensure they are acclimated with performing PIC duties, not necessarily PICs who've already obtained PIC experience through the SFAR prerequisite ratings. GAMA, Joby,¹⁷³ and Eve asserted that SOE is not

mandatory for obtaining a type rating, even when the aircraft is equipped with a single set of controls. Specifically, commenters stated that SOE is not required when the five checking points of § 61.64(f)(1) can be assessed in aircraft with single controls at the examiner's discretion under § 61.45(e). Archer expressed the lack of need for SOE, stating that the FAA's purpose of SOE to ensure applicants have sufficient experience operating the powered-lift for which the type rating is sought in the actual flight environment prior to acting as PIC of the aircraft for the first time in the NAS is met through the "other requirements"¹⁷⁴ the FAA is levying on pilots seeking a category and type rating.

The FAA notes that the five checking points of § 61.64(f)(1) that commenters refer to are: (1) preflight inspection, (2) normal takeoff, (3) normal instrument landing system approach, (4) missed approach, and (5) normal landing. The FAA agrees with the commenters that SOE is not required if the applicant completes these five checking points in the aircraft because the person's certificate would not be issued with a limitation. However, if the entirety of the practical test is completed in the FSTD or if the applicant completes one of the checking points in the FSTD, it follows that the certificate would receive a PIC limitation pursuant to § 61.64(f)(2), unless the person meets one of the experience requirements set forth by § 61.64(b) through (e), as applicable. In that scenario, the PIC limitation may be removed by completing SOE pursuant to § 61.64(g).

Additionally, the FAA agrees with Archer that the purpose of SOE is to ensure applicants have sufficient experience in the aircraft in the NAS and actual operating environment that the PIC would operate within. However, the FAA does not agree that SOE is entirely unnecessary on the basis of "other requirements" that the FAA proposed in the NPRM or that SOE should only apply to initial PICs in the NAS. When SOE is required, the FAA does not give latitude based on the pilot's experience in other categories of aircraft. Therefore, the FAA is not requiring anything more than is already required for a pilot when adding a different category or type to their existing certificate. If Archer refers to the prerequisites proposed in

¹⁶⁷ While the FAA acknowledges that there are currently no type-certificated powered-lift, developmental and certification flight tests, which are conducted in accordance with an experimental certificate to the aircraft and authorization to the manufacturer's test pilots, could be credited toward the pilot's 500 hours of flight time in the type of powered-lift for which a rating is sought.

¹⁶⁸ The FAA also proposed to make a conforming amendment to § 61.64(f) technical in nature that would replace the cross reference to § 61.64(e)(1) through (4) to only referencing paragraph (e).

¹⁶⁹ As discussed in section V.D.3.ii. of this preamble, this final rule adopts certain miscellaneous amendments to make clear that regulatory references to class throughout part 61 are only appropriate if the regulations require classes for that category of aircraft. These miscellaneous amendments include § 61.64(g)(1).

¹⁷⁰ Section 91.3(a). See also 14 CFR 1.1, which provides the PIC has final authority and responsibility for the operation and safety of the flight.

¹⁷¹ GAMA, *A Rationale Construct for Simplified Vehicle Operations (SVO)*, (May 20, 2019).

¹⁷² ALPA also supported the use of the highest fidelity devices (e.g., an FFS with six degrees of motion) to ensure the appropriate level of aerodynamic modeling. This preamble discusses the FAA's FTSD position(s) in section IV.C of this preamble.

¹⁷³ Joby additionally recommended to remove the instrument requirements in the five checking points to be conducted in the aircraft. The FAA does not agree with Joby recommendation as this fundamental testing element minimally ensures a pilot can operate an aircraft in IFR conditions if necessary. As further discussed in section V.A. of this preamble, a pilot operating a powered-lift could be subject to inadvertent IMC, where a pilot must hold the requisite skills to operate an aircraft in IMC conditions.

¹⁷⁴ The FAA quotes Archer's phrasing here as the FAA is unsure what other requirements the FAA proposed to impose outside of the traditional airman certification framework that Archer intends to refer to. While the FAA proposed alternate requirements, the FAA finds these requirements are relieving rather than additional.

§ 194.215(a) (*i.e.*, a commercial pilot certificate with at least an airplane category and single- or multiengine class rating or a rotorcraft category and helicopter class rating, and the corresponding instrument rating), the FAA finds that this would not ensure that a pilot possesses sufficient operating experience in the actual flight environment specific to the powered-lift. As discussed in section V.G.1 of this preamble, pilot proficiency does not exactly translate from category to category. While the pilot may have a plethora of PIC experience in the NAS in an airplane or helicopter, training and testing in a simulated environment necessitates operating experience specific to the powered-lift itself.

Several commenters suggested alternatives to SOE. GAMA stated that the FAA does not need to grant a blanket authorization for SOE in single control aircraft. Rather, GAMA suggested two alternatives to ensure an equivalent level of safety and oversight. First, GAMA suggested amending the SOE regulations to include an alternate operation “as authorized by the Administrator” through a letter of authorization (LOA). Second, GAMA suggested the FAA make a determination during the FSB process as to whether the manufacturer demonstrates operational suitability and reduced pilot skill and knowledge required for safe operation such that pilots may be exempt from SOE or be authorized to conduct SOE virtually. Similarly, other commenters, such as L3Harris and Eve, suggested leveraging the FSB process to determine if a combination of SOE in an FSTD and scenario-based training (SBT), exposing the pilot to in-flight situations (*i.e.*, situational awareness, workload management, communication, decision making) in lieu of SOE would meet an equivalent level of safety. Further, NBAA recommended utilizing the FSB process for a determination as to whether supervised line flying (SLF), as defined in AC 120–53,¹⁷⁵ could be used as a post-qualification in lieu of SOE. Eve suggested utilizing line operational simulations, line-oriented flight training (LOFT), special purpose operational training (SPOT), and line operational evaluations (LOE) to comply with

¹⁷⁵ Supervised line flying is defined under AC120–53 as amended, is associated with the introduction of equipment or procedures requiring post-qualification skill enhancement during which a pilot occupies a specific pilot position and performs particular assigned duties for that pilot position under the supervision of a qualified company check airman.

operating experience requirements in single pilot operations.

The FAA finds the use of limitations and a broad overarching “determination” would be arbitrary thereby not providing uniform expectations of manufacturers regarding the required pilot skill and knowledge for safe operation of an aircraft. The FAA would also not be able to broadly apply this relief to the manufacturer since the relief itself would be applicable to an individual pilot who has trained and tested entirely in the simulator. Further, the FAA does not agree with the feasibility of utilizing the FSB process to determine if SOE would not be required or reduced for a pilot operating a specific powered-lift. The FAA does not currently permit the FSB process to determine under what conditions SOE is required or could be reduced; a change of this nature would be a global change affecting all aircraft, which is out of the scope of this rulemaking, especially without any data or rationale to support safety considerations.

The FAA does not agree with L3Harris and EVE’s suggestions to combine SOE with aircraft and FSTD experience. As discussed previously in this section, the FAA maintains its position that SOE is only valid when conducted in an aircraft due to the unique characteristics in the actual operating environment that the FFS inherently cannot replicate.

The FAA also disagrees with NBAA and other commenters that suggest SLF is an adequate replacement to SOE. Powered-lift are coming to the civilian market for the first time and the only pilots with powered-lift experience in the NAS are military pilots and test pilots. Therefore, while applicants for a powered-lift type rating may accomplish their training and testing in FFS under an approved training program, the FAA has determined that applicants must have sufficient experience operating the powered-lift for which a type rating is sought as is the case for other categories of aircraft. As discussed further in section V.E.2 of this preamble, the FAA sees that the contents of AC 120–53 in regard to supervised line flying would not be applicable in this scenario especially in a standalone context with reference to § 61.64. Section 61.64 is applicable to every pilot receiving a rating, while supervised line flying is only a consideration when talking in terms of an air carrier’s approval of a training program. Powered-lift could benefit from supervised line flying if such is deemed necessary through an FSB but utilizing those standalone part 61 requirements would not be

appropriate. Initially, the SFAR enables certificate holders certain flexibility when considering receiving a pilot certificate under part 61 through training conducted under parts 135, 141, and 142.

However, in consideration of commenters’ general positions and this final rule’s facilitation of flight training in powered-lift with a single set of controls and single pilot seat, the FAA finds that it is appropriate to extend certain relief in the context of SOE as well. Pilots who already possess a powered-lift category and instrument rating and are only adding a powered-lift type rating to their certificate would be able to utilize regulatory pathways already provided in part 61 for training and testing in an FSTD. Specifically, as is currently applicable to airplanes and helicopters requiring the applicant to hold a type rating, even if those aircraft were equipped with a single functioning flight control and single pilot station, the type rating could be wholly accomplishable in a Level C FFS or higher per § 61.63(d) and § 61.64. However, after accomplishing the practical test for a type rating entirely in the simulator, the person would receive a limitation on their certificate with PIC restrictions, but the pilot observing the SOE would need to be onboard the aircraft from an observing position. Therefore, the FAA adopts new § 194.255, which will contain the alternate requirements for powered-lift without fully functioning dual controls used in supervised operating experience when adding a type rating.

New § 194.255 largely mirrors current § 61.64(f) and (g), with minor revisions to account for the inherent limitations of a single controls and single pilot station aircraft. Notwithstanding the limitation prescribed in § 61.64(f), a person who does not meet the requirements of § 61.64(e)¹⁷⁶ will receive a limitation on the certificate restricting the person from operating the powered-lift type from carrying any person or property on the aircraft, other than necessary for the purpose of the narrowly tailored parameters of SOE (see § 194.255(a)). New § 194.255(b) sets forth the removal requirements, which mirror § 61.64(g). Finally, under new § 194.255(c), the observing pilot will be required to have unobstructed visual sight of the controls and instrumentation.

¹⁷⁶ In other words, a person who has 500 hours of flight time in the specific type of powered-lift would not receive a limitation on their certificate warranting SOE.

F. Establishment of an Alternate Pathway for Pilot Certification

The introduction of powered-lift as a new category of civil aircraft creates unique challenges for the training and certification of airmen. The traditional framework for a pilot follows an incremental path to build piloting skills through an iterative series of training activities with a flight instructor, accumulation of other flight experience, and successful completion of a practical test with an evaluator (*i.e.*, student pilot to private pilot to commercial pilot to ATP for part 121 and certain part 135 operations). Under this building block approach, a pilot must meet minimum aeronautical experience requirements at each certificate level which include total time and subsets of flight time like pilot-in-command time, night time, and cross-country time. In many instances, a portion of this time must be accomplished in the aircraft for the category rating sought.

However, as discussed in the NPRM, two predominant barriers exist in the introduction of powered-lift into civil operations.¹⁷⁷ First, the FAA does not anticipate that the initial powered-lift that obtain type certification will be broadly available for basic airman training and certification at the private pilot level. Rather, manufacturers intend to produce powered-lift for commercial purposes, meaning the initial pilots will be required to hold at least a commercial pilot certificate to act as required flightcrew members (*i.e.*, PIC or SIC) for compensation or hire. This situation disrupts the building block approach to flight training and certification which is customary for other categories of aircraft. Second, because there are no civil powered-lift, a person would have difficulty obtaining flight training due to the low numbers of qualified flight instructors who constitute a key foundation of the civil airman certification framework¹⁷⁸ and would not have the necessary flight time in a powered-lift to be eligible for a rating at the commercial pilot level.

To address these barriers without adversely affecting safety, the FAA proposed subpart B of part 194 to establish alternate pathways for pilots to obtain powered-lift ratings through alternate aeronautical experience

requirements and expanded logging provisions, while maintaining the general building block framework prescribed by part 61. Many commenters supported the FAA's general intention to create an alternate framework for powered-lift pilots in light of the aforementioned barriers to certification (*i.e.*, current lack of powered-lift in civilian operations and lack of powered-lift flight instructors). Specifically, several powered-lift manufacturers agreed that the part 61 framework is inadequate as applied to the integration of powered-lift in the NAS and expressed support for the concept of an alternate framework. Airlines for America agreed with the FAA's framework in encompassing the current building-block approach while also redefining the aeronautical experience requirements for powered-lift.

Alternate Approaches: Cycle-Based and Competency-Based

Commenters recommended different approaches to certifying powered-lift pilots and flight instructors than that proposed by the NPRM, which leveraged the building block approach with alternate requirements where necessary. One commenter expressed that the FAA's proposed alternate approach may be feasible as the industry matures, but that it is infeasible for initial powered-lift operations. Suggested alternatives included a competency-based approach and a cycle-based approach.

Archer proposed a cycle-based approach in lieu of part 61 certification, specifically in context of the alternate experience framework in general and cross-country alternate requirements, stating that the traditional hours-based training and experience does not account for the unique characteristics of powered-lift. Archer stated that the length of training requirements is impossible to achieve in some powered-lift, specifically providing the example of powered-lift exceeding helicopter minimum training times. Archer urged the FAA to contemplate a cycle-based approach to pilot training utilizing §§ 121.434 and 61.159(b) as a guide and recommended amending § 61.129(e)(2)(iii) to permit powered-lift pilots to substitute 10 operating cycles¹⁷⁹ for 10 hours of cross-country time.¹⁸⁰

SAE International suggested developing pilot training criteria in accordance with ICAO Annex 1 focusing on a competence-based, performance-based approach to pilot training and certification, much like EASA member states do. The commenter believed a more competence-based approach will mitigate risk and provide well trained and qualified pilots and instructors without being prescriptive (hours based).

Similarly, Liliun proposed a competency-based approach to powered-lift certification rather than an hour requirement under the premise that some powered-lift will have limited endurance and range. Liliun stated that requiring in-flight hours will lead to an excessive number of "sorties,"¹⁸¹ ultimately escalating training costs without improving safety. Instead, Liliun recommended a framework where a pilot demonstrates specific skills relevant to the operation of a particular powered-lift established by the FSB because applicants will already be trained and qualified as commercial pilots (with an instrument rating). Liliun emphasized flying experience already held by a pilot against the powered-lift type rating specifics and the operational characteristics of powered-lift (*e.g.*, short duration flights with an emphasis on landings and takeoffs) whereby certification should be tailored to the representative conditions and maneuvers. GAMA echoed Archer and Liliun's recommendation, stating that because the SFAR applies to already-qualified commercial pilots with significant experience, the elevated prerequisites justify a competency and training-oriented curriculum rather than an hours-based approach. AWPC urged the FAA to consider flight hours required in a powered-lift that focus only on achieving the minimums required by §§ 61.65(f), 61.129(e)(3), and 61.129(e)(4), which are training oriented requirements instead of a prescriptive time building metric. AWPC also urged the FAA to leverage a training and through a competency-based approach in combination with passing a practical test to ATP certificate standards. Finally, SAE International supported a competency approach to training and certification.

The FAA declines to adopt a cycle-based approach or competency-

¹⁷⁷ 88 FR 38946 at 38965 (June 14, 2023).

¹⁷⁸ The FAA recognizes that the only pilots and flight instructors with powered-lift ratings are those obtained through the military competency provisions of § 61.73. While there are approximately 905 powered-lift pilots and 447 powered-lift flight instructors (as of January 2024) through this process to form an initial cadre, these numbers are likely insufficient to meet forthcoming demands.

¹⁷⁹ 14 CFR 121.431(b) defines an operating cycle as a complete flight segment consisting of a takeoff, climb, enroute portion, descent, and a landing.

¹⁸⁰ This preamble addresses Archer's comments pertaining to FSTD credit and cross-country time in sections V.D.2. and V.F.ii. of this preamble, respectively.

¹⁸¹ A sortie is a military aviation term typically used to describe the combat mission of a singular military aircraft. The FAA notes that there is no equivalent term in FAA regulations but understands the term in this situational context to refer to "training flights."

approach in this final rule for the following reasons.

By referring to a cycle-based framework, the FAA understands commenters as meaning that operational cycles, as used in part 121, should be the model in which the FAA dictates experience requirements for applicants seeking a pilot certificate with powered-lift ratings. Section 121.431 provides the only FAA definition of “operating cycle,” which is specifically earmarked for the purpose of subpart O of part 121 (Crewmember Qualifications). Specifically, § 121.431(b) defines an operating cycle as a complete flight segment consisting of a takeoff, climb, enroute portion, descent, and a landing. Within part 121, the cycle-based approach is not used in the context of flight training, but rather it refers to activity after a part 121 pilot completes an air carrier training program and is designed to consolidate what the pilot has learned in training. Part 121 flightcrew members utilizing these provisions are certificated pilots in accordance with part 61, which means they have obtained significant operating experience in the category, class, and type, where appropriate, of aircraft to achieve initial certification. At such time, the pilot already holds the category and type rating necessary to operate the aircraft and the pilot has already met the cross-country requirements in category and demonstrated proficiency in operating the aircraft to receive a type rating. Additionally, this substitution of hours with operating cycles occurs while under supervision of a check pilot, for the purpose of this experience of an air carrier’s overall compliance with part 121, not for initial category and type certification.

In sum, the purposes of § 121.434 and the use of operating cycles (*i.e.*, preparing a pilot specifically for part 121 operations) are vastly different from the traditional certification framework and corresponding alternate experience requirements for powered-lift. Because the FAA only has experience and operational data of operating cycles in an unparalleled training scenario (*i.e.*, in the context of additional training after the foundational certificates and ratings are obtained), and commenters did not provide any supporting data to justify a pivotal airman certification transition, the FAA does not find that the use of operating cycles to obtain a powered-lift category rating provides an equivalent level of experience to ensure foundational proficiency when obtaining an initial powered-lift category rating.

Archer also urged the FAA to adopt a model like that set forth by § 61.159(b) that would permit a pilot to substitute cycles of a takeoff and landing to a full stop for one hour of flight time to satisfy certain aeronautical experience requirements.¹⁸² The FAA finds that the substitution in § 61.159(b) is not feasible to implement into a model for powered-lift certification at this time. The FAA proposed the substitution of 20 night takeoffs and landings as currently set forth by § 61.159(b) in 1968, which was later adopted in 1969.¹⁸³ The proposed rule¹⁸⁴ explained that the aeronautical experience for an ATP certificate required at least 100 hours of night flight time with no minimum number of landings. Additionally, when flight times were first developed in the regulations, airplanes had to stop more frequently for fuel and, therefore, logged more takeoffs and landings in the 100-hour time frame.

However, the FAA noted that because of technological advancements, airplanes made fewer fuel stops and, therefore, accomplished many fewer landings within the ATP night flight time experience of 100 required hours. Therefore, to account for this discrepancy, as well as to ensure proficiency in operations involving a reduction in a pilot’s vision, associated darkness, and available lighting, the FAA adopted the substitution in § 61.159(b) to incentivize an applicant for an ATP certificate to complete these critical flight operations to proficiency without instituting a required minimum in the regulations. However, this time is limited to 25 hours of the 100 hours of required night flight time experience; therefore, requiring pilots to still attain at least 75 hours of night flight time.

Comparably, the FAA notes that the cross-country flight time required for a powered-lift pilot certificate is ten hours, and vastly less than the 100 hours of night flight time the commenter’s comparison is based upon. As discussed in section V.A. of this preamble, one critical point of pilot

proficiency in the powered-lift category is the transition period from vertical take-off to horizontal flight and back to vertical landing. Should the FAA contemplate a takeoff and landing cycle mirroring § 61.159(b), the transition period into vertical flight would be a critical element to include in the scope of that cycle, which would be the equivalent of a cross-country flight. The situations a pilot encounters during the terminal and enroute portions of a cross-country flight constitute valid experiences to increase a pilot’s opportunity to use dead reckoning and pilotage over the entire route, not only the takeoff or landing portion of the flight. The FAA further discusses endurance challenges in cross-country requirements in section V.F.4.ii. of this preamble.

Additionally, the FAA notes this substitution’s applicability to those applicants seeking an ATP certificate is different from the minimum certificate level held by the target cadre of pilots this SFAR is directed toward. An applicant for an ATP certificate with an airplane category rating must hold a commercial pilot certificate with an instrument rating issued under part 61,¹⁸⁵ inherently including a prerequisite level of experience in the airplane category. In the absence of data presented to support a cycle-based substitution, the FAA finds that implementation of a cycle-based framework at the foundational entry-level of pilot certification for powered-lift may introduce a reduction in pilot proficiency in comparison to the traditional pathways of airman certification.

Similarly, at this time, the FAA does not find it appropriate to implement a novel approach to initial category ratings through competency-based training. As defined by ICAO, competency-based training is training and assessment characterized by a performance orientation, emphasis on standards of performance, and their measurement and the development of training to the specified performance standard.¹⁸⁶ Traditionally, a competency-based training framework is free of defined schedules and hour requirements. While operators under parts 121 and 135 regularly utilize

¹⁸² Specifically, § 61.159(b) permits a person who has performed at least 20 night takeoffs and landings to a full stop to substitute each additional night takeoff and landing to a full stop for 1 hour of night flight time to satisfy the 100 hours requirements of night flight time in § 61.159(a)(2). However, not more than 25 hours of night flight time may be credited in such manner.

¹⁸³ Airplane Transport Pilot Certificate with Airplane Rating final rule, 34 FR 17162 (Oct. 22, 1969). This provision was originally adopted in § 61.145(b), later redesignated as § 61.155(b) in 1973 (38 FR 3156). The 1997 final rule relocated § 61.155(b) to present-day § 61.159(b) (62 FR 16220, Apr. 4, 1997).

¹⁸⁴ Airplane Transport Pilot Certificate with Airplane Rating NPRM, 33 FR 12782 (Sept. 10, 1968).

¹⁸⁵ Section 61.153(d)(1). In lieu of a commercial pilot certificate with an instrument rating issued under part 61, an ATP applicant may meet the military experience requirements under § 61.73 to qualify for a commercial pilot certificate and an instrument rating (§ 61.153(d)(2)) or may hold certain foreign ATP licenses with instrument privileges or a foreign commercial pilot license (§ 61.153(d)(3)).

¹⁸⁶ ICAO Doc. 9868, Procedures for Air Navigation Services, Training, 3d Edition (2020).

competency-based training (and cycle-based framework) to facilitate additional and specific experience for more complex operations, the FAA does not utilize competency-based training as a pathway to airman certification in part 61 (neither foundational initial certification nor added ratings).

Under the traditional airman certification process under part 61 (and part 141), a pilot must meet minimum aeronautical experience requirements at each certificate level that include total time requirements (e.g., 250 total hours to be eligible for a commercial pilot certificate) and subsets of flight time like pilot-in-command time, nighttime, and cross-country time. While these requirements are characterized by time components, this framework ensures that flight training envelops smaller blocks of flight training (e.g., instrument training in a powered-lift under § 61.129(e)(3)(i) or flight time (e.g., 10 hours of cross-country flight time in a powered-lift under § 61.129(e)(2)(ii)) that, together, constitute the total objective of minimum aeronautical experience for a category rating on a certificate (e.g., 250 hours of flight time for a commercial pilot certificate with a powered-lift category rating). Additionally, these subsets are tethered to flight proficiency regulations respective to the certificate sought (e.g., § 61.127(b)) to ensure a person receives training on critical areas of operation. The applicable Airman Certification Standard or Practical Test Standard mirrors these areas of operation as the practical test standard. An hours-based approach ensures a set amount of flight time, exposing the pilot to a cross-section of, for example, flight environments, scenarios, and potential emergencies. Conversely, a wholly competency-based framework may not ensure a pilot receives such comprehensive exposure to foundational aeronautical experience, particularly where a practical test cannot encompass every flight scenario to confirm an independent determination of competency. For example, an applicant for a commercial pilot certificate is required to conduct aeronautical experience at night but is not required to demonstrate competency during a practical test at night.

In regard to commenters' reference to experience already held as a helicopter or airplane pilot, as the FAA outlined in section V.E of this preamble, this would not be wholly appropriate. Because a powered-lift is essentially a hybrid aircraft, pilots who have completed airplane training or helicopter training are not going to have 1:1 proficiency in a powered-lift. In other words, a pilot

fully trained to only airplane proficiency will not have experience in a vertical land and takeoff regime and, conversely, a pilot fully trained to only helicopter proficiency will not have experience in horizontal flight regime. Furthermore, pilots who first received a pilot certificate in an airplane or helicopter could have deeply ingrained tendencies due to the law of primacy¹⁸⁷ that can be very difficult to overcome. The FAA notes that this could have a significant impact on a pilot transitioning from airplane or helicopter to powered-lift. For example, a pilot performing a circling approach is conducting a maneuver requiring physical skills, while also cognitively evaluating surroundings to manage the flight path and perform a safe landing in the aircraft in which the circling approach is being conducted. During this maneuver, the pilot must incorporate motor skills as well as cognitive abilities to correlate the surrounding environment while being able plan and execute an appropriate flight path to safely land (i.e., considering possible interaction with other traffic, maintaining clear of clouds while on the approach). If the applicant first learned this in an airplane, and then was transitioning to conducting the task in a powered-lift, what was first learned in the airplane would be in the forefront of a pilot's actions. Checklists, procedures, and maintaining positive control of the aircraft while executing this maneuver in a different category of aircraft warrants training in the aircraft on specific maneuvers to ensure the pilot has the skills necessary to operate in the NAS.

Furthermore, the FAA disagrees that training wholly in a simulator would effectively mitigate any negative transfer of learning present due to the pilot's previous experience. Effective training under realistic operating conditions and variability (i.e., in an aircraft versus in a simulator) provides the operational experience necessary for a pilot to overcome primacy. Simulator experience can present an environment that helps develop a pilot's motor skills as well as their cognitive skills to

¹⁸⁷ Pioneer of educational psychology, E.L. Thorndike formulated three laws of learning in the early 20th century. These laws are universally accepted and apply to all kinds of learning: the law of readiness, the law of exercise, and the law of effect. Since Thorndike set down his laws, three more have been added: the law of primacy, the law of intensity, and the law of recency. Primacy in teaching and learning, stipulates that what is learned first, often creates a strong, almost unshakable impression and underlies the reason an instructor needs to teach correctly the first time. Aviation Instructor's Handbook, FAA-H-8083-9B (2020) pages 3-11 through 3-12.

respond to a scenario. However, when obtaining a category rating, the integration of motor skills with cognitive skills is only fully attained to a level that mitigates any negative tendencies due to the law of primacy when the pilot is provided the opportunity to perform functions in the actual flight environment.¹⁸⁸ Therefore, these possible proficiency gaps necessitate experience specific to a powered-lift rather than fully crediting a pilot with an airplane category or helicopter class rating with a powered-lift category rating.

Additionally, the FAA does recognize the time that a helicopter or airplane pilot has through prerequisites in the alternate framework and generalized requirements in § 61.129. For example, § 61.129(e)(1) requires 100 hours in a powered aircraft, only 50 of which must be in a powered-lift. Other than the requirement that the aircraft used be a powered aircraft, the regulation does not specify which powered aircraft the other 50 hours must be accomplished in. Therefore, the other 50 hours could be accomplished in an airplane or helicopter.

Finally, an SFAR intended to facilitate operations of a new and novel category of aircraft is not the appropriate place to implement a new airman certification framework due to the lack of operational data to illustrate that a novel framework would provide an equivalent level of safety in initial pilot category training. For these reasons, this final rule does not introduce a cycle-based or competency-based pathway to initial powered-lift ratings at this time.

Safety Management System Processes

A4A stated that any effort to provide alternative flight time and experience requirements should be vigorously vetted through the Safety Risk Management (SRM) process.

The FAA uses a Safety Management System (SMS) to integrate the

¹⁸⁸ The FAA recognizes this in a balance of crediting certain experience, while also requiring specific experience relative to the ratings and certificates a pilot is accomplishing. For example, §§ 61.129 (a)(4), 61.129 (b)(4), and 61.129 (c)(4) require solo experience to be conducted in single-engine airplane, multiengine airplane, or helicopter. Likewise, 10 hours of flight training and specific cross country flights are required to be accomplished in the specific category of aircraft required for single-engine airplane, multiengine airplane, or helicopters by §§ 61.129 (a)(3), 61.129(b)(3), or 61.129 (c)(3) respectively. The FAA has found it appropriate to codify these existing requirements, as applicable to the ratings sought, and finds these contributing human factors considerations are integral to overcoming any negative learning effects from previous experience a pilot may have in a different aircraft.

management of safety risk into operations, acquisition, rulemaking, and decision making. SMS consists of four components: Safety Policy, safety risk management (SRM), Safety Assurance, and Safety Promotion.¹⁸⁹ The FAA has its own established SRM policy, which supports the FAA's SMS by providing the ability to consistently conduct SRM and provide safety risk information to decision makers. The NPRM proposed both limited permanent changes and an SFAR to facilitate powered-lift operations and permit the FAA to gather data and better understand what a comprehensive permanent regulatory framework should look like. The FAA has not identified any hazards with the narrowly tailored alternate experience that would trigger the SRM process. Additionally, with each alternate requirement proposed (and adopted in this final rule), the FAA likewise proposed (and adopts) certain risk mitigations (*e.g.*, extra cross-country flights, requirements that the alternate requirements may only be utilized through approved training programs with FAA oversight). Since the FAA can initiate SRM at any time through its established policy, the FAA would initiate an SRM as necessary to ensure risk is mitigated. For example, if it becomes apparent that a specific hazard may exist because of the alternate experience, the FAA would initiate an SRM to identify and assess hazards related to the alternate flight time and experience requirements adopted in this final rule.

The following sections briefly describe the proposed alternate requirements and address any comments on that proposal. To note, where the FAA did not propose and adopt an alternate aeronautical experience or logging provision, the person must meet the applicable part 61 requirement, as appropriate.¹⁹⁰

1. Applicability of Alternate Requirements

Because the alternate eligibility requirements facilitate a degree of relief from certain provisions in § 61.129, the FAA proposed certain prerequisites to ensure the applicant possesses extensive flight experience and a solid foundational skill set in § 194.215(a). Therefore, except for the alternate requirements for cross-country discussed later in this section, to utilize the alternate aeronautical experience and logging requirements for obtaining a powered-lift category rating and

instrument-powered-lift rating, the FAA proposed a person already hold at least a commercial pilot certificate with at least an airplane category and single-engine or multiengine class rating or a rotorcraft category and helicopter class rating. The FAA also proposed the person hold an instrument-airplane or instrument-helicopter rating that corresponds to a category rating held at the commercial pilot certificate level. Commenters generally supported the parameters proposed in § 194.215(a).

A4A, Archer, and Bristow supported the proposal that alternate requirements be allowed only for pilots who already hold a commercial pilot certificate and corresponding instrument rating for another category of aircraft. Archer stated that the prerequisites offer a meaningful skills and experience advantage that substantially mitigates the challenge of training in aircraft that have different flight control characteristics, and may have a single set of controls, but share an operating environment and fundamental aerodynamics. Archer further noted that possessing one category rating to enable eligibility for another category rating is unprecedented but would constitute a near-term enabler for innovation. The FAA agrees with the benefits pointed out by commenters and emphasizes that, by virtue of holding these certificates/ratings, the powered-lift applicant will have, first, satisfied the respective aeronautical experience and training requirements and, second, demonstrated flight proficiency and competency through successful completion of the requisite knowledge and practical tests. Additionally, the applicant will have valuable practical experience, such as operating in the NAS, communicating with ATC, interacting with other air traffic, and the duties and responsibilities of acting as PIC of an airplane or helicopter.

One commenter questioned whether pilots of aircraft that operate primarily in wing-borne flight should be eligible for powered-lift designations in general given that they are unlikely to experience the unique aerodynamic and handling qualities-related effects of aircraft that generate thrust via proprotors. The commenter also provided examples such as lateral darting, settling with power, untoward low airspeed aerodynamic effects, and one thrust-producing device operating within ground effect while the other is operating out of ground effect.¹⁹¹

¹⁹¹ While the commenter did not specifically opine on the alternate eligibility prerequisite itself, the FAA determined this point is best adjudicated in relation to the prerequisites for the alternate framework.

Another individual suggested prerequisites consisting of an airplane category rating; rotorcraft category, helicopter class ratings; and part 107 UAS certificate. The commenter acknowledged that this would narrow the pool of eligible pilots but stated that initial pilots with dual qualifications in addition to a part 107 UAS rating would be the most adequately situated to inform industry in training adaptation and procedures.

The unique aerodynamic and handling qualities of a powered-lift necessitate specific powered-lift training and flight time, which is why a pilot who operates primarily in wing-borne flight (*i.e.*, an airplane-rated pilot) must complete specific powered-lift aeronautical experience requirements rather than being automatically eligible for a powered-lift category rating solely on the basis of a prerequisite certificate. The prerequisites for the alternate framework simply function to ensure that an applicant has an advanced level of aeronautical knowledge as a foundation before capitalizing on certain relieving provisions. However, the FAA disagrees with the premise that holding a remote pilot certificate issued under part 107 translates into experience that should be credited or required in the applicability of the proposed alternate requirements for manned aircraft under this rulemaking. Part 107 applies to the registration, airman certification, and operation of civil small UAS within the U.S.¹⁹² To obtain a part 107 certificate, a person need only meet the eligibility requirements of § 107.61, which includes either (1) passing an initial aeronautical knowledge test covering the areas of knowledge in § 107.73 or (2) completes training covering the areas of knowledge in § 107.74, if the person holds a part 61 certificate (other than a student pilot certificate) and meets the flight review requirements of § 61.56. Several of these knowledge areas are specifically tailored to small UAS that would not translate to recognizable experience applicable to a powered-lift. For example, effects of weather on small UAS performance and operations will be handled differently by a remote pilot than the effects of weather¹⁹³ on a large powered-lift with a pilot physically onboard the aircraft. For these reasons, the FAA finds there would be little net benefit by also requiring a part 107 small UAS rating on a person's pilot certificate to the prerequisites of the alternate eligibility framework.

¹⁹² § 107.1.

¹⁹³ §§ 107.73(c) and 107.74(b).

¹⁸⁹ FAA Order 8040.4C *Safety Risk Management Policy*.

¹⁹⁰ See § 194.215(b).

Therefore, the FAA adopts the requirement that a person must hold at least a commercial pilot certificate with at least an airplane category and single- or multi-engine class rating or a rotorcraft category and helicopter class rating, and the corresponding instrument rating (*i.e.*, instrument-airplane or instrument-helicopter), to utilize the alternate experience requirements (except for cross-country) in § 194.215(a).

2. Obtaining a Powered-Lift Category Rating on the Commercial Pilot Certificate (§ 61.129(e))

Section 61.129(e) sets forth the aeronautical experience requirements¹⁹⁴ to obtain a commercial pilot certificate with a powered-lift category rating. Section 61.129(e)(1) through (4) require specific flight time, such as flight time in powered aircraft, flight time in powered-lift, PIC flight time (including a certain amount of PIC time in a powered-lift), cross-country time, flight training time, and solo flight time (or flight time performing the duties of PIC in a powered-lift with an authorized instructor onboard), resulting in at least 250 hours of total flight time. These flight time requirements specific to powered-lift, resulting from the 1997 final rule, largely mirror the aeronautical experience requirements for airplanes.¹⁹⁵

By virtue of this rulemaking, and as extensively discussed in the NPRM,¹⁹⁶ the FAA acknowledges the lack of certificated powered-lift in civil operations available in which pilots can build the necessary flight time required in § 61.129(e). Even with the introduction of powered-lift into civil aviation, pilots will encounter an inability to satisfy several of these requirements for a commercial pilot certificate (and an instrument rating¹⁹⁷), such as the required PIC flight time in powered-lift in § 61.129(e)(2)(i) and cross-country experience in powered-lift in § 61.129(e)(3) and (4). Additionally, the logging requirements of § 61.51(e) present obstacles for a pilot who is not

rated in a powered-lift to log PIC flight time in a powered-lift.

Therefore, the FAA proposed to enable certain applicants for a powered-lift category rating on their commercial pilot certificate to satisfy alternate aeronautical experience and logging requirements for (1) test pilots and instructor pilots, (2) the initial cadre of instructors, (3) pilots receiving training under an approved training program, including provisions that would enable certain applicants to credit time obtained in an FFS toward certain flight time requirements. The FAA also proposed alternate requirements for cross-country flights, which are generally applicable to all applicants for a commercial pilot certificate with a powered-lift category rating.¹⁹⁸ This section discusses the adopted alternate framework in part 194¹⁹⁹ (*i.e.*, alternate experience, logging, cross-country requirements, and provisions facilitating FFS credit) and responds to comments.

While the alternate framework is largely adopted as proposed in subpart B to new part 194, the FAA determined the challenges presented in obtaining PIC flight hours in a powered-lift necessitate further relief in the context of hours required and available credit in an FFS, as subsequently discussed. Section V.F.6. of this preamble provides tables summarizing the adopted alternate requirements for persons seeking a powered-lift category rating on a commercial pilot certificate.

The FAA received many comments pertaining to the total amount of hours of flight time in a powered-lift set forth by § 61.129(e)(1) and, second, the hours of PIC flight time in a powered-lift set forth by § 61.129(e)(2). The FAA did not propose an hour reduction to either of these provisions in the NPRM. Because each of these provisions apply to all populations of pilots under the SFAR (*i.e.*, test pilots, instructor pilots, initial cadre instructors, and pilots receiving training under an approved training program), this section discusses the additional relief provided by this final rule to PIC flight time in a powered-lift and available FFS credit. Subsequent sections provide additional discussion applicable to specific pilot populations.

Alternative Structured Options for Flight Time in § 61.129(e)(1)

AWPC, GAMA, and Joby suggested reducing the requirement that a pilot must log 100 hours in a powered aircraft, 50 of which must be in a powered-lift.²⁰⁰ Each suggested structured alternatives in lieu of the hour requirement. AWPC noted the commonality between ACS utilized for training and testing and suggested that, in conjunction with the prerequisites to utilize the SFAR, the FAA should approve a course that is competency and training oriented rather than prescriptive time building. AWPC suggested credit through an Initial Operating Experience (IOE) or other SOE toward flight hours toward § 61.129(e)(1). Similarly, notwithstanding Joby's emphasis on eliminating the powered-lift category rating as discussed in section V.A. of this preamble, Joby suggested that the FAA facilitate other methods for obtaining aeronautical experience prior to conducting commercial operations in lieu of a category-based emphasis on time building. Joby specifically stated that § 61.129(e)(1) is not aligned with type-specific training and experience in the SFAR. Joby contended supervised line flying (SLF) requirements, including virtual observation or a probationary period, would be appropriate in light of the broader training program. Similarly, ADS recommended the FAA leverage the FSB process to require post-qualification SLF. Finally, GAMA questioned the net safety benefit of the requirement of § 61.129(e)(1) flight time in a powered-lift as mere time-building and urged the FAA to transition away from § 61.129(e)(1) time building and, instead, prioritize scenario-based training in an FSTD through SLF and LOFT.

The FAA does not find that activities such as SLF, IOE, or LOFT achieve a level of safety for an initial powered-lift category rating such that a full substitution is warranted. SLF, IOE, and LOFT are tools utilized by an operator to transition a certificated pilot into the operational environment specific to that operator (*i.e.*, structured flight training environments to line operations). For example, SLF is typically conducted upon the introduction of equipment or procedures for a specific pilot position and particular assigned duties within an air carrier (*e.g.*, introduction of a new system like ADS-B, RAAS, or new operations like ETOPS), presuming the pilot is appropriately certificated and

¹⁹⁴ Section 61.123 prescribes the general eligibility requirements for a commercial pilot certificate; paragraph (f) requires an applicant to meet the aeronautical experience requirements of subpart F (Commercial Pilots) that apply to the aircraft category and class rating sought (*i.e.*, § 61.129).

¹⁹⁵ Pilot, Flight Instructor, Ground Instructor, and Pilot School Certification Rules, final rule, 62 FR 16220 (Apr. 4, 1997).

¹⁹⁶ See 88 FR 38946 at 38967 (June 14, 2023).

¹⁹⁷ While this section discusses obtaining a powered-lift category rating on a commercial pilot certificate, section V.F.3. of this preamble discusses obtaining an instrument-powered-lift rating.

¹⁹⁸ Section V.F.4. of this preamble discusses alternate means to satisfy the cross-country aeronautical experience requirements for a private pilot certificate with a powered-lift category rating and an instrument-powered-lift rating.

¹⁹⁹ The FAA adopts these alternate eligibility requirements in a temporary state in the SFAR to obtain operational data to properly inform a permanent rulemaking in the future.

²⁰⁰ § 61.129(e)(1).

rated. To date, these tools are not tailored toward flight training toward an initial category and type rating.

The alternatives suggested by commenters (*i.e.*, SLF, IOE, and LOFT) could all be used by certificate holders as supplementary to their part 135 operations. However, the FAA does not find that these programs provide an equivalent or greater level of safety to the aeronautical experience requirements set forth by part 61 such that a reduction in flight time required for an initial powered-lift rating is justified at this time. The requirement to obtain a certain amount of flight time in the aircraft a pilot seeks a rating for is not a new or novel concept unique to powered-lift. While the FAA anticipates challenges with the traditional part 61 framework, the FAA finds the alternate requirements, as adopted by this final rule, to be sufficient measures in furthering powered-lift civilian operations. Additionally, because there are no certificated powered-lift for civilian operations upon which the FAA may base an overhaul of the traditional training time and hours-based framework on, nor did commenters provide any data or persuasive evidence, the FAA declines at this time to implement the novel concept of category certificate elimination or credit for SLF, IOE, and LOFT toward an initial rating.

Reduction of Powered-Lift Pilot-in-Command Time (§ 61.129(e)(2))

A person who applies for a commercial pilot certificate with a powered-lift category rating must log at least 250 hours of flight time consisting of at least, in pertinent part, 100 hours of PIC flight time, which includes at least 50 hours in a powered-lift.²⁰¹ Under § 61.51(e)(1), as relevant to this section, a pilot may log PIC time only when the pilot is the sole manipulator of the controls of an aircraft for which the pilot is rated (category, class, and type rating, if appropriate) or is the sole occupant of the aircraft. While the FAA explained in the NPRM, and still maintains, that the proposal would permit pilots to log the time that meets the criteria in this final rule retroactively,²⁰² the FAA did not propose to decrease the requirement to log 50 hours of PIC flight time in a powered-lift for any pilot under the SFAR. Many commenters urged the

FAA to implement a provision reducing this requirement.

Many commenters stated that the 50-hour requirement in existing § 61.129(e)(2)(i) is simply a time-building requirement that does not add value to a pilot's experience, especially where pilots under the SFAR will have extensive prior PIC experience through virtue of the prerequisite requirements. These commenters included: HAI, L3Harris, AWPC, GAMA, Lilium, Archer, and Supernal.

Commenters stressed that the simplicity of powered-lift renders time building of little value and questioned the net safety benefit of a 50-hour requirement. For example, Archer proposed a 30-hour minimum considering the unique capabilities of powered-lift, many of which possess control frameworks that provide inherent hands-off stability. Archer noted that many OEMs' reliance on battery electric driven propulsions would make maneuver-centric repetition in aircraft training difficult. Supernal emphasized the importance of the critical skill of transitioning between vertical and on-wing flight as opposed to total flight hours. Similarly, GAMA and L3Harris proposed a substitution like that set forth in § 61.159(b) whereby an applicant could perform a certain number of powered-lift takeoffs and landings in lieu of a certain amount of flight hours. Commenters also referenced commonality between maneuvers required by the powered-lift Airmen Certification Standards (ACS) and the airplane and helicopter ACS for purposes of the prerequisite requirements set forth by § 194.215. GAMA, Lilium, and AWPC emphasized that this gives further credence to reducing the hour requirement (*i.e.*, because those pilots will have already demonstrated proficiency in overlapped tasks by virtue of holding the prerequisite ratings).

Additionally, commenters urged the FAA to consider the environment within which training under the SFAR will occur to warrant a reduction in hours. Specifically, AWPC and GAMA emphasized that training under the SFAR would be conducted under an approved course under parts 135, 141, and 142, which require certain prerequisites to entry and a standardized course of instruction. Commenters, including Archer, likened this to courses under part 141, where the FAA approves certain reduced aeronautical experience time compared to part 61. Specifically, Archer noted that appendix I to part 141, (4)(c)(3) requires a minimum of 30 hours of flight training to add a helicopter class rating

to an existing pilot certificate and urged the FAA to adopt similar parameters.

Further, GAMA and AWPC cited the recent final rule, Recognition of Pilot in Command Experience in the Military and Air Carrier Operations,²⁰³ to support the premise that there is a lack of safety benefit provided by a time-building approach. Specifically, the commenters stated that the FAA explained in that final rule that time spent in certain flight regimes in a military powered-lift was equivalent to time in an airplane for the purposes of meeting specific aeronautical experience requirements for an ATP certificate. Both commenters stated that the minimum times should be linked to those specified in §§ 61.65(f) (aeronautical experience for the instrument-powered-lift rating), 61.129(e)(3) (20 hours of training on the areas of operation in § 61.127(b)(5)), and 61.129(e)(4) (solo flight time or flight time performing the duties of PIC with an authorized instructor on board), which are training oriented rather than time building, in conjunction with passage of a practical test to ATP certificate standards to ensure equivalent level of safety.

Finally, several commenters emphasized that the 50-hour PIC flight time in a powered-lift set forth by § 61.129(e)(2)(i) would present resource and cost challenges contrary to public interest. AWPC noted that time building in a large, multi-engine turbine powered tiltrotor would be contrary to public interest because of the consumption of large quantities of fuel, especially at a time when the AAM industry is making strides toward zero carbon emissions, in addition to other noise impacts. Other commenters, such as Lilium, noted that electric aircraft would have limited range and endurance capabilities that would make accumulating time in an aircraft difficult. HAI stated that requiring 50 hours of PIC in a powered-lift would be overly burdensome and unnecessary, especially considering the minimum qualifications a pilot would have to hold would be at the commercial pilot certificate level. HAI and GAMA expressed concern that the flight endurance and resource limitations would extend each FSB process from six to nine months. They further emphasized the challenges presented for OEM's where FSB members would be required to travel long distances to conduct their duties.

First, the FAA does not agree that aeronautical experience is only a time-building exercise but emphasizes that the aeronautical experience

²⁰¹ Section 61.129(e)(2).

²⁰² To underscore, flight time that a pilot is currently accruing, and has previously accrued, that meets the conditions adopted in the SFAR may be applied toward the 50-hour requirement when the pilot applies to take the practical test.

²⁰³ 87 FR 57578 (Sept. 21, 2022).

requirements are an iterative process to ensure a pilot has adequately trained to proficiency while gaining a minimum level of experience to be a safe pilot in the NAS. The FAA maintains the value in accruing experience in the aircraft through minimum time requirements, as such experience builds a pilot's ability to respond and make decisions in unexpected conditions. For example, with respect to weather, some research indicates, first, a lower level of pilot experience increases accident rates versus incident rates during adverse weather events and, second, increased experience results in better decision-making abilities. The study also found that increased experience results in a lower accident rate than subgroups that had less pilot experience when studying actual occurrences related to adverse weather events.²⁰⁴

However, in light of commenters' contentions, the FAA reevaluated the amount of time required by § 61.129(e)(2)(i) for those pilots using the alternate framework set forth by the SFAR. Specifically, the FAA compared the experience requirements in existing § 61.129 for airplanes (§ 61.129(a) and (b)) and helicopters (§ 61.129(c)) related to those required for a powered-lift rating (§ 61.129(e)). An applicant must have 50 hours of PIC flight time in an airplane when applying for an airplane single-engine rating and multiengine rating;²⁰⁵ for a helicopter class rating, however, an applicant must only log 35 hours of PIC flight time in the helicopter class to be eligible for a commercial pilot certificate. As discussed, to receive a powered-lift rating at the commercial pilot certificate level, a pilot would need 50 hours of PIC time in a powered-lift, which aligns with the time requirement for airplanes.

While the NPRM did not propose to reduce the hours set forth in § 61.129(e)(2)(i), it proposed to allow pilots under the SFAR receiving training from a certificate holder to credit up to 15 hours of PIC time obtained in a Level C or higher FFS toward the 50-hour PIC requirement.²⁰⁶ However, after reconsidering the hybrid nature of a powered-lift in relation to the prerequisites²⁰⁷ and requirements set

forth under the alternate framework and weighing the current requirements in § 61.129 for a commercial certificate for powered-lift, airplanes, and helicopters, the FAA agrees that a reduction in flight hours as PIC in a powered-lift under the SFAR would sufficiently ensure pilots are proficient in the duties of a PIC operating a powered-lift and alleviate some of the burden posed for operators of a powered-lift without jeopardizing safety.

When determining the amount of reduced time, the FAA specifically considered a reduction to align with the PIC time in a helicopter. The FAA maintains that a powered-lift is essentially a hybrid between an airplane and helicopter. While part 61 does not traditionally facilitate any category-to-category reduction in PIC aeronautical experience, the hybrid status of a powered-lift, in conjunction with the mitigations discussed herein and certain operational symmetry between helicopter and powered-lift, substantiate the alignment of powered-lift PIC time to helicopter PIC time for pilots under the SFAR.²⁰⁸ While the FAA's position is that powered-lift are, for practical purposes, operated largely like airplanes, key operational differences necessitate closer alignment with helicopter requirements for the purposes of airman certification than alignment with airplane requirements.

Specifically, as noted by commenters, powered-lift operations will be of shorter range, resulting in condensed critical phases of flight as compared to airplanes, which should be reflected in the training footprint. Given that powered-lift training flights and commercial operations will generally consist of shorter range distances, combined with the advanced technology

airplane or instrument-helicopter rating that corresponds to a category rating held at the commercial pilot certificate level.

²⁰⁸ By virtue of a person holding the prerequisites as set forth in 194.215(a), the person would have accrued experience in horizontal flight or vertical land and take off such that regardless of the category the person holds, the person will have some degree of PIC experience in a powered-lift flight regime. Conversely, a person who holds, for example, an airplane category rating who seeks a rotorcraft category rating will only possess experience in a horizontal flight regime, inapplicable to the flight regime experienced in rotorcraft. The FAA notes that, while this time is valuable and applicable to powered-lift experience and operations, thereby warranting a reduction in PIC flight time as explained herein, actual experience in the category of aircraft (*i.e.*, a powered-lift) is essential to attaining full proficiency in the powered-lift where aeronautical knowledge and operational gaps will exist by virtue of operation in another category of aircraft (*e.g.*, an airplane category pilot will have no experience with vertical land and takeoff). Additionally, see section V.F. of this preamble for additional discussion on primacy effect.

detailed by the commenters (*e.g.*, hands-off capabilities, advanced automation, Simplified Vehicle Operations), the reduction in flight time will not negatively affect safety because applicants will conduct a substantial number of takeoffs, transitions from vertical and on-wing flight, and landings (*i.e.*, the critical phases of powered-lift flight) within 35 hours, similar to helicopters. Conversely, airplanes inherently possess longer range capabilities, resulting in less burden to reach the 50-hour PIC time in an airplane and longer cross-country horizontal flight opportunity.

Finally, applicants seeking a commercial certificate with a powered-lift category rating must conduct their training under an approved training program under part 135, 141, or 142 under the SFAR to qualify for this PIC relief. As noted by commenters, appendix D to part 141, which sets forth the minimum curriculum for a commercial pilot certification course, and appendix I, which sets forth the minimum curriculum for an additional aircraft category rating course, generally facilitate a reduced hour footprint than the corresponding certificates in part 61. This relief is largely due to the greater oversight, structured training program, dedicated training facilities, and FAA-approved curriculum offered at the part 141 pilot school. The FAA finds that the approved part 135, 141, and 142 programs under which an SFAR pilot would receive training offer the same safeguards (*e.g.*, oversight, structure, etc.) for certain reduced footprints such that a similar degree of relief may be offered for these approved programs without a reduction in safety.

Therefore, the FAA is reducing the total hours of PIC in the powered-lift from 50 hours to 35 hours to situate pilots seeking a powered-lift rating under the SFAR more similarly on their commercial pilot certificate to those that are attaining a helicopter rating on their commercial pilot certificate. Notwithstanding the eligibility requirement specified in § 61.123(f), new § 194.216(a) will permit an applicant for a commercial pilot certificate with a powered-lift category rating under §§ 194.217, 194.219, 194.221, or 194.223 to log 35 hours of pilot-in-command flight time in a powered-lift in lieu of the aeronautical experience requirement of § 61.129(e)(2)(i) (*i.e.*, 50 hours). In turn, this requires minor revisions to the reg text as proposed in those alternate experience provisions (§§ 194.217, 194.219, 194.221, and 194.223). Because § 194.216(a) renders § 61.129(e)(2)(i) inapplicable to pilots under the SFAR

²⁰⁴ See Udo-Imeh, N. E., & Landry, S. J. (2021). Dimensions of Pilot Experience and Their Contributing Variables. 63rd International Symposium on Aviation Psychology, 376–384. *coresholar.libraries.wright.edu/isap_2021/63*.

²⁰⁵ §§ 61.129(a)(2)(i) and (b)(2)(i).

²⁰⁶ See proposed § 194.223(c).

²⁰⁷ Specifically, to use the SFAR's alternate framework, a person must already hold at least a commercial pilot certificate with at least an airplane category and single- or multiengine class rating or a rotorcraft category and helicopter class rating. The person will also be required to hold an instrument-

seeking a commercial pilot certificate with a powered-lift category rating, the FAA finds it necessary to replace references proposed in part 194 from § 61.129(e)(2)(i) to § 194.216(a). This cross-reference replacement is adopted in: §§ 194.217(b)(3), 194.217(c), 194.219(b)(3), 194.219(c), 194.221(b)(3), 194.221(c), and 194.223(c).

The FAA notes this relief is only permitted under the limited circumstances set forth by the SFAR with the discussed mitigations and does not make a permanent change to § 61.129(e)(2)(i). As discussed in section I.G. of this preamble, the benefit of the SFAR is to collect information over the lifespan of the temporary regulations. The FAA intends to use the time to determine whether a permanent change to § 61.129(e)(2)(i), congruent to PIC flight time in a helicopter, is justified in part 61. Additionally, as discussed further in the subsequent section of this preamble, this final rule will allow for 15 hours in a Level C or higher FFS to be credited toward the PIC requirement of § 194.216(a) and expands this relief to all pilots under the SFAR.

Relatedly, the FAA agrees with GAMA and AWPC that a similar concept was promulgated in the final rule *Recognition of PIC Experience in the Military and Air Carrier Operations*, although the two are not synonymous scenarios such that the traditional approach of garnering time in the aircraft is not warranted from a safety perspective. The Recognition of PIC Experience final rule allowed military pilots to credit flight time in a powered-lift while operated in horizontal flight only toward the requirements of § 61.159(a)(5) (*i.e.*, an airplane category rating). This change was to assist military pilots of powered-lift in qualifying for an ATP certificate in the airplane category supported by the premises that, first, a military pilot will have two to five times the amount of PIC time required by the regulation; second, military powered-lift pilots receive training and qualifications in airplanes prior to transitioning to a powered-lift; and, third, the comprehensive and demanding nature of military pilot training and military assessment of flight proficiency.²⁰⁹ These premises are not synonymously applicable to the qualifications required for the operations enabled by this SFAR.

While not the basis for the FAA's decision to reduce the PIC flight time, the FAA finds that this reduction will address commenters' concerns about resources and cost to the training provider. To the extent that commenters

suggested noise impacts would be implicated because of the additional time required to operate an aircraft toward pilot certification, the FAA notes that these aircraft will still be required to meet the noise requirements of part 36; noise considerations are further discussed in section IV.B. of this preamble ("Noise Certification").

Expansion of FFS Credit Toward PIC Flight-Time Requirements

Currently, § 61.129(i) permits a certain amount of credit for use of an FSTD to certain aeronautical experience requirements. Specifically, in pertinent part, § 61.129(i)(1) permits an applicant who has not accomplished the training required by § 61.129 in a course conducted by a training center certificated under part 142 to credit a maximum of 50 hours toward the total aeronautical experience requirements of § 61.129 for a powered-lift rating, provided the aeronautical experience was obtained from an authorized instructor in an FFS or FTD that represents the powered-lift category and type. For applicants who have accomplished the training required by § 61.129 in a course conducted by a training center certificated under part 142, § 61.129(i)(2) permits the applicant to credit a maximum of 100 hours toward the total aeronautical experience requirements of § 61.129 for a powered-lift rating, provided the aeronautical experience was obtained from an authorized instructor in an FFS or FTD that represents the powered-lift category and type.

To allow for more flexibility and to foster the development of an initial cadre of powered-lift pilots, the FAA proposed to temporarily permit certain time obtained in a Level C or higher FFS to be credited specifically toward the 50-hour PIC flight time requirement in § 61.129(e)(2)(i) in addition to the permitted use of credit in § 61.129(i). Specifically, to mitigate any risk with increasing creditable FFS time, the relief as proposed would have only applied to the group of pilots receiving training from an approved training program under the SFAR provided (1) the aeronautical experience was obtained performing the duties of PIC in a Level C or higher FFS representing the powered-lift category and (2) the FFS sessions were conducted in accordance with an approved training program under part 135, 141, or 142.²¹⁰

²¹⁰ See proposed § 194.223(d). This relief was also proposed for those pilots receiving training under an approved training program leading to an instrument-powered-lift rating in proposed § 194.231(c). Section V.F.3. of this preamble discusses the instrument-powered-lift alternate

The FAA did not receive any comments directly opposing crediting of time in this manner. In fact, several commenters commended the FAA on the approach in § 194.223(d) to credit aeronautical experience in this manner, citing limited range and endurance in the aircraft itself that could hinder the ability to perform repetitive, maneuver-centric training in the aircraft. However, many commenters who supported reducing the PIC time in a powered-lift also proposed the FAA permit the credit of even more time in an FFS toward the PIC time in a powered-lift. These commenters generally emphasized that FSTDs provide realistic, controlled training environments especially useful for training on abnormal and emergency procedures and specific operational scenarios. Commenters suggested crediting 35 hours of PIC time in the FFS, thereby only requiring 15 hours of PIC flight time in the powered-lift in flight (under the premise of the proposal retaining the 50 hours of PIC time in a powered-lift requirement) or permitting all PIC flight time in the FFS. Commenters included: Archer, Liliium, Bristow, GAMA, Supernal, and Flight Safety International.

Commenters also urged the FAA to consider widening the scope from FFS to FSTD. Supernal recommended the FAA maximize the use of flight training devices and flight simulators used for proficiency and examinations and generally agreed with the need for high fidelity simulators utilized for training and qualification of a person seeking a powered-lift type rating. Archer agreed with the FAA's approach to credit 15 hours of flight training in an FSTD, but suggested the FAA should consider Level 6 FTD devices or higher to be considered in this credit. Archer stated that FTDs qualified under part 60 would encourage a more widespread application of innovative devices, ensuring training remains affordable and accessible for a broader range of operators. Archer described FTDs as offering a balanced approach to training through realistic simulation at a fraction of the cost of Level C or higher FFSs. Additionally, Archer stated that requiring a Level C FFS for PIC aeronautical experience does not align with regulations that offer flexibility and efficiency by use of an FTD such as §§ 61.64, 61.129(i), 141.41, and 142.59.

CAE, FlightSafety International, BETA, UPS Flight Forward,²¹¹ and L3Harris also requested the FAA amend

experience requirements proposed and adopted in the SFAR.

²¹¹ UPS FF specifically drew comparisons to part 121 AQP advances with FTDs of a lower level.

the proposal to include any FSTD acceptable to the Administrator or that meets the equivalency of a Level C FFS rather than specify Level C FFS only. BETA suggested consideration of non-motion or 3-degree-of-freedom platforms for creditable training and evaluation.

As discussed in the preceding section of this preamble, this final rule reduces the amount of PIC flight time in a powered-lift from 50 hours to 35 hours. The FAA does not find a reasonable basis to allow a greater amount of credit than 15 hours, nor has the FAA received any compelling data on why a higher hourly amount of simulator training would provide an equivalent level of safety. The FAA finds that the operation of an aircraft in the NAS when adding a foundational category rating to a pilot certificate is important because FSTDs cannot fully replicate the operational experience a pilot receives in the actual flight environment, including, but not limited to, interaction with other aircraft, decision making experience and familiarity with actual air traffic control environment.

In the proposal, the FAA intended to permit 30% of training in a Level C or higher FFS. While the FAA does not see a reason to reduce this amount in light of the total reduced PIC flight time in a powered-lift, particularly given considerations of abnormal and emergency procedures training opportunities afforded by simulation, the FAA notes that training in a Level C or higher FFS could now account for approximately 43% of the required time. Therefore, because time in an FFS that may be credited toward the PIC flight time in a powered-lift accounts for a larger footprint, the FAA finds that commenters' concerns pertaining to limited ranges, cost, and accessibility are addressed.

Additionally, after consideration of comments, the FAA does not find a reasonable basis to limit the population of pilots that may use this crediting provision. Under the proposal, an applicant for a commercial pilot certificate with a powered-lift category rating could only credit the 15 hours toward the 50-hour PIC flight time requirements in § 61.129(e)(2)(i), in relevant part, in accordance with an approved training program under part 135, 141, or 142. However, the FAA finds it appropriate to generalize the provision to all pilots under the SFAR: a manufacturer's test pilots and instructor pilots,²¹² FAA test pilots and

ASIs,²¹³ initial cadre flight instructors, and pilots receiving training under an approved training program. This final rule moves the framework of the provision from proposed § 194.223(d) to § 194.216(b) to apply to all pilots under the SFAR, in accordance with the manufacturer's proposed training curriculum, manufacturer's approved training curriculum, or approved training program under part 135, 141, or 142, as applicable to the pilot.

However, the FAA maintains that credit is only appropriate for that time in a Level C or higher FFS. As discussed in section IV. C. of this preamble, the FAA described that a Level C FFS provides the minimum level of fidelity and motion cueing to replicate the environment for the time in which a pilot would normally be logging PIC time in the aircraft.²¹⁴ FFSs qualified below a Level C FFS are typically not qualified for takeoff, landing, and taxi tasks for initial pilot training and have less stringent system latency requirements, ultimately resulting in slower responsiveness of the simulation, reduced visual system fields of view, and no minimum requirements for daylight or dusk visual scenes. These differences contribute to a lower level of fidelity of the simulation that would result in an overall lower level of immersion during a simulation event. Therefore, the FAA declines to broaden credit to Level A and B FFSs.

Further, the FAA disagrees that FTDs would be adequate to warrant credit for PIC aeronautical experience at this time because an FTD meets lower thresholds than an FFS when qualified in accordance with part 60, resulting in a device characterized by a lower level of immersion and fidelity than that characterized in a Level C FFS or higher. Most levels of FTDs do not require a visual system and are not qualified to conduct takeoff, landing, and taxi training tasks, limiting their effective use for gaining PIC aeronautical experience. Without a visual display system, the PIC is unable

when instructor pilots and test pilots operate the aircraft. Absent a type-certificate, the simulator would not be fully qualified under part 60 (see § 60.13). This provision expands FFS credit to instructor pilots, test pilots, FAA test pilots, and FAA ASIs at the experimental aircraft stage, even though an FFS may not be fully qualified at that time, because the FFS could receive interim qualification. An instructor pilot or test pilot could, therefore, credit time in the interim qualified FFS.

²¹³ See section V.F.3.i.c. of this preamble for discussion on the addition of FAA test pilots and ASIs to the alternate framework under the SFAR.

²¹⁴ This rule does not preclude an applicant from crediting aeronautical experience as allowed in § 61.129(i) toward a powered-lift rating. The FAA is allowing PIC aeronautical experience to be conducted in a Level C FFS or higher.

to replicate taxiing, takeoffs, landings, and other aspects of a full flight in the aircraft which require a visual representation outside the aircraft. These are necessary tasks that would normally be conducted during a pilot's accumulation of PIC experience.

A Level 7 FTD is the only level of FTD that has a minimum qualification requirement for a visual display system. However, while a Level 7 FTD does have a visual display system and would be able to provide the necessary visual representations, unlike a Level C FFS or higher, a Level 7 FTD does not require a motion system. Therefore, the Level 7 FTD is not capable of replicating the spatial orientation a pilot would experience in the aircraft. Spatial orientation is the natural ability to maintain body orientation or posture in relation to a surrounding environment at rest and during motion. Humans inherently maintain spatial orientation on the ground, so the three-dimensional environment of flight is unfamiliar to the human body and creates sensory conflicts and illusions that make spatial orientation difficult to achieve in certain scenarios. As such spatial orientation is an important part of the environment a pilot experiences during flight and is an important part of the experience gained through training due to the risks of spatial disorientation during flight.²¹⁵ Training devices that do not utilize a motion queuing system are not able to replicate the unique environment in which the human body experiences sensory conflicts due to being aloft in a three-dimensional environment. Training in a Level C FFS or higher provides these important environmental experiences. Therefore, because of these differences and the concerns regarding pilot immersion, the FAA is retaining the requirement for a Level C or higher FFS to be utilized toward the PIC aeronautical experience.²¹⁶

If industry can formulate an equivalent training footprint due to advancements in technology, the FAA would consider it at a future date. However, currently there are not sufficient levels of advancement in technology for the FAA to approve a lower qualified FSTD toward the requirements in this SFAR to be

²¹⁵ See FAA Aeromedical Safety Brochure, Spatial Disorientation: Why You Shouldn't Fly By the Seat of Your Pants; FAA Medical Brochure Visual Illusions. Available at www.faa.gov/pilots/safety/pilotsafetybrochures.

²¹⁶ The FAA notes that use of a flight training device or flight simulator is still available as permitted in § 61.129(i). The ability to credit time spent in a Level C or higher FFS toward PIC time in a powered-lift would apply only to applicants utilizing the alternate experience requirements contained in § 194.216(b).

²¹² A powered-lift at the manufacturer will be actively working through the type-certification process with the experimental powered-lift and, therefore, the aircraft will not be type certificated

incorporated into the FAA's developed training footprint. The FAA notes that should advancements in technology warrant any further relief, a sponsor of such a device could petition the FAA for exemption in accordance with part 11.

i. Test Pilots and Instructor Pilots: Alternate Aeronautical Experience and Logging Requirements for a Powered-lift Category Rating

Several manufacturers are currently pursuing a type certificate for powered-lift, which requires developmental and certification flight tests to establish the aircraft meets the applicable certification standards pursuant to § 21.35.²¹⁷ To facilitate certification activities, manufacturers utilize test pilots who design, develop, and test the aircraft's systems and components. Additionally, manufacturers use instructor pilots to develop and validate the training for the experimental powered-lift.²¹⁸ The duties that these instructor pilots and test pilots perform exceed those of a pilot operating in a normal flight environment, which results in these test pilots and instructor pilots gaining significant experience in a particular powered-lift and intricate knowledge of the aircraft's systems and components. Therefore, the FAA proposed alternate experience requirements for qualifying test pilots and instructor pilots at an OEM to create an initial cadre of powered-lift pilots in proposed §§ 194.217 and 194.219.²¹⁹ The FAA determined these individuals would hold the most experience due to their issuance of an LOA to act as PIC during experimental aircraft operations, development of manufacturer's training program, and intricate knowledge of the aircraft's systems and components.²²⁰

A4A supported this proposed approach to providing an alternate pathway for powered-lift pilot certification. A4A emphasized that using manufacturer pilots to develop necessary crew training would provide the best option for the initial cadre of powered-lift flight instructors and

supported amendments to better meet the challenges of introducing a new category of aircraft. AWPC stated that the proposed SFAR provides a reasonable alternate pathway for OEM test pilots and instructor pilots. This section first adjudicates broader comments pertaining to test pilots and instructor pilots. The subsequent sections discuss each of the proposed alternate requirements and respond to related comments.

Eve generally opposed the SFAR proposal for the certification of test pilots and instructor pilots, partially on the basis of urging the FAA to align with ICAO Annex 1, section 2.1.1.4. Additionally, Eve stated the FAA should recognize the experience and duties of instructor and test pilots and authorize these pilots to (1) deliver training to FSB pilots and the initial cadre of instructors in part 141, 142, and 135 training programs²²¹ and (2) receive the powered-lift type rating automatically. Eve also disagreed with the proposal to permit test pilots to be trained by the instructor pilot as unreasonable on the premise that once a powered-lift category rating is not required (*i.e.*, if the FAA eliminated the category rating and fully aligned with ICAO Annex 2.1.1.4 in this final rule), it would be nonsensical to require the instructor pilot to train the test pilot. Additionally, an individual commenter stated that the FAA's allowance for manufacturers' test pilots to function as an instructor pilot could be problematic if they do not understand broader issues related to the nuances of powered-lift operations and operating multi-engine machines close to the ground in complex aerodynamic environments.

First, this final rule does not implement ICAO Annex 1, section 2.1.1.4 for those reasons stated in section V.A. of this preamble. In this SFAR, the FAA sought to leverage the experience and duties of test pilots and instructor pilots to create an initial cadre of powered-lift pilots because these individuals are the most qualified initially given their significant experience in a particular powered-lift and intricate knowledge of the aircraft's systems and components. However, the FAA does not agree that granting a rating automatically on the basis of a test pilot or instructor pilot's duties, responsibilities, and experience would be appropriate without demonstration of proficiency on a practical test.

Although these instructor pilots and test pilots have significant experience as part of the pilots' duties for the manufacturer, the practical test serves as a necessary assessment to ensure proficiency in the skills required to operate an aircraft in the NAS. In addition to the foundational element of establishing a pilot meets baseline proficiency standards, the practical test, which aligns with the applicable ACS, may subject a pilot to a skill or tasks that the pilot would experience in the NAS, but may not necessarily experience in the pilot's day-to-day operations as an instructor pilot or test pilot at the manufacturer. In other words, the practical test is essential to ensuring every pilot within the NAS has demonstrated the same knowledge, skill, and ability to operate the aircraft in many different scenarios. Most applicants for a certificate or rating are not excepted from a practical test, regardless of the pilot's experience or professional position, and instructor pilots and test pilots for powered-lift should not be treated differently.²²² For these reasons, the FAA has determined that the test pilots and instructor pilots must still demonstrate proficiency on a practical test to receive a rating under part 61. The FAA notes that FAA FSB members are equally subject to the practical test requirements to obtain an LOA and subsequent type rating once the type rating is established.²²³

²²² The FAA notes that there are limited circumstances that an applicant may apply for a pilot certificate without taking a practical test. Pursuant to § 61.73, an applicant may apply on the basis of his or her military pilot qualifications and receive a commercial pilot certificate with appropriate aircraft category, class, instrument rating and type rating so long as the pilot has received this qualification in the Armed Forces and presents evidentiary documentation in accordance with § 61.73(b) and (h). The FAA allows for this to be conducted without a practical test because applicants in accordance with § 61.73 accomplish extensive flight training and checking in the respective aircraft they receive qualification in for the Armed Forces. If a civilian equivalent of a powered-lift utilized by the Armed Forces emerges, an applicant could be granted the type rating without a practical test as well, as long as the powered-lift has been recognized to be comparable in FAA Order 8900.1, Volume 5, Chapter 2, Section 19, Table 5–88. Similarly, pursuant to § 61.75, an applicant may apply for a private pilot certificate if that person meets the requirements of § 61.75, holds a foreign pilot license without an ICAO limitation, holds a medical certificate under part 67, and is able to read, speak, write, and understand the English language. The FAA recognizes that an applicant who holds a pilot certificate granted in accordance with their country's respective CAA have also trained and tested to receive their foreign certificate. Therefore, an applicant may forgo a practical test, but only to receive a U.S. private pilot certificate.

²²³ Additionally, the FAA notes a challenge for these pilots: under § 61.51(e) they are unable to log time in which they act as PIC in accordance with an LOA issued by the FAA because they don't hold

²¹⁷ To facilitate flight tests for a non-certificated aircraft, the FAA issues an experimental certificate to the aircraft for research and development and showing compliance with the FAA's regulations. See § 21.191.

²¹⁸ In this case, an experimental certificate is issued for the purpose of crew training. See § 21.191.

²¹⁹ Specifically, under §§ 194.217(a) and 194.219(a), as adopted, the flights must be conducted in an experimental powered-lift at the manufacturer and the test pilots and instructor pilots must be authorized by the Administrator to act as PIC of the experimental powered-lift.

²²⁰ See section V.G.i.d. of this preamble for the addition of FAA test pilots and ASIs to the alternate framework adopted by this final rule.

²²¹ The FAA notes that test pilots and instructor pilots would be the persons providing training to the FSB pilots and initial cadre of instructors in parts 141, 142, and 135 training programs under proposed §§ 194.221, 194.223, 194.229, and 194.231.

a. Aeronautical Experience Requirements Concerning Training (§ 61.129(e)(3))

Currently, § 61.129(e)(3) requires an applicant for a powered-lift category rating to log at least 20 hours of training from an authorized instructor, as defined in § 61.1, on the areas of operation listed in § 61.127(b)(5). A test pilot and an instructor pilot at the manufacturer will possess extensive experience with the powered-lift; however, their flight time would not be considered to meet paragraph (e)(3) because they would not receive the flight training from an authorized instructor. Therefore, the FAA proposed alternate provisions set forth by §§ 194.217(b)(1) and (2) and 194.219(b)(1) and (2). The provisions are adopted as proposed.

First, a test pilot will be permitted to meet the 20 hours of training on the areas of operation in § 61.127(b)(5) in an experimental powered-lift at the manufacturer with an instructor pilot rather than with an authorized instructor in § 194.217(b).²²⁴ Likewise, the instructor pilot who provides the proposed training curriculum will be permitted to credit the time providing the training toward § 61.129(e)(3) pursuant to § 194.219(b). In both cases, the manufacturer's proposed training curriculum would be required to include 20 hours of training on the areas of operation set forth in § 61.127(b)(5), aligning with the corresponding requirement in § 61.129(e)(3). To verify the training, § 194.217(b)(1)(ii) will require the test pilot to receive a logbook or training record endorsement from the instructor pilot certifying that the test pilot satisfactorily completed the training curriculum. Similarly, § 194.219(b)(1)(ii) will require the instructor pilot to receive an endorsement from a management official within the manufacturer's organization certifying that the instructor pilot has provided the manufacturer's proposed training curriculum to a test pilot on the areas of operation listed in § 61.127(b)(5).

Relatedly, § 61.129(e)(3)(iv) requires an applicant to log at least 3 hours in

the powered-lift category on their respective pilot certificates. In this SFAR, the FAA alleviates this challenge by leveraging the experience gained by test pilots, instructor pilots, and ASIs acting as PIC in accordance with an LOA for a powered-lift that is in the experimental phase of its type certification by permitting those pilots to log this time as PIC flight time toward ratings required by part 61.

²²⁴ Consistent with the current prohibition in § 61.195(i), which prohibits a flight instructor from making any self-endorsements for a certificate, rating or practical test, the FAA finds it would be inappropriate to permit the instructor pilot to make a self-endorsement.

a powered-lift with an authorized instructor in preparation for the practical test within the preceding two calendar months from the month of the test; the lack of authorized instructors as defined in part 61 creates the same problem as previously discussed. To enable the test pilot or instructor pilot to take the practical test after completing or providing the manufacturer's proposed training curriculum, §§ 194.217(b)(2) and 194.219(b)(2) will permit the preparation for a practical test to be completed with an instructor pilot rather than an authorized instructor, as required by part 61. While the test pilot would receive the three hours from an instructor pilot, an instructor pilot would be required to receive the three hours from another instructor pilot. To enable the examiner to verify that the applicant received the preparation for the practical test, the applicant would be required to receive a logbook endorsement under § 61.123(e)(2). Section 194.213 will permit the applicant to obtain such endorsement from an instructor pilot rather than from an authorized instructor (see section V.F. of this preamble for additional discussion on § 194.213).

Lilium opposed the proposed requirement for test pilots to be qualified by a manufacturer instructor pilot following the completion of 20 hours of training in accordance with the manufacturer's proposed training curriculum.²²⁵ Lilium contended the additional training would be unnecessary and add undue time and cost to the development process. Lilium stated that, instead, the FAA should consider adoption of the test pilot qualification requirement set forth by EASA FCL.725, paragraph (e), which permits test pilots involved in the development, certification, or production flight tests for an aircraft type to apply for the relevant type rating after completing either 50 hours of total flight time or 10 hours of flight time as PIC on test flights.

The FAA notes that the 20 hours of training time set forth by § 61.129(e)(3) could be concurrently accomplished within the testing program of developing a powered-lift to meet requirements outlined in the type certification process, not necessarily

²²⁵ Additionally, Lilium recommended that the FAA amend § 61.129(e)(3)(iv) to permit the three hours of preparation for the practical test to be conducted in an FSTD for all pilot populations under the SFAR. Lilium did not provide any rationale for such relief outside of referencing that § 61.129(e)(3)(iv) would inherently require dual controls in the aircraft. The FAA addresses powered-lift with single controls and Lilium's recommendation in section V.D. of this preamble.

following the completion of a manufacturer's proposed training curriculum. Additionally, the FAA noted in the NPRM that the SFAR would permit pilots to retroactively log time that meets the criteria adopted by this final rule. Therefore, a pilot could log all time within the life of the pilot's career as a powered-lift instructor or test pilot that meets the requirements in this final rule for a commercial pilot certificate with a powered-lift category rating and the applicable type rating. While powered-lift are currently in various stages of development and testing, the FAA finds that 20 hours of training consisting of the areas of operation required for all applicants for a commercial pilot certificate does not constitute an undue burden in the consideration of (1) the role of a powered-lift manufacturer in developing associated training curriculum in general and (2) a test pilot or instructor pilot's expected career at a manufacturer. Therefore, the FAA finds these considerations negate Lilium's assertion that additional time would result in a substantial time and cost burden.

The FAA does not find EASA's provision FCL.725(e) to be similarly situated to the existing FAA's test pilot framework or the alternate requirements set forth by the SFAR. EASA stipulates in FCL.725 that pilots holding a flight test rating issued in accordance with FCL.820 who were involved in development, certification, or production flight tests for an aircraft type, and have completed either 50 hours of total flight time or 10 hours of flight time as PIC on test flights in that type, shall be entitled to apply for the issue of the relevant type rating, provided that they comply with the experience requirements and the prerequisites for the issue of that type rating, as established in FCL subpart H (Class and Type Ratings) for the relevant aircraft category.

FCL.820 outlines the requirements for a flight test rating. Under EASA regulations, pilots may only act as a PIC in certain category 1 or 2 flight tests if they hold a flight test rating.²²⁶ Applicants for the first issuance of a flight test rating must also (1) hold at least a commercial pilot license (CPL) and an instrument rating (IR) in the appropriate aircraft category, (2) have completed at least 1,000 hours of flight time in the appropriate aircraft category, of which at least 400 hours must have been as PIC, and (3) complete a training course at an EASA-approved training program appropriate to the intended

²²⁶ FCL.820(a) and (b).

aircraft and category of flights.²²⁷ Therefore, these pilots already have this base level of flight proficiency before FCL.725 provisions for a type rating apply, which far surpass the requirements in part 61 for the issuance of an initial pilot certificate with powered-lift category rating. For example, to gain this experience in airplanes, Alternate Means of Compliance (AMC1) FCL.820 states that competency-based courses should include 350 hours of ground training, 100 hours of flight test training of which 15 flights should be made without an instructor on board. Additionally, the curriculum should include elements on theoretical knowledge, flight test techniques and flight training.²²⁸

The FAA contends that implementing the requirements of FCL.820 would result in extensively more burdensome requirements than the FAA's alternate means of compliance for a test pilot (and instructor pilot) to obtain powered-lift ratings in this SFAR. The FAA's test pilot framework differs from that of EASA's in that while a part 141 school has guidelines for test pilot training in appendix K to part 141, that training does not result in a flight test pilot rating. Therefore, if the FAA were to align its approach with the requirements of FCL.725(e), the FAA would need to require significantly more ground and flight training of the test pilot and instructor pilot than is currently afforded in this SFAR.

b. Aeronautical Experience Requirements Involving Time Performing the Duties of PIC in Experimental Powered-Lift (§ 61.129(e)(4))

Section 61.129(e)(4) currently requires an applicant for a powered-lift category rating to obtain either 10 hours of solo flight time in a powered-lift under an endorsement from an authorized instructor or 10 hours of flight time performing the duties of PIC in a powered-lift with an authorized instructor onboard. Either of these flight times may be credited toward the flight time requirement in § 61.129(e)(2), which requires 100 hours of PIC flight time. As previously discussed, the requirement for an authorized instructor defined under part 61 presents a problem for test pilots and instructor pilots; therefore, the FAA proposed §§ 194.217(b)(3) and 194.219(b)(3), with no comments received. The provisions are adopted as proposed.

Therefore, to preserve the option of obtaining solo flight time, §§ 194.217(b)(3) and 194.219(b)(3) will allow test pilots and instructor pilots to obtain the solo endorsement from an instructor pilot in lieu of an authorized instructor. Additionally, test pilots and instructor pilots will be permitted to complete the 10 hours of flight time performing the duties of PIC in an experimental powered-lift with a person other than an authorized instructor onboard. Specifically, under § 194.217(b)(3) (for test pilots), another test pilot or an instructor pilot who is authorized by the Administrator to act as PIC of the experimental powered-lift may be onboard. Under § 194.219(b)(3) (for instructor pilots), a test pilot, another instructor pilot who is authorized by the Administrator to act as PIC of the experimental powered-lift, or an FAA test pilot or ASI may be onboard.

c. Aeronautical Experience Requirements Involving Logging PIC Flight Time (§ 61.129(e)(2))

Section V.F.2. of this preamble discusses the reduction in PIC flight time under the provisions of this SFAR, which is applicable to test pilots and instructor pilots. Section 61.129(e)(2) prescribes 100 hours of PIC flight time, which includes at least 50 hours in a powered-lift.²²⁹ Under § 61.51(e)(1), in pertinent part, a pilot may only log PIC time when the pilot is the sole manipulator of the controls of an aircraft for which the pilot is rated (category, class, and type rating, if appropriate) or is the sole occupant of the aircraft. As discussed in the NPRM, these provisions present challenges for the key population of test and instructor pilots.²³⁰ As it pertains to test pilots, the test pilot would be precluded from logging time under the first option because the pilot would not be appropriately rated. Further, the test pilot would be precluded from logging PIC time under the second option because the test pilot may not be the sole occupant of the powered-lift when conducting operations for conducting research and development or showing compliance with the regulations²³¹ or

the powered-lift may require two pilot flightcrew members. As it pertains to instructor pilots, under § 61.51(e)(3), a flight instructor may log PIC flight time for all flight time while serving as the authorized instructor in an operation if the instructor is rated as PIC of that aircraft. However, the manufacturer's instructor pilot would not be an authorized instructor pursuant to part 61.

Considering the various functions a test pilot performs during the course of their duties (e.g., test flights, filing flight plans, conducting departures and instrument approaches, etc.) and accounting for an instructor pilot's duties and responsibilities (e.g., developing, validating, and delivering the manufacturer's proposed training curriculum), the FAA proposed alternate logging requirements in § 194.217(c) for test pilots and in § 194.219(c) for instructor pilots. The FAA did not receive any comments to these provisions. This final rule adopts these provisions as proposed (in addition to the reduction in PIC flight time in a powered-lift as described in section V.F.2. of this preamble). Therefore, § 194.217(c) will permit the test pilots to log PIC flight time for flights when they are the sole manipulator of the controls of the experimental powered-lift despite the fact that they are not rated in the aircraft. The test pilot must act as PIC of the experimental powered-lift in accordance with an LOA issued by the Administrator and the flight must be conducted for the purpose of research and development or showing compliance with the regulations in accordance with the powered-lift's experimental certificate. Similarly, § 194.219(c) will permit the instructor pilots to log PIC flight time for flights when they are serving as an instructor pilot for the manufacturer of an experimental powered-lift for which the pilot is not rated. The instructor pilot must act as PIC of the experimental aircraft in accordance with an LOA issued by the Administrator and the flight must be conducted for the purpose of crew training in accordance with the powered-lift's experimental certificate.

d. FAA Test Pilots and FAA ASIs

As discussed in section V.A. of this preamble, the FAA adopts the requirement that pilots hold a type

received the required training that is appropriate to the pilot certification level, aircraft category, class, and type rating (if a class or type rating is required) for the aircraft to be flown and have received an endorsement for solo flight in that aircraft from an authorized instructor.

²²⁷ FCL.820(d).

²²⁸ AMC1 FCL.820(d), Condition 1 courses for aeroplanes.

²²⁹ § 61.129(e)(2)(i).

²³⁰ 88 FR 38946 at 38969 (June 14, 2023).

²³¹ The "sole occupant" provision is intended to recognize the solo flight time that is required under the aeronautical experience requirements for certificates and ratings. Because student pilots seeking an initial category and class rating or certificated pilots who are adding a new rating to their pilot certificate are not yet rated, this section recognizes this solo time as PIC time without the pilot having to be rated in the aircraft. Section 61.31(d)(2) permits pilots to act as PIC of an aircraft when not rated in the aircraft provided they have

rating for the powered-lift the pilot seeks to operate. Accordingly, FAA test pilots and ASIs are subject to the same pilot certification requirements. However, as written, the SFAR would preclude an FAA test pilot or ASI from using the same flexibilities that manufacturer test pilots and instructor pilots may use.

At this time, the manufacturers' test pilots and instructor pilots are the only pilots who have significant experience operating the civilian powered-lift that are planning to come to market. Similarly, the FAA employs test pilots and ASIs involved in the certification process for manufacturers that are pursuing a type certificate in a powered-lift. FAA test pilots and ASIs play a significant role in the type certification of newly designed aircraft, powered-lift included, without which new entrant aircraft would not be able to enter civil operations. These individuals employed by the FAA are also issued authorizations to operate the aircraft, intricately involved in development of the manufacturer's training program, and acquire significant experience and knowledge in the particular powered-lift to facilitate the type certification process.

FAA test pilots are pilots employed by the FAA who facilitate type certification of the performance, stability, and control requirements of new or modified aircraft. FAA test pilots enable the type certification compliance and certification process through flight testing of avionics, propulsion, and mechanical/electrical systems, as well as other equipment installations on aircraft to which they are assigned. An FAA test pilot also participates as a subject matter expert on type certification board meetings with the manufacturer, flight safety review board meetings, and FSBs, as necessary. Through qualitative and quantitative flight tests and evaluation of engineering data on modified and new type design, the FAA test pilots oversee and ensure compliance with applicable airworthiness requirements eventually culminating in the type certification of an aircraft. In addition to these duties, FAA test pilots maintain a high level of pilot proficiency and currency in categories and classes of aircraft for the projects they are assigned. Currently, there are a small number of FAA test pilots who hold powered-lift category ratings.

Similarly, ASIs are employed by the FAA and maintain involvement early in the type certification process of new aircraft. These ASIs evaluate detailed flight characteristics of aircraft certification projects to establish

training requirements for FAA operations inspectors responsible for evaluating and approving training programs set forth by the manufacturer. ASIs develop a detailed knowledge of the aircraft's systems to ensure operational safety of the aircraft through the training program. Like FAA test pilots, FAA ASIs also serve as members of type certification boards and advisors to aircraft certification on flight operations problems regarding newly designed aircraft being type certificated and introduced into revenue service. Other duties of inspectors include recommending amendments to proposed manufacturer crew training, participating in the development of approved AFMs, and representing flight standards in conducting operational suitability flight evaluations.

Therefore, FAA test pilots and ASIs possess unique experience parallel to that of a manufacturer's test pilots that merits their inclusion in the alternate experience requirements to receive a powered-lift category, instrument, and type rating. While the FAA did not initially propose to extend the SFAR to this population, the FAA finds it necessary to facilitate FAA test pilots and ASIs performing official job functions to receive a pilot certificate with a powered-lift category rating to support the pipeline of powered-lift certification.

Accordingly, this final rule makes several minor revisions in §§ 194.203, 194.217, and 194.219 to add FAA test pilots and ASIs into the alternate SFAR framework to obtain a commercial pilot certificate with a powered-lift category rating. Additionally, the FAA adds a definition of "FAA test pilot" and "aviation safety inspector" to § 194.103. The FAA notes that FAA test pilots and FAA ASIs are added into the provisions facilitating an alternate framework to obtain an instrument-powered-lift rating, however, those provisions are discussed in section V.F of this preamble.

First, to define the exact population of FAA pilots that may use the alternate framework, the FAA adopts two new definitions in § 194.103 for the purpose of part 194. Specifically, an "aviation safety inspector" will be defined as a pilot employed by the FAA to conduct operations of a powered-lift for the purpose of establishing a type rating in that particular powered-lift under part 21, as appropriate. Similarly, an "FAA test pilot" will be defined as a pilot employed by the FAA to conduct operations of a powered-lift for the purpose of establishing a design approval that leads to an aircraft type certificate for that particular powered-

lift under part 21. These narrowly scoped definitions function to ensure the FAA pilot utilizing the relief is performing official FAA job duties and will have experience and familiarity specific to the type of powered-lift for which the pilot will seek a type rating, parallel to that experience expected of a manufacturer's test pilots and instructor pilots.

Next, § 194.203 sets forth alternate qualification requirements for certain flight instructors. This section provides that, in addition to the provisions specified in § 61.3(d)(3), a flight instructor certificate issued under part 61 is not necessary to conduct flight training if the training is given by an instructor pilot in a powered-lift at the manufacturer, provided the training is conducted in accordance with the manufacturer's training curriculum and is given to either (1) a test pilot, or (2) certain persons authorized by the Administrator for the purpose of training in a powered-lift training program.²³² Because FAA test pilots and ASIs will receive training during the type certification process through their testing, compliance, and evaluation flights, this final rule adds FAA test pilots and ASIs to the population covered by § 194.203(a) in new paragraph (a)(3). The FAA test pilot or ASI may only receive training from an instructor pilot without a part 61 flight instructor certificate if received for the purpose of establishing a type rating in a powered-lift as part of the FAA ASI's official job functions or for the purpose of establishing a design approval that leads to an aircraft type certificate for that particular powered-lift under part 21 as part of the FAA test pilot's official job functions.

Additionally, § 194.213 provides alternate endorsement requirements for certain persons seeking a powered-lift rating. Specifically, § 194.213(a) permits an instructor pilot or a management official to provide endorsements to certain persons. To account for FAA test pilots and ASIs, the FAA adds new paragraph (a)(1)(iii), which permits a manufacturer's instructor pilot to provide an FAA test pilot or FAA ASI the required logbook or training record endorsements under parts 61 and 194 for a commercial pilot certificate with a powered-lift category rating, an instrument-powered-lift rating, a powered-lift type rating, or a flight

²³² Specifically, an initial check pilot, chief instructor, assistant chief instructor, or training center evaluator for the purpose of initiating training in a powered-lift under an approved training program under part 135, 141, or 142. This final rule adopts the section as proposed, as discussed in section V.G. of this preamble.

instructor certificate with powered-lift ratings. Again, the FAA test pilot or ASI must be performing official job functions for the purposes delineated in the respective definition to utilize the alternate requirement.

As the preceding sections have detailed, § 194.217 provides the alternate aeronautical experience and logging requirements for a commercial pilot certificate with a powered-lift category rating specifically for manufacturer test pilots. As stated, the FAA proffers the alternate requirements for test pilots to extend to FAA test pilots and ASIs. Therefore, the FAA adds this population of pilots in § 194.217 through revisions in paragraphs (a), (b), (b)(1), (b)(1)(ii), (b)(2) through (b)(4), and (c)(1), and a new paragraph (a)(3). The FAA notes that § 194.217(b)(3) permits the aeronautical experience requirement in § 61.129(e)(4) by logging at least 10 hours of solo flight time under an endorsement from an instructor pilot or by performing the duties of PIC in an experimental powered-lift with a test pilot or an instructor pilot onboard. While the regulation would permit another test pilot to be onboard the flight with a test pilot performing the duties of PIC in an experimental powered-lift, the FAA is not adopting a parallel provision to permit a FAA test pilot or ASI to be on board a flight with another FAA test pilot or ASI performing the duties of PIC.

The FAA contemplated this alternative option but did not find this to be in the interest of safety. The instructor pilot and test pilots from the manufacturer are the most knowledgeable in the aircraft. Ensuring that instructor pilots or test pilots from the manufacturer are on board the flight with an FAA test pilot or ASI ensures that a pilot with significant experience and knowledge on that OEM's powered-lift is performing the duties of PIC, thereby ensuring an equivalent level of safety. Additionally, the FAA makes two conforming amendments to § 194.219, which sets forth the alternate aeronautical experience and logging requirements for a commercial pilot certificate with a powered-lift category rating for instructor pilots, as an outgrowth of the inclusion of FAA test pilots and ASIs.

First, one criteria for an instructor pilot to meet the alternate requirements for § 61.129(e)(3) and (4) requires the instructor pilot to have provided the manufacturer's proposed training curriculum to a test pilot, within certain parameters. Because FAA test pilots and ASIs will receive the proposed training curriculum from an instructor pilot, the

FAA revises § 194.219(b)(1)(i) to include this population of pilots in the criteria as applicants an instructor pilot could receive credit for delivering the training program. Second, this final rule adds FAA test pilot and ASIs to the group of persons permitted to be onboard the experimental powered-lift while an instructor pilot performs the duties of PIC to satisfy the aeronautical experience requirement in § 61.129(e)(4), which is set forth in new § 194.219(b)(3)(iii).

ii. Initial Cadre Instructors: Alternate Aeronautical Experience and Logging Requirements for Powered-Lift Category Ratings

As acknowledged in the NPRM,²³³ the alternate experience and logging requirements for test pilots and instructor pilots would enable individuals to obtain powered-lift ratings on their pilot certificates. However, the FAA found that those alternate requirements alone would be insufficient to develop enough personnel to support training in a powered-lift in an approved training program under part 135, 141, or 142.

The FAA did not propose relief to the qualifications required of persons who provide training and checking for an approved training curriculum under parts 135, 141, and 142 (*i.e.*, part 135 check pilots, part 141 assistant chief instructors and chief instructors, and part 142 training center evaluators). Specifically, under part 135 and the provisions of this final rule, a part 135 check pilot must hold the certificates and ratings required to serve as PIC in the aircraft (*i.e.*, at least a commercial pilot certificate with a powered-lift category rating, instrument powered-lift rating, and appropriate type rating).²³⁴ Under part 141, an assistant chief instructor or chief instructor must hold a powered-lift category rating on both their commercial pilot certificate and their flight instructor certificate as well as a powered-lift type rating on their commercial pilot certificate.²³⁵ A part 142 TCE must hold the certificates and ratings in which they are instructing or checking for that aircraft.²³⁶

To build the initial cadre of instructors and address these obstacles, the FAA's intended framework uses test pilots and instructor pilots to build the initial cadre of instructors (*e.g.*, a qualified instructor for a part 142 training center), who would then

provide training under a part 135, 141, or 142 approved training program. To facilitate this, the FAA proposed § 194.221(a) to permit persons who are authorized to serve as initial check pilots, chief instructors, assistant chief instructors, or training center evaluators to receive the training for powered-lift ratings at a manufacturer.

Eve opposed the initial cadre framework proposed by the NPRM, stating that training the initial cadre of instructors after the FSB process concludes will delay civilian powered-lift operations. Eve stated that the FAA's proposal to require flight hours in a certificated aircraft is burdensome and unfeasible. Eve emphasized that they did not disagree with utilizing test pilots and instructor pilots to qualify the initial cadre of instructors but asserted that the FAA should allow the initial cadre of instructors to be qualified in parallel with the aircraft certification and FSB processes, as is the FAA's current practice with the introduction of new aircraft types.²³⁷ UPS FF also contended that requiring a powered-lift to be type-certificated before an operator can implement its training program would result in an undue financial burden and unnecessary delays in developing an initial cadre. Specifically, UPS FF recommended revising the SFAR to allow manufacturers to provide instruction to an operator prior to type certification, utilizing FAA guidance for the use of experimental aircraft for commercial flight instruction.

The FAA does not find the initial cadre of instructors to be similarly situated to test pilots and instructor pilots to warrant an equivalent level of relief in the alternate framework. Test pilots and instructor pilots at the manufacturer are involved in development and testing of prospective aircraft toward the eventual type

²³⁷ EVE specifically recommended the FAA follow similar processes for initial cadre preparation as is currently the practice in accordance with FAA Order 8900.1, Volume 3, Chapter 54, Section 2 *Part 142 Training Centers: Training, Qualification, and Designation of Training Center Instructors and Evaluators* as well as those set forth in Air Transportation Job Task Analysis (AT JTA) 4.1.202 *Conduct a Flight Standardization Board (FSB) Evaluation*. EVE noted that once a powered-lift category requirement was removed, the FAA would be able to follow these two reference guidance documents. The FAA notes that regardless of whether a category rating is required, this is the current practice that the FAA would follow to procedurally accomplish an FSB in a powered-lift. Specifically, in regard to ELEMENT 8.3 *Receive FSB training*, the initial cadre of participants of the FSB would be receiving the applicable training from the provider and the FAA predicated the alternate experience for test pilots and instructor pilots with the expectation that the FAA would follow these procedures when conducting an FSB.

²³³ 88 FR 38970 (June 14, 2023).

²³⁴ See § 135.337(b)(1) and SFAR PROVISION.

²³⁵ See §§ 141.35(a)(1), 141.36(a)(1), 141.37(a)(2)(ii).

²³⁶ See § 142.47(a)(5).

certification of products and airframes. Test pilots and instructor pilots have significant experience throughout the production of the aircraft and have the background knowledge and skills to conduct quantitative and qualitative analysis, identify outcomes that may require the manufacturer to redesign or adjust design of aircraft components, which therefore results in the applicable flight experience necessary to accept a higher level of operating risk because of the experimental status of the aircraft. This warrants separate relief from that offered to the initial cadre of instructors because the initial cadre of instructors will not inherently have the equivalent level of experience of a manufacturer's test pilots and instructor pilots (*i.e.*, the initial cadre instructor would not have any prior experience in the category of powered-lift or intricate knowledge of the powered-lift type during its development). The FAA, therefore, adopts § 194.221(a) as proposed.

Test pilots and instructor pilots will receive an LOA provided to the manufacturer by the FAA to conduct very specific tasks in accordance with § 21.191(a), (b), and (c). The FAA would not consider issuing an LOA to an initial cadre of instructors unassociated with a manufacturer for these very specific purposes because they would not be carrying out the purposes of these experimental test flights. Once the aircraft is type certificated, the FAA proposed separate relief for an initial cadre of instructors to be trained by the particular powered-lift experts: test pilots and instructor pilots. Combining this responsibility with the duties assigned to the test pilots and instructor pilots, and authorized by the LOA, would complicate both the type certification and FSB process and the training of the initial cadre of instructors due to the fluidity of the aircraft and training program at that time.

Additionally, the FAA finds grouping the initial cadre of instructors in with the test pilots and instructor pilots would not be in the interest of safety due to the experimental status of the aircraft.²³⁸ The FAA finds it important for the initial cadre of instructors to be trained on the type-certificated aircraft as it will be available for training, testing, and civilian operations under the type certificate and under a more concrete training program. Specifically,

²³⁸ The FAA notes that manufacturers may not support this type of access to their powered-lift in the experimental phase to persons not under an employment contract, contractor agreements, or nondisclosures with the manufacturer for intellectual property and proprietary trade secret purposes.

throughout the type certification process, the aircraft may change in design and programming and, likewise, throughout the FSB, the proposed training program may be revised. Until a type certificate is issued, aircraft design would not be solidified and any changes made, as well as associated knowledge of those changes, may not be transferred to the base of pilots in the initial cadre that would then be responsible for training at their respective certificate holder. For example, if an individual intended for the initial cadre of instructors trained on a unique handling characteristic, and that handling characteristic was modified as an outgrowth of the TC process, the individual may not receive the appropriate training for the modified characteristic in the fluidity of the powered-lift and training program. This differs for test pilot and instructor pilots because of their in-depth and firsthand involvement with the development of the aircraft and training program and with TC and FSB processes.

CAE and NBAA expressed concern that the proposal requires initial cadre instructors and TCEs to be trained by the manufacturer, which gives a significant competitive advantage to manufacturers. CAE and NBAA stated that this (1) eliminates the ability for part 142 training centers to qualify initial cadre instructors and TCEs by their own means, and (2) creates a backlog for training with the potential for manufacturers to solely determine who may be trained and when training may occur. CAE and NBAA emphasized the burden this would place on manufacturers to train in volume to scale the industry.

First, the FAA disagrees that the proposal reduces the ability for air agencies to qualify initial cadre instructors and TCEs by their own means as compared to the competitive advantage the manufacturer may have. The lack of powered-lift in operations today inherently requires the manufacturer to be significantly involved in the certification framework. At the onset of powered-lift entering the market, test pilots and instructor pilots at the manufacturer will be the only qualified individuals to deliver training in the respective OEM's powered-lift, which the FAA expects to form the initial foundation of pilots. After the initial cadre of instructors for parts 141 and 142 air agencies is trained, certificate holders may operate within their approved training programs. In other words, reliance on the manufacturer as the sole training option would significantly lessen after certification of the initial cadre of

instructors. This is the same general concept as the status quo for entrance of new aircraft types: at the onset, the manufacturer serves as the most qualified individual to train FAA inspectors and test pilots and industry personnel, after which industry stakeholders springboard subsequent populations of pilots through part 61 training or enrollment at air agencies (*e.g.*, parts 141 and 142). Therefore, the FAA does not view the alternate framework set forth by the SFAR²³⁹ as narrowly tailored for manufacturers, but rather leverages the current concept with facilitating frameworks to achieve initial commercial entrance of powered-lift into civilian operations while balancing the interest of safety.

In sum, when an operator, pilot school, or training center sends an individual to the manufacturer for training in a powered-lift, the individual would not be fully qualified as a check pilot, chief instructor, assistant chief instructor, or training center evaluator for powered-lift, but each would be considered a candidate for their respective positions.²⁴⁰ To ensure an appropriate level of oversight, the FAA proposed §§ 194.203(a)(2), 194.213(a)(1)(ii), and 194.221(a)(1), which are adopted herein, permit those individuals who are authorized by the Administrator through a temporary letter of approval (authorizing the individual to be a candidate for an operator, pilot school, or training center for the purpose of establishing sufficient qualified personnel) to receive training in a powered-lift at the manufacturer. After the individual completes the training program, the individual may pursue certification in accordance with current practice (*e.g.*, complete a practical test to receive the appropriate powered-lift ratings and could obtain a powered-lift category rating on their flight instructor certificate in accordance with subpart H of part 61), as well as deliver the training curriculum under their respective part in accordance with current practice (for example, receive a permanent letter of approval to be a check airman under part 135 or a TCE under part 142).

²³⁹ The FAA notes also that other manufacturers have obtained part 142 training center certificates and, in some instances, part 141 pilot school certificates, to facilitate initial training and certification in their aircraft. The FAA anticipates that the relief provided to the persons who serve as test pilots and instructor pilots for powered-lift manufacturers will enable the manufacturers to support training and qualification of other training providers' personnel.

²⁴⁰ In addition, for part 135 check pilot applicants and part 142 TCEs, the initial cadre check airmen or initial cadre TCE process will apply.

a. Aeronautical Experience Requirements Concerning Training (§ 61.129(e))

The FAA proposed alternate aeronautical experience requirements in § 194.221(b) to facilitate training and certification of the initial cadre of instructors and overcome similar training obstacles as those faced by test pilots and instructor pilots, as previously discussed. In sum, certain provisions throughout § 61.129(e) require training and flight hours to be conducted with an authorized instructor, as defined in part 61, onboard the powered-lift. As with test pilots and instructor pilots, the person receiving the manufacturer's training from an instructor pilot may not have an authorized instructor, as defined in § 61.1, providing the flight training or training in preparation for the practical test. Notwithstanding the general opposition to the initial cadre framework addressed in the previous section, the FAA did not receive comments on the specific provisions set forth in § 194.221(a) and (b)(1) through (3) to address these obstacles. The FAA adopts these provisions as proposed.

Therefore, § 194.221(b) allows the requisite training to occur with an instructor pilot at the manufacturer in lieu of a part 61 authorized instructor. First, § 194.221(b)(1) will permit the individual to satisfactorily complete the manufacturer's training curriculum in the powered-lift in place of the requirement in § 61.129(e)(3), which requires 20 hours of training on the areas of operation listed in § 61.127(b)(5) from an authorized instructor. The training curriculum must include 20 hours of flight training on the areas of operation listed in § 61.127(b)(5) and be provided by an instructor pilot at the manufacturer. Additionally, pursuant to § 194.221(b)(1)(ii), the individual must receive an endorsement in their logbook or training record from the instructor pilot certifying that the training was completed. Second, § 194.221(b)(2) will permit to permit the preparation for the practical test to be completed with an instructor pilot rather than an authorized instructor.²⁴¹ Finally, § 61.129(e)(4) requires an applicant for a powered-lift category rating to obtain either 10 hours of solo flight time in a powered-lift or 10 hours of flight time performing the duties of PIC in a

²⁴¹ To the extent that instructor pilots may hold the necessary certificates and ratings to be an authorized instructor as defined in § 61.1 in a powered-lift, those instructor pilots would be able to provide endorsements without need for this relief.

powered-lift with an authorized instructor onboard; the FAA in § 194.221(b)(3) will permit the instructor pilot to replace the authorized instructor in § 61.129(e)(4). Also, as noted earlier, § 194.221(a)(2) will require that the flights are conducted in type-certificate powered-lift at the manufacturer.

b. Alternate Aeronautical Experience Logging PIC Flight Time (§ 61.129(e)(2))

The FAA proposed alternate logging requirements in § 194.221(c) to overcome PIC logging obstacles as set forth in § 61.51(e), similar to those faced by test pilots and instructor pilots, as previously discussed.²⁴² In section V.J. of this preamble, the FAA explained that a reduction in PIC time is warranted from 50 hours to 35 hours. Therefore, the initial cadre of instructors who would train with the manufacturer under the SFAR would be required to obtain 35 hours of PIC flight time in powered-lift. As discussed, under § 61.51(e)(1), a pilot may log PIC time when the pilot is (i) the sole manipulator of the controls of an aircraft for which the pilot is rated (category, class, and type rating as appropriate), or (ii) the sole occupant of an aircraft. The initial cadre of instructors who attend training at a manufacturer would not yet be rated in the powered-lift, so they would not be able to log PIC time as sole manipulator of the controls. Additionally, because the majority of the flight time with the manufacturer would consist of training time with an instructor pilot, the person would not be able to log this time as PIC time as the sole occupant of the powered-lift. The FAA proposed § 194.221(c) to address this obstacle; notwithstanding the general opposition to the initial cadre framework addressed in the previous section, the FAA did not receive comments on this specific provision set forth in § 194.221(c). Therefore, this final rule adopts these alternate logging provisions and reduces the maximum logging time when the pilot is the sole manipulator of the controls of a powered-lift for which the pilot is not yet rated from 40 hours, as proposed, to 25 hours as subsequently discussed.

Specifically, as noted in section V.J of this preamble, the FAA reduced the PIC flight time required for all pilots under the SFAR to 35 hours instead of 50 hours. It, therefore, follows that this alternate logging requirement adopted in this final rule would now enable

²⁴² As proposed, § 194.221(c) would have allowed an applicant for a commercial pilot certificate with a powered-lift category rating to log up to 40 hours of the 50 hours of pilot-in-command flight time required by § 61.129(e)(2)(i).

persons to log 25 hours of PIC flight time for flights when they are obtaining flight training on the areas of operation specified in § 61.127(b)(5).²⁴³ Therefore, to establish the initial cadre of persons who would initiate training in a powered-lift in accordance with an approved training program under part 135, 141, or 142, § 194.221(c) will permit those persons who would receive training at the manufacturer to log up to 25 hours of PIC flight time toward the 50-hour requirement during flights when the person is the sole manipulator of the controls of the powered-lift for which the person is not rated. Pursuant to the conditions adopted in § 194.221(c)(1) through (3), the person must be manipulating the controls of the powered-lift and performing the duties of PIC with an instructor pilot onboard, and the flight must be conducted in accordance with the manufacturer's training curriculum.

The FAA found that the flight time permitted under the proposed alternate requirement would be valuable for the purposes of logging PIC flight time for a powered-lift category rating because the pilot would be solely manipulating the controls of the powered-lift, thereby obtaining experience with its flight and handling characteristics, while simultaneously exercising the duties of PIC. By exercising the duties of PIC, the pilot would experience increased responsibilities during the flight (compared to a typical training flight in an aircraft in which they are not yet rated), including heightened decision-making. The FAA noted that these pilots would still be required to obtain the last 10 hours of PIC flight time as solo flight time under § 61.51(e).²⁴⁴

iii. Pilots Receiving Training Under an Approved Training Program

a. Alternate Requirements for a Commercial Pilot Certificate With a Powered-Lift Category Rating

The NPRM acknowledged an obstacle created in § 61.51(e)(1) for persons seeking to obtain a powered-lift category rating on their commercial pilot certificate outside a manufacturer's training curriculum (*i.e.*, under an

²⁴³ As detailed in this section, an applicant for a powered-lift category rating would be required to obtain either 10 hours of solo flight time in a powered-lift or 10 hours of flight time performing the duties of PIC in a powered-lift with an authorized instructor onboard. Therefore, with the total time being reduced to 35 hours of PIC, the FAA has likewise adjusted the 40 hours to 25 to account for the last 10 hours being conducted as solo or supervised by an authorized instructor.

²⁴⁴ The solo flight endorsement required under § 61.31(d)(2) may be provided by an instructor pilot in lieu of an authorized instructor in accordance with § 194.213(a).

approved training program at a part 135 operator or a part 141 or 142 air agency). Specifically, pilots would be unable to log PIC flight time in a powered-lift in accordance with § 61.51(e)(1)(i) because they would not yet be rated in the aircraft. Thus, at the commercial pilot level, a person would have to obtain the 50 hours of PIC time required by § 61.129(e)(2)(i) as the sole occupant of the powered-lift under solo endorsements from an authorized instructor. The FAA proposed § 194.223(c) to cure this logging obstacle. As subsequently discussed, this final rule adopts § 194.223(c) as proposed with one minor revision.

As discussed in section V.F.2. of this preamble as it applies to the initial cadre of instructors, the reduction in PIC flight time in a powered-lift from 50 hours to 35 hours necessitates an aligning reduction in the allowance to log up to 40 hours of PIC flight time provided in § 194.223(c). Using the same ratio, this final rule reduces 40 hours to 25 hours. An applicant would still be required to obtain the remaining 10 hours of PIC time as the sole occupant of the powered-lift under an instructor endorsement.

Therefore, § 194.223(c) will permit certain applicants for a commercial pilot certificate with a powered-lift category rating to log up to 25 hours of PIC flight time toward the 35-hour requirement during flights when the pilot is the sole manipulator of the controls of the powered-lift for which the pilot is not rated. Conditions to utilize this relief will require (1) the applicant to manipulate the controls of the powered-lift with an authorized instructor onboard, (2) the applicant to perform the duties of PIC, and (3) the flight to be conducted in accordance with an approved training program under part 135, 141, or 142.²⁴⁵ This PIC flight time may be logged when the applicant is obtaining flight training on the areas of operation specified in § 61.127(b)(5) under an approved part 135, 141, or 142 training program.

An individual commenter questioned whether the 40 hours (now 25 hours as adopted by this final rule) of flight time would be required in every make and model of powered-lift within the powered-lift category.

The FAA notes the PIC flight time required by § 61.129(e) is category specific, including § 194.216(a) and certain time within § 61.129(e)(2)(ii) as applicable to the powered-lift category, not powered-lift type specific.

²⁴⁵ Training under part 135, 141, or 142 is discussed in more detail in section V.G. of this preamble.

Therefore, an applicant could log time gained in multiple powered-lift toward the aeronautical experience, given the applicant meets the conditions for logging PIC flight time in § 61.51(e)(1)(i) or the alternate logging requirements in § 194.223(c). In other words, the same general framework to obtain any other category or class rating on a commercial pilot certificate would apply (e.g., to obtain an airplane single-engine rating, an applicant must log at least 100 hours of PIC flight time, which includes at least 50 hours in airplanes, pursuant to § 61.129(a)(2); the regulation does not specify the class or type of airplane).

b. Use of a Full Flight Simulator for PIC Time for a Commercial Pilot Certificate With a Powered-Lift Category Rating

The FAA proposed in § 194.223(d) to permit an applicant for a commercial pilot certificate with a powered-lift category who is accomplishing training under an approved program under part 135, 141, or 142 to credit a maximum of 15 hours obtained in an FFS toward the 50-hour PIC flight time requirement in § 61.129(e)(2)(i), provided the aeronautical experience was obtained performing the duties of PIC in a Level C or higher FFS that represents the powered-lift category. Many commenters urged the FAA to provide further credit for simulator training or expand the scope of FSTD for credit. Because the FAA expands this credit to the broader group of pilots in § 194.216(b) of this final rule, section V.F of this preamble discusses the proposal, comments received, and final rule action.

3. Obtaining an Instrument-Powered-Lift Rating (§ 61.65(f))

Section 61.65 provides the requirements to obtain an instrument rating, including the general aeronautical knowledge, flight proficiency, and aeronautical experience requirements for an instrument-powered-lift rating. Because pilots are unable to satisfy several of the aeronautical experience requirements for an instrument-powered-lift rating for the same reasons that pilots are unable to satisfy certain requirements for a commercial pilot certificate with a powered-lift rating, as previously discussed, the NPRM proposed alternate pathways to obtain this rating.

First, as previously discussed, adopted § 194.215 would limit the alternate aeronautical experience and logging requirements for obtaining an instrument-powered-lift rating to those persons who already hold (1) at least a commercial pilot certificate with at least an airplane category and single- or

multiengine class rating or a rotorcraft category and helicopter class rating and (2) the corresponding instrument rating. Aligning with the framework proposed, and adopted by this final rule, for a commercial certificate with a powered-lift category rating, the FAA proposed alternate experience and logging requirements to obtain an instrument-powered-lift rating for the same populations: (1) test pilots and instructor pilots, (2) the initial cadre of instructors, and (3) pilots receiving training under an approved training program.

The FAA did not receive comments regarding the proposed alternate framework for an instrument-powered-lift rating and provides a brief summary of each framework element herein. As discussed in section V.F.2.i.d. of this preamble, FAA test pilots and ASIs were unintentionally excluded from the proposal and added in this final rule. Other than this addition subsequently discussed, the FAA adopts the alternate framework to obtain an instrument-powered-lift rating as proposed. Alternate requirements for cross-country flights, which are generally applicable, are discussed later in this section.

i. Test Pilots and Instructor Pilots: Alternate Aeronautical Experience and Logging Requirements for Instrument-Powered-Lift Rating

Sections 194.225 and 194.227 will set forth the alternate aeronautical experience and logging requirements for test pilots and instructor pilots seeking an instrument-powered-lift rating. In §§ 194.225(a) and 194.227(a), these alternate requirements will apply if the flights are conducted in an experimental aircraft at the manufacturer and the test pilots or instructor pilots are authorized by the Administrator to act as PIC of the experimental powered-lift. The alternate aeronautical experience requirements are set forth in § 194.225(b)(1) through (4) for test pilots and § 194.227(b)(1) through (4) for instructor pilots. Similarly, the alternate logging requirements will be set forth in §§ 194.225(c) for test pilots and 194.227(c) for instructor pilots.

a. Aeronautical Experience Requirements Involving Instrument Training (§ 61.65(f)(2))

First, § 61.65(f)(2) requires 40 hours of actual or simulated instrument time in the areas of operation listed under § 61.65(c), of which 15 hours must be received from an authorized instructor who holds an instrument-powered-lift rating. The FAA found it necessary to propose an alternate to the requirement for a part 61 authorized instructor for

test pilots or instructor pilots to accomplish the 15 hours of instrument training on the areas of operation listed in § 61.65(c), as required by § 61.65(f)(2). Therefore, under § 194.225(b)(1), a test pilot will be permitted to satisfactorily complete the manufacturer's training curriculum in the experimental powered-lift with an instructor pilot. Similarly, under § 194.227(b)(1), the instructor pilot will be able to credit the time spent providing the manufacturer's training curriculum to another instructor pilot or a test pilot toward the training required by § 61.65(f)(2). The manufacturer's training curriculum must include 15 hours of instrument training on the areas of operation listed in § 61.65(c).

For the purpose of verifying satisfactory completion of the alternate experience requirement to an examiner, the FAA proposed to require the test pilot or instructor pilot to receive an endorsement in their logbook or training record. Under § 194.225(b)(1)(ii), a test pilot will be required to receive an endorsement from the instructor pilot who provided the training, certifying that the test pilot satisfactorily completed the manufacturer's training curriculum in the experimental powered-lift. Under § 194.227(b)(1)(ii), an instructor pilot will be required to receive an endorsement from a management official within the manufacturer's organization certifying that the instructor pilot has provided the manufacturer's training curriculum to a test pilot.

Second, § 61.65(f)(2)(i) requires the aforementioned instrument time (*i.e.*, that set forth by § 61.65(f)(2)) to include 3 hours of instrument flight training from an authorized instructor in a powered-lift within 2 calendar months before the date of the instrument rating practical test. Sections 194.225(b)(2) (for test pilots) and 194.227(b)(2) (for instructor pilots) will permit the preparation for the instrument rating practical test to be completed with an instructor pilot rather than an authorized instructor. To enable the examiner to verify that the preparation was completed, under § 194.213 the applicant may obtain the endorsement from the instructor pilot, rather than an authorized instructor under § 61.65(a)(6), who certifies that the applicant is prepared for the practical test.

Third, the instrument time referenced in § 61.65(f)(2) must include instrument flight training on cross-country flight procedures, including one cross-country flight in a powered-lift with an authorized instructor that is performed under IFR, when a flight plan has been

filed with an ATC facility.²⁴⁶ The cross-country flight must include 250 nautical miles along airways or by directed routing from an ATC facility, an instrument approach at each airport, and three different kinds of approaches with the use of navigation systems.²⁴⁷ Sections 194.225(b)(3) (for test pilots) and 194.227(b)(3) (for instructor pilots) will allow test pilots or instructor pilots to perform instrument training on cross-country flight procedures referenced in § 61.65(f)(2)(ii) in an experimental powered-lift with an instructor pilot rather than an authorized instructor. The applicant will be required to receive a logbook or training record endorsement but may obtain such from the instructor pilot to certify that the applicant completed the cross-country flight with the instructor pilot.²⁴⁸

b. Aeronautical Experience Requirements Involving Logging PIC Flight Time (§ 61.65(f)(1))

Section 61.65(f)(1) requires a person who applies for an instrument-powered-lift rating to log at least 50 hours of cross-country time as PIC, 10 hours of which must be in a powered-lift. As discussed in the NPRM, the FAA recognized the obstacle with logging PIC time in accordance with § 61.51(e)(1) for the same reasons stated in section V.J of this preamble. Accordingly, consistent with the alternate logging requirements proposed for persons seeking to add a powered-lift category rating on a commercial pilot certificate, § 194.225(c) will permit test pilots at the manufacturer to log PIC flight time for the purpose of satisfying the 10-hour cross-country requirement in § 61.65(f)(1) when the test pilot is the sole manipulator of the controls of an experimental powered-lift even if the test pilot is not rated for the aircraft. To log this time, the test pilot must act as PIC of the experimental powered-lift in accordance with a letter of authorization issued by the Administrator. In addition, the flight must be conducted for the purpose of research and development or showing compliance with the regulations in accordance with the experimental certificate issued to the powered-lift pursuant to § 21.191.

Similarly, § 194.227(c) will allow instructor pilots to log PIC flight time for the purpose of satisfying the 10-hour cross-country requirement in § 61.65(f)(1) when the pilot is serving as an instructor pilot for the manufacturer

of an experimental powered-lift for which the instructor pilot is not rated under certain conditions. The pilot must act as pilot-in-command of the experimental powered-lift in accordance with a letter of authorization issued by the Administrator and the flight must be conducted for the purpose of crew training in accordance with the experimental certificate issued to the powered-lift pursuant to § 21.191.

c. FAA Test Pilots and ASIs

As discussed in section V.F.2.i.d. of this preamble, adopting the aforementioned SFAR provisions as proposed would preclude an FAA test pilot or ASI from utilizing the same flexibilities given to manufacturer test pilots and instructor pilots. For the same reasons discussed herein, the FAA finds it appropriate to add FAA test pilots and ASIs into the alternate framework to obtain an instrument-powered-lift rating.²⁴⁹

Therefore, to facilitate this relief, this final rule adds FAA test pilots and ASIs to the following paragraphs:

§ 194.225(a), (b), (b)(1), (b)(1)(ii), (b)(2) through (b)(4), (c), and (c)(1). FAA test pilots and ASIs will be able to utilize the same provisions available to a manufacturer's test pilots, as previously summarized. Additionally, while no amendment is necessary, the FAA notes that, like test pilots, FAA test pilots and ASIs would be a population of pilots that the instructor pilot will be able to credit the time spent providing the manufacturer's training curriculum under § 194.227(b)(1).

ii. Initial Cadre Instructors: Alternate Aeronautical Experience and Logging Requirements for Instrument-Powered-Lift Ratings

In the NPRM, the FAA proposed alternate experience and logging requirements for certain requirements in § 61.65(f) to facilitate initial training and certification of persons who have been authorized to serve as the initial cadre of instructors in § 194.229. Under § 194.229(a), which will set forth the applicability provisions, the alternate requirements will apply if the applicants are authorized by the Administrator to serve in the instructor positions²⁵⁰ in an approved training program under part 135, 141, or 142 and the flights are conducted in type-certificated powered-lift at the manufacturer.

²⁴⁶ § 61.65(f)(2)(ii).

²⁴⁷ § 61.65(f)(2)(ii)(A) through (C).

²⁴⁸ Section VI.B.1. of this preamble discusses additional relief from the requirement to file an IFR flight plan for certain pilots.

²⁴⁹ FAA test pilots and ASIs would be defined under new § 194.103, as discussed in section V.F.3.i.c. of this preamble.

²⁵⁰ In other words, check pilots, chief instructors, assistant chief instructors, and TCEs.

a. Aeronautical Experience Requirements Involving Training (§ 61.65(f))

As with test pilots, the FAA will permit initial check pilots, chief instructors, assistant chief instructors, or training center evaluators to receive the 15 hours of instrument training on the areas of operation listed in § 61.65(c) from an instructor pilot in lieu of an authorized instructor in § 194.229(b)(1). The instructor pilot will be required to conduct the training in accordance with the manufacturer's training curriculum. Additionally, these persons will be required to obtain a logbook or training record endorsement from the instructor pilot certifying satisfactory completion of the manufacturer's training curriculum for the same reasons the test pilot is required to receive such an endorsement.

Additionally, the instructor pilot may replace the authorized instructor for (1) the 3 hours of instrument flight training in a powered-lift in preparation for the practical test for an instrument-powered-lift rating within 2 calendar months before the date of the practical test in § 61.65(f)(2)(i), and (2) the cross-country flight prescribed by § 61.65(f)(2)(ii). Further, the person receiving the training at the manufacturer may obtain an endorsement from the instructor pilot certifying the completion of this cross-country flight. Section 194.229(b)(2) and (b)(3) will prescribe these requirements, respectively.

b. Aeronautical Experience Requirements Involving Logging PIC Flight Time (§ 61.65(f)(1))

In the NPRM, the FAA recognized the obstacle of logging PIC time in accordance with § 61.51(e)(1) for the reasons previously discussed in section V.J. of this preamble. Accordingly, consistent with the alternate logging requirements adopted herein for persons seeking to add a powered-lift category rating on a commercial pilot certificate, § 194.229(c) will allow a person receiving training at the manufacturer to log PIC flight time for the purpose of satisfying the 10-hour cross-country requirement in § 61.65(f)(1) despite not being rated in the powered-lift in certain conditions. To log this time, the applicant will be required to solely manipulate the controls of the powered-lift with an instructor pilot onboard and perform the duties of PIC; additionally, the flight will be required to be conducted in accordance with the manufacturer's training curriculum for the powered-lift.

iii. Pilots Receiving Training Under an Approved Training Program: Use of a Full Flight Simulator for Instrument Training for an Instrument-Powered-Lift Rating

Because the FAA proposed alternate pathways for personnel from part 135, 141, and 142 certificate holders to obtain the experience necessary to be eligible for the initial powered-lift ratings on pilot and flight instructor certificates, these certificate holders will have access to a pool of authorized instructors to conduct training under their approved training programs. Therefore, the FAA did not find it necessary to enable alternate experience requirements for pilots receiving training under an approved training program that substitute instructor or test pilots for authorized instructors.

Rather, the FAA found that temporarily permitting pilots receiving training under an approved training program²⁵¹ to credit some cross-country time obtained in a Level C or higher FFS would not adversely affect safety in light of the skills the pilot would develop in the FFS and the narrow applicability of the alternate requirement to seasoned pilots who already hold a commercial pilot certificate with an instrument rating. Therefore, the FAA proposed § 194.231(c) to temporarily permit a maximum of 4 hours obtained in a Level C or higher FFS to be credited toward the flight time requirement in § 61.65(f)(1), which requires an applicant to obtain 10 hours of cross-country time²⁵² as PIC in a powered-lift. The 4 hours must include experience performing the duties of PIC during a simulated cross-country flight in a Level C or higher FFS that represents the powered-lift category and that includes the performance of instrument procedures under simulated instrument conditions. This relief only extends to those applicants and FFS sessions under a training program approved under part 135, 141, or 142. Furthermore, the FAA proposed that a minimum of Level C FFS would be required to ensure the appropriate level of aerodynamic modeling, visual fidelity, and motion cueing to replicate the powered-lift.

FSI recommended the FAA revise § 194.231 to remove the requirement for a Level C or higher FFS and permit the training in any approved FSTD. FSI

²⁵¹ Adopted § 194.231(a) sets forth the general applicability requirements to utilize the crediting provisions subsequently discussed.

²⁵² Pursuant to § 61.1, cross-country time must involve the use of dead reckoning, pilotage, electronic navigation aids, radio aids, or other navigation systems to navigate to the landing point.

stated that FFS Level C or higher training is expensive and restrictive and urged the FAA to consider, first, the simplified vehicle operation of powered-lift and, second, other modern technologically advanced FSTDs.

The FAA received a number of similar comments related to crediting time in a Level C or higher FFS in the context of the alternate framework for a commercial certificate with a powered-lift rating, as proposed in § 194.223(d). The FAA declines to expand the acceptable type and level of FSTD for credit to the aeronautical experience requirements of § 61.65(f)(1) for the reasons discussed in section V.F. of this preamble.

As noted in the preamble, generally cross-country time may not be credited in an FFS because it does not depict a realistic enroute environment under VMC (*e.g.*, verifying waypoints utilizing pilotage and dead reckoning is limited by the visual display fidelity available in FFSs). The FAA acknowledges that under IMC conditions, however, the pilot is training on and testing on the pilot's ability to use instrument navigation to fly along routes depicted by navigational information via enroute and terminal charts, which is different from verifying visual reference with the use of visual waypoints. Therefore, the FAA maintains it is appropriate to permit some cross-country time to be credited in an FFS because the display and flightdeck information will align with the environment the pilot would operate in flight, but also maintains that the credit should be limited for the same reasons as those comprehensively discussed in section V.J. of this preamble. The ratio of time (*i.e.*, four hours in the simulator combined with the skills the seasoned pilot would acquire from conducting 6 hours of cross-country time in the NAS) in a Level C or higher FFS would ensure the pilot has sufficient experience to apply for an instrument-powered-lift rating. Therefore, the FAA adopts the amendment as proposed.

4. Alternate Requirements for Cross-Country Flights for Commercial Pilot Certificate, Instrument Rating, and Private Pilot Certificate

Finally, upon evaluation of the expected range capabilities of powered-lift, the FAA determined that the distances specified in the definition of "cross-country time" in § 61.1 and the specific cross-country flights prescribed in part 61 may not be feasible for the powered-lift coming to market. Therefore, the FAA proposed several alternate provisions to facilitate a pilot's ability to complete and log cross-

country time while ensuring the experience meets the essential objectives of pilot training. The FAA received many comments on these cross-country proposals, which are considerably intertwined. Therefore, this section, first, summarizes all cross-country proposals, second, responds to applicable comments, and third, discusses cross-country tangentially related proposals and final rule actions.

i. Summary of Proposed Cross-Country Alternate Means

To Log Cross-Country Time in Powered-Lift

First, cross-country time is currently defined in § 61.1(b). Within § 61.1(b), there are multiple definitions of cross-country time that are applicable based on how the cross-country time is used to meet aeronautical experience requirements. To meet the current definition of cross-country time for aeronautical experience for powered-lift ratings, the flight time²⁵³ aligns with that of airplanes and must include a landing point that is at least a straight-line distance of more than 50 nautical miles from the original point of departure, except for an ATP certificate and military pilots who qualify for a commercial pilot certificate under § 61.73, whereby cross-country time for aeronautical experience does not require a landing point. Given the significant disparity between the range capabilities of airplanes and the emerging powered-lift currently going through aircraft certification, the FAA found it unnecessary to require cross-country time in a powered-lift to include the same distance as that required for airplanes and, therefore, proposed to add § 194.201 as a temporary provision that would reduce the general distance for logging cross-country time in a powered-lift from 50 nautical miles to 25 nautical miles.

Specifically, as proposed, the rule would permit a person to log flight time in a powered-lift as cross-country time²⁵⁴ when that time (1) includes a point of landing that is at least a straight-line distance of more than 25 nautical miles from the original point of departure, and (2) involves the use of dead reckoning, pilotage, electronic navigation aids, radio aids, or other navigation systems to navigate to the landing point. While the FAA proposed

to permit a pilot to log shorter cross-country flights as cross-country time, the pilot would nevertheless be required to obtain the requisite hours of cross-country time in a powered-lift for the certificate or rating sought.²⁵⁵

Additionally, the FAA's proposed provision in § 194.201 would govern the logging of cross-country time in powered-lift for the purpose of meeting the aeronautical experience requirements of part 61 as a whole that apply to a powered-lift category rating, including the cross-country time required for an ATP certificate with a powered-lift category rating. Thus, a person would be permitted to log cross-country time in accordance with § 194.201 toward the 500 hours of cross-country time in § 61.163(a)(1). This proposal would equally apply to cross-country flight training time in a powered-lift required by § 61.109(e)(1) and solo cross-country time required by § 61.109(e)(5)(i).²⁵⁶

Summary of Specific Cross-Country Proposals for a Commercial Pilot Certificate

The FAA also proposed alternate cross-country aeronautical experience requirements to those set forth in § 61.129(e) for all applicants for a powered-lift category rating at the commercial pilot certificate level. In place of the long cross-country flight in § 61.129(e)(4)(i) (*i.e.*, 250 nautical miles), proposed § 194.233(b) would permit an applicant to complete a cross-country flight that consists of landings at a minimum of three points, with one segment consisting of a straight-line distance of at least 50 nautical miles from the original point of departure. As a result of reducing the straight-line distance from 250 nautical miles to 50 nautical miles, proposed § 194.233(b) would require an applicant seeking to comply with the alternate requirement to complete an additional cross-country flight of the same specified distance of 50 nautical miles. The proposed additional cross-country flight would have to be conducted to different points

of landing than the initial cross-country flight. The FAA noted, however, that the original point of departure may be the same, as pilots generally begin cross-country flights at their home airport.

Likewise, the FAA proposed alternate requirements for the cross-country requirements of § 61.129(e)(3)(ii) and (iii) (*i.e.*, straight-line distance of at least 100 nautical miles from the original departure point). Under proposed § 194.233(a), an applicant would be required to log at least one 2-hour cross country flight in a powered-lift in daytime conditions (proposed § 194.233(a)(1)) and one 2-hour cross-country flight in a powered-lift in nighttime conditions (proposed § 194.233(a)(2)). Each of these proposed cross-country flights must consist of a total straight-line distance of 50 nautical miles from the original point of departure (rather than 100 nautical miles, which is currently required by § 61.129(e)(3)). As a result of reducing the straight-line distance from 100 nautical miles to 50 nautical miles, the FAA proposed in § 194.233(a)(3) to require an additional cross-country flight of the same specified distance of 50 nautical miles. Except for the original point of departure, the additional cross-country flight must include landings at different points than the points selected for the day and night cross-country flights. The NPRM did not propose to reduce the required flight time (2 hours).

The applicant for a commercial pilot certificate with a powered-lift category rating would still be required to receive and log ground training from an authorized instructor on the aeronautical knowledge areas specified in § 61.125(b). Additionally, the applicant would still be required to receive and log flight training from an authorized instructor on the areas of operation specified in § 61.127(b)(5), which includes navigation.²⁵⁷ Additionally, the applicant must meet the aeronautical experience requirements that apply to the powered-lift category rating (*e.g.*, 10 hours of cross-country time in a powered-lift) and pass the practical test on the areas of operation listed in § 61.127(b), which includes tasks on cross-country planning and navigation (*e.g.*, cross-country planning is a task under Preflight Preparation area of operation in the Commercial Pilot for Powered-Lift Category ACS).

²⁵⁵ While the FAA proposed to adopt provisions in the SFAR that would require cross-country flights with shorter minimum legs than those currently specified in § 61.129(e), the FAA noted that these requirements would serve as an alternative to the requirements set forth in § 61.129(e). Thus, an applicant for a commercial pilot certificate with a powered-lift category rating still has the option to complete the cross-country flights specified in § 61.129(e).

²⁵⁶ This merely reduces the distance requirements listed in §§ 61.109(e)(2)(i) and 61.109(e)(5)(ii) to mirror those required in § 61.109(c)(2)(i) and 61.109(c)(5)(ii) for helicopters. Private pilot applicants for a powered-lift rating must meet all other aeronautical experience requirements provided in § 61.109(e).

²⁵⁷ § 61.127(b)(5)(vii).

²⁵³ See 14 CFR 1.1 for the definition of flight time.

²⁵⁴ Section 61.129(e)(2)(ii) requires an applicant for a commercial pilot certificate with a powered-lift category rating to acquire 10 hours of cross-country flight time as PIC in a powered-lift. Section 61.65(f) requires an applicant for an instrument-powered-lift rating to obtain 10 hours of cross-country flight time as PIC in a powered-lift.

Summary of Specific Cross-Country Proposals for an Instrument-Powered-Lift Rating (§ 61.65(f))

Similarly, the FAA proposed alternate cross-country aeronautical experience requirements for all applicants for an instrument-powered-lift rating under § 61.65(f) in § 194.235. In place of the long cross-country flight in § 61.65(f)(2)(ii)(A) (*i.e.*, a flight of 250 nautical miles), proposed § 194.235(a)(2)(i) would permit an applicant to complete a cross-country flight that involves a distance of 100 nautical miles along airways or by directed routing from an ATC facility. To ensure the applicant for an instrument-powered-lift rating obtains experience comparable to that which would be obtained under the current regulation, the FAA proposed to require the applicant to complete an additional cross-country flight of the same specified distance of 100 nautical miles.

Under proposed § 194.235(a)(1), the applicant for an instrument-powered-lift rating would still be required to receive and log ground training from an authorized instructor (or from an instructor pilot) on the aeronautical knowledge areas set forth in § 61.65(b). The applicant would also still be required to receive and log flight training from an authorized instructor (or from an instructor pilot if the person receiving training is an eligible pilot under § 194.215) on the areas of operation specified in § 61.65(c).²⁵⁸ Furthermore, the applicant must meet the existing aeronautical experience requirements that apply to the instrument-powered-lift rating (*e.g.*, 10 hours of cross-country flight time as PIC in a powered-lift) and pass the practical test on the areas of operation in § 61.65(c).

The FAA also proposed in § 194.235(b) to provide relief from the requirement in § 61.65(f)(2)(ii) to perform instrument training on cross-country procedures under IFR and a flight plan filed with an air traffic control facility when an aircraft is not certificated for IFR. This relief is necessary to prevent a person from filing an IFR flight plan for a powered-lift that is certificated for VFR-only operations in violation of an aircraft's operating limitations under § 91.9. This relief would only be available when the pilot already holds an instrument airplane rating, an instrument helicopter

rating, or an ATP certificate, as these pilots would already have experience operating under IFR and will have been tested on instrument procedures and regulations governing IFR operations.

ii. Comments on the Proposed Cross-Country Alternate Means

ALPA supported the alternate cross-country framework whereby the NPRM reduced the straight-line distance from 250 nautical miles to 50 nautical miles in proposed § 194.233(b) with the proposed mitigations (*e.g.*, different landing points, additional cross-country flight), finding that the framework would still maintain adequate training and safety. Further, ALPA noted and supported that the FAA did not propose to reduce the minimum amount of cross-country time to be obtained in a powered-lift for a certificate.

Archer generally supported the FAA's acknowledgement that, first, a pilot must be trained on the navigation of a powered-lift from takeoff to different destinations than the original point of departure and, second, that the existing cross-country training requirements create barriers given the range and endurance inherent in the general array of powered-lift intended for civilian operations. While Archer specifically supported the proposed reduction from 50 to 25 nautical miles in § 194.201, Archer opposed the retention of the 2-hour endurance requirements and 50 and 100 nautical mile range requirements for the individual cross-country training flights in proposed §§ 194.233 and 194.235. Archer specifically stated that the FAA's citation of a powered-lift's range of 105 to 162 nautical miles represents the absolute maximum ranges for conventional takeoff and landing, without fuel reserves, at the beginning of battery life; Archer contended that a vertical takeoff and landing without fuel reserves near the end of battery life would reduce the operational range to 25 to 55 nautical miles. Similarly, Archer stated that the NPRM failed to address endurance limitations where the range is only 30 minutes (specifically, given the parameters of the previously described operation) and that the current operational range of powered-lift will be significantly less than the operational range of the majority of helicopters. Archer recommended the FAA implement a performance and cycle-based framework through the execution of realistic training flights of a length and endurance that are commensurate with those operations that will be conducted after the pilot obtains the required ratings. Additionally, Archer

recommended the FAA eliminate the 2-hour endurance requirement in § 194.233, reduce the required distance to 25 nautical miles in §§ 194.233 and 194.235, and add a provision in § 61.129(e)(2)(iii) allowing the powered-lift pilot to substitute 10 operating cycles for 10 hours of cross-country time.²⁵⁹

Similarly, FSI recommended the FAA align with ICAO Annex 1 recommendation 2.1.1.4, which FSI stated would remove the requirement for a powered-lift category rating, thereby removing the requirement for cross-country flight time. FSI stated that the lack of infrastructure will make cross-country training difficult due to the lack of places to charge electric aircraft. Additionally, FSI recommended that the FAA allow credit for cross-country time obtained for an airplane or helicopter rating and cross-country time conducted as a lost scenario in the approved FSTD, and that any cross-country flight time in the aircraft be accomplished after the practical test as part of supervised operating experience.

First, in regard to Archer's position to eliminate the 2-hour cross-country requirements set forth in proposed § 194.233(a)(1) and (2), the FAA considered the given capable ranges of various aircraft in the certification process. The required two hours establishes the minimum flight time of the entire flight: in other words, two hours is the total time necessary to encompass the associated distances and allow for the pilot to ensure appropriate performance planning.²⁶⁰ The alternate regulations will not preclude a pilot from stopping at an airport and charging, similar to how an airplane or helicopter stops along their filed route to get fuel. Given this flexibility on accomplishing the 2-hour requirement, the FAA does not find additional relief to be warranted. Second, Archer suggested the FAA further reduce the distance proposed in §§ 194.233 and 194.235 to 25 nautical miles because the endurance of some aircraft would be 30 minutes or less. The FAA has evaluated the active type certification projects for powered-lift and does not find any powered-lift with a range less than 50 nautical miles, regardless of length of time in flight capabilities, nor was the FAA provided with any supporting evidence of such a limitation during the

²⁵⁸ The FAA notes that the introductory language in § 61.65(f)(2) requires that the flight time under that section cover the areas of operation in § 61.65(c); therefore, the cross-country flight required under § 61.65(f)(2)(ii)(A) must cover those areas.

²⁵⁹ Archer specifically referenced §§ 121.434 and 61.159(b).

²⁶⁰ See Legal Interpretation to Olshock, Pan Am International Flight Academy (May 4, 2007).

comment period to warrant further relief.²⁶¹

Third, Archer urged the FAA to adopt a performance and cycle-based framework through execution of training flights of length and endurance that are commensurate with those operations to be conducted after the pilot obtains the required ratings. As previously discussed in section V.J. of this preamble, the FAA does not find this manner of cross-country flight experience would provide a level of experience commensurate with that required for initial powered-lift category and type certification for those reasons discussed in this preamble. Additionally, as a cycle-based substitution applies to cross-country aeronautical experience specifically, commenters did not provide the FAA with any information other than a topical suggestion as to how a performance or cycle-based framework would achieve a level of proficiency equal with that of a pilot receiving an initial powered-lift category rating. Further, a significant objective of cross-country flights is to expose a pilot to time in the category of aircraft where random events may occur in the airspace, including, for example, weather, delays, air traffic, and ATC communication. Another objective is to expose the pilot to unfamiliar terrain and different landing points than a pilot's base or familiar airport, thereby facilitating diverse experience in preflight planning. Without additional information for the FAA to evaluate, a cycle-based framework, which may be repetitive and offer little experience beyond a rudimentary traffic pattern, may not expose the pilot to these key objectives. An initial certification framework only encompassing familiar, smaller routes and circuits may not adequately equip the pilot with situational proficiency, for example, should the need arise to land at an unfamiliar landing site.

Finally, in response to FSI's comments, the FAA acknowledges there is an experience advantage by virtue of each pilot utilizing the relief provided by the SFAR holding certain certificates and ratings; however, the FAA does not find that this translates to synonymous experience such that vital training elements can be wholly eliminated or substituted. Performing a cross-country flight in an airplane or helicopter may be vastly different than performing a cross-country flight in a powered-lift.

While there are certain elements to a cross-country flight that are shared amongst categories of aircraft (*e.g.*, use of navigation charts, communicating with ATC, operations in airspace, avoidance of traffic, runway incursions at unfamiliar airports), cross-country flight time provides experience in aircraft-specific characteristics. These characteristics include encountering different challenges in flightdeck management relative to the pilot's operation of the aircraft while acting as PIC (*e.g.*, passenger briefing requirements, aircraft automation, use of appropriate checklists, dealing with inoperative equipment). These differences affect the performance of certain tasks, flightdeck management, and risk management during a cross-country flight and ultimately require a skill set that is unique to the category of aircraft such that a substitution would not ensure a pilot has proficiency in the powered-lift.

The FAA also finds that performing cross-country time as a lost procedures²⁶² scenario in an approved FSTD in lieu of cross-country in the aircraft would not provide an adequate substitution for the same reasons that powered-lift cross-country flights may present scenarios unanticipated in airplane or helicopter cross-country operations. The FAA already expects an applicant to be trained on lost procedures, as the commercial powered-lift ACS sets forth Lost Procedures as a Task under Area of Operation VII, Navigation.

To the extent that FSI calls attention to infrastructure issues, the FAA notes that the Department of Transportation published a Request for Information (RFI)²⁶³ in the **Federal Register** in 2023 seeking information from the OEM community to inform a short-term and long-term national strategy to integrate AAM into the NAS, including infrastructure considerations. Additionally, the Advanced Air Mobility Interagency Working Group (AAM IWG) is considering infrastructure challenges as part of this effort. The FAA notes that certain OEMs have utilized portable charging stations and even installed chargers at specific airports to help accommodate long-

distance flights.²⁶⁴ The FAA is an active member of the AAM IWG and will continue to collaborate on a national strategy to address infrastructure issues. However, the FAA does not see associated infrastructure challenges as reason to alter the aeronautical experience required of a pilot who is training to operate a powered-lift in the NAS in commercial, passenger-carrying operations. Experience gained in the aircraft must be predicated on the need to enhance the pilot's ability to operate a powered-lift, particularly outside the pilot's local operating environment.

iii. Specific Cross-Country Flights for Private Pilot Certificate (§ 61.109)

As discussed in the NPRM, the FAA proposed alternate pathways primarily for individuals at the commercial level to enable immediate commercial passenger-carrying operations. However, the FAA recognized that rationale for offering relief from the cross-country requirements for commercial pilots applies equally to an applicant for a private pilot certificate. Therefore, the FAA proposed to reduce the nautical mile distances in the aeronautical experience required to be eligible for a private pilot certificate. The FAA did not receive comments on the alternate aeronautical experience requirements for private pilots as set forth in proposed § 194.237 and adopts the amendments as proposed.

Specifically, alternate aeronautical experience requirements will allow an applicant for a private pilot certificate with a powered-lift category rating to complete the cross-country flights in § 61.109 at a reduced nautical mile distance. First, in place of the cross-country flight in § 61.109(e)(2)(i) (*i.e.*, night flight training that includes one cross-country flight over 100 nautical miles), § 194.237(a) will require an applicant to receive three hours of night flight training that includes two cross-country flights with each flight consisting of a total distance that exceeds 50 nautical miles. Additionally, in place of the solo cross-country flight that is currently listed in § 61.109(e)(5)(ii) (*i.e.*, 150 nautical miles total distance with one segment of the flight consisting of a straight-line distance of more than 50 nautical miles), § 194.237(b) will set forth alternate solo cross-country experience. Specifically, the applicant will be required to complete one solo cross-country flight of 100 nautical miles total distance with landings at three points

²⁶¹ The exemption process under part 11 would remain an option for powered-lift manufactured with a range capability of less than 50 nautical miles.

²⁶² Lost Procedures, which are described in the Pilot's Handbook of Aeronautical Knowledge, FAA-H-8083-25, consist of a series of tasks to perform should a pilot become lost while in flight. These procedures consist of climbing to increase radio and navigation reception, plotting position using onboard navigational equipment, communicating with ATC or Flight Service Stations, and if the situation is dire enough transmitting on emergency frequency and setting transponder to 7700.

²⁶³ Notice and Request for Information on Advance Air Mobility, 88 FR 31593 (May 17, 2023).

²⁶⁴ www.popsci.com/technology/alia-electric-aircraft-completes-journey/evtol.news/news/beta-flies-south-for-the-winter.

and with one segment of the flight consisting of a straight-line distance of more than 25 nautical miles (§ 194.237(b)(1)). The applicant will be required to complete an additional solo cross-country flight to be conducted in a powered-lift (§ 194.237(b)(2)). This additional solo cross-country flight will require landings at a minimum of three points, with one segment consisting of a straight-line distance of at least 50 nautical miles from the original point of departure. The additional cross-country flight will be required to be conducted to different points of landing than the initial cross-country flight.

While proposed § 194.237 reduces the required distances for the cross-country flights in § 61.109, it will not reduce the required flight time. A person seeking a private pilot certificate with a powered-lift category rating will still be required to obtain 3 hours of cross-country flight training in a powered-lift, pursuant to § 61.109(e)(1), and 5 hours of cross-country solo flight time in a powered-lift under § 61.109(e)(5)(i), as adopted by this final rule.²⁶⁵

iv. Part 141 Appendices

Certain existing minimum curriculum requirements for a part 141 pilot school seeking to use a powered-lift specified in the part 141 appendices mirror the cross-country requirements set forth in §§ 61.65(f), 61.109(e), and 61.129(e). As previously discussed, the FAA adopts alternate cross-country requirements in §§ 194.233, 194.235, and 194.237 and, therefore, proposed that part 141 pilot schools should be able to use these alternate cross-country distances.

The FAA did not receive comments on the provision and adopts § 194.239(b) to facilitate these substitutions. As set forth by § 194.239(b)(3), the part 141 training course using the alternate cross-country distances must include an additional cross-country flight consistent with the requirements of §§ 194.233, 194.235, and 194.237, as applicable.

Additionally, as discussed in section V.F.2. of this preamble, this final rule reduces the amount of PIC time in a powered-lift set forth by § 61.129(e)(2)(i) from 50 hours to 35 hours. However, the FAA does not find a conforming amendment is necessary to account for the part 141 appendices in the SFAR similar to the amendments to account for the alternate cross-country

²⁶⁵ Currently, § 61.109(e)(5) permits an applicant to obtain 10 hours of solo flight time in either an airplane or a powered-lift. For the reasons discussed in section V.I.1. of this preamble, the FAA proposed to amend § 61.109(e)(5) to require the solo flight time to be obtained in a powered-lift and adopts that amendment in this final rule.

requirements because the PIC requirements are subject to § 141.55(d) which allows a pilot school to apply and receive approval for a reduced hour curriculum in accordance with the appropriate appendix of part 141.

v. Technical Correction and Nomenclature Change

The NPRM proposed a minor technical correction to the definition of cross-country time in § 61.1(b). Specifically, the definition lists seven paragraphs, but incorrectly only references up to the sixth (*i.e.*, paragraphs (ii) through (vi) rather than paragraphs (ii) through (vii)). The FAA proposed to correct the cross-reference in paragraph (i) of the definition to refer to paragraphs (ii) through (vii).

Additionally, the FAA noted that the nomenclature concerning “cross-country time” is inconsistent throughout part 61. The NPRM proposed to remove “cross-country flight time” throughout part 61 and replace the term with the words “cross-country time.”

The FAA did not receive any comments to these proposals and adopts, first, the correction in § 61.1(b) definition of cross-country time and, second, the nomenclature change to “cross-country time” in the following provisions: §§ 61.65(d), (e), (f), (g) introductory text, (g)(1) and (2); 61.67(b)(3); 61.68(b)(3); 61.129(g)(2)(i); 61.159(a)(1), (a)(5)(i); 61.160(e), (f); 61.161(a)(1); 61.163(a)(1), (a)(3)(i); and 61.411(a)(1)(iii) and (iv), (c)(1)(iii) and (iv), (d)(1)(iii) and (iv), (f)(1)(iii) and (iv), (g)(1)(iii) and (iv).

5. Comments Pertaining to ATP Certificate Aeronautical Experience

Bristow urged the FAA to consider providing relief for pilots seeking to gain aeronautical experience toward an ATP with powered-lift rating. Specifically, Bristow highlighted concerns that without such relief, only a small pool of military pilots would be qualified to immediately enable entities to stand up powered-lift commuter services. Bristow supported aeronautical experience requirement relief for those persons seeking an ATP certificate with a powered-lift category rating under the premise that powered-lift operations and characteristics are different than those of conventional aircraft with operations that require an ATP certificate. Bristow stated that ATP certificates are essential to pilots of conventional aircraft to transport large groups of passengers over long distances at high altitudes and that the currently mandated 1,500 hours of experience teaches pilots how to respond to serious

situations in aircraft (*e.g.*, loss of an engine), handle unscripted and unanticipated operational events (*e.g.*, diversions), and experience operations in and out of different airports and operating environments with unique conditions and limitations. Bristow explained that, by contrast, powered-lift will function like taxis and busses as alternative to commercial aircraft services within a specific mile range at lower altitudes. Additionally, Bristow stated that powered-lift operations will follow set corridors with highly scripted operations and catastrophic events would not be as consequential due to built-in redundancies and autonomous systems.

Subpart G of part 61 prescribes the requirements for issuance of an ATP certificate and ratings, the conditions under which those certificates and ratings are necessary, and the general operating rules for persons who hold those certificates. Among other requirements, a person must meet the aeronautical experience requirements of subpart G that apply to the aircraft category and class rating sought before applying for the practical test. Section 61.163 sets forth the aeronautical experience requirements for a powered-lift category rating. Currently, a person must have at least 1,500 hours of total time as a pilot that includes at least: (1) 500 hours of cross-country flight time, (2) 100 hours of night flight time, (3) 250 hours in a powered-lift as a PIC (or as an SIC performing the duties of a PIC under the supervision of a PIC, or any combination thereof) that includes at least 100 hours of cross-country flight time and 25 hours of night flight time, and (4) 75 hours of instrument flight time in actual or simulated instrument conditions.²⁶⁶ Additionally, no more than 100 hours of the total aeronautical experience requirements may be obtained in an FSTD that represents a powered-lift if the training is obtained under a part 142 training center.²⁶⁷

The FAA did not propose relief to the aeronautical experience requirements for an ATP certificate with a powered-lift rating because the reasons that the FAA proposed, and adopts herein, relief for the PIC flight time in a powered-lift aeronautical experience requirements for a commercial pilot certificate with a powered-lift rating are not equally

²⁶⁶ § 61.163(a)(1)–(4). The FAA notes that, of the 75 hours of instrument flight time, a person is limited to no more than 25 hours of simulated instrument time in an FSTD (see § 61.163(a)(4)(i)). However, if training is completed in a course conducted by a part 142 training center, a person may credit a maximum of 50 hours of the 75 hours in an FSTD (see § 61.163(a)(4)(ii)).

²⁶⁷ § 61.163(b).

applicable. The FAA acknowledges that the flight regimes of a powered-lift and a helicopter are similar for purposes of airmen certification, to warrant a stronger emphasis on vertical take-offs and landings and transition into horizontal flight and reduction specifically to PIC in a powered-lift time, particularly given the prerequisites to use the SFAR where a pilot would have met the PIC requirements in another aircraft. The FAA further reasoned that this reduction in PIC flight time in a powered-lift and cross-country relief will be conducted under a part 135, 141, or 142 training program. These training programs inherently include safeguards such as greater oversight, structured programs, dedicated training facilities, and FAA-approved curriculum, which function to ensure the pilot engages in high-quality training events.

However, the FAA did not reduce the total amount of flight time required to apply for a commercial pilot certificate with a powered-lift category rating, nor will this final rule reduce the total amount of flight time required for an ATP certificate with a powered-lift category rating for the same reasons. Specifically, as discussed in section

V.F.4.ii. of this preamble, accruing experience in the aircraft through general minimum flight time requirements builds the pilot's proficiency in responding to an array of environmental and decisional situations. While this time is significantly lower for an ATP certificate with a rotorcraft category, helicopter class rating than for an ATP certificate with an airplane category rating (*i.e.*, 300 hours), the FAA does not have, nor has been presented with, data or supporting evidence that a reasonable safety basis exists to warrant a significant reduction of hours, especially where the intended operations for powered-lift include immediate passenger-transporting commercial operations.

Additionally, the pilot flight time required for an ATP certificate with a powered-lift category rating is generalized pilot time such that a person's previously held experience in an airplane or helicopter will constitute a sizeable portion of required time. Specifically, only 250 hours of the flight time set forth by § 61.163 is required to take place in a powered-lift. The FAA does not find this to be an insurmountable amount of hours given

the proficiency requirements expected of a pilot transporting passengers in commercial operations.²⁶⁸ Therefore, the FAA declines to provide any further relief from the requirements of § 61.163 outside of the alternate definition of cross-country time, which would apply to the cross-country requirement in § 61.163(a)(3)(i).

6. Alternate Experience and Logging Summaries

i. Summary Tables for Obtaining a Commercial Pilot Certificate With Powered-Lift Rating

As noted, this rule finalizes requirements to facilitate airmen certification for a commercial pilot certificate with a powered-lift rating involving several alternate experience and logging requirements. To facilitate readability of the alternate requirements that would apply to persons seeking powered-lift ratings, the FAA has compartmentalized the rule language into individual sections depending on the powered-lift ratings sought. Tables 3, 4, and 5 contain the proposed alternate provisions for a commercial pilot certificate with a powered-lift rating.

TABLE 3—ALTERNATE PROVISIONS FOR A COMMERCIAL PILOT CERTIFICATE WITH A POWERED-LIFT CATEGORY RATING: TEST PILOTS AND INSTRUCTOR PILOTS

Current flight time requirements (§ 61.129(e))	Alternate provisions for test pilots, FAA test pilots, and FAA ASIs *	Alternate provisions for instructor pilots *
Powered-Aircraft Time		
100 hours in powered-aircraft, of which 50 hours must be in a powered-lift	<i>No alternative.</i>	<i>No alternative.</i>
PIC Flight Time		
100 hours of PIC flight time, which includes at least— (1) 50 hours in a powered-lift, and (2) 50 hours in cross-country flight of which 10 must be in powered-lift	100 hours of PIC flight time which includes at least— (1) 35 hours in a powered-lift of which 15 may be in a Level C or higher FFS; and (2) 50 hours in cross-country flight of which 10 must be in powered-lift. A test pilot, FAA test pilot, or ASI who is not rated in the powered-lift may log PIC flight time in the experimental powered-lift if (1) the test pilot is the sole manipulator of the controls, (2) the test pilot is acting as PIC, and (3) the flight is conducted for the purpose of R&D or showing compliance. See §§ 194.216 and 194.217(c).	100 hours of PIC flight time, which includes at least— (1) 35 hours in a powered-lift of which 15 may be in a Level C or higher FFS; and (2) 50 hours in cross-country flight of which 10 must be in powered-lift. An instructor pilot who is not rated in the powered-lift may log PIC flight time in the experimental powered-lift if (1) acting as PIC, and (2) the flight is conducted for the purpose of crew training. See §§ 194.216 and 194.219(c).

²⁶⁸ § 61.163(a)(3).

TABLE 3—ALTERNATE PROVISIONS FOR A COMMERCIAL PILOT CERTIFICATE WITH A POWERED-LIFT CATEGORY RATING: TEST PILOTS AND INSTRUCTOR PILOTS—Continued

Current flight time requirements (§ 61.129(e))	Alternate provisions for test pilots, FAA test pilots, and FAA ASIs *	Alternate provisions for instructor pilots *
Training on the Areas of Operation listed in § 61.127(b)(5)		
20 hours of training on the areas of operation listed in § 61.127(b)(5) that includes at least—	Test pilot, FAA test pilot, or ASI may receive this training from an instructor pilot (rather than an authorized instructor) if (1) training is conducted in accordance with the manufacturer's training curriculum, and (2) test pilot, FAA test pilot, or ASI receives endorsement from instructor pilot certifying satisfactory completion of the curriculum. See § 194.217(b)(1).	In lieu of receiving this training, an instructor pilot may meet this requirement by providing the manufacturer's training curriculum to a test pilot, FAA test pilot or ASI, which includes 20 hours of training on the areas of operation listed in § 61.127(b)(5). The instructor pilot must receive endorsement from management official certifying that instructor pilot provided the training. See § 194.219(b)(1).
(1) 10 hours of instrument training using a view-limiting device including attitude instrument flying, partial panel skills, recovery from unusual flight attitudes, and intercepting and tracking navigational systems. 5 hours of the 10 hours required on instrument training must be in a powered-lift.	Test pilot, FAA test pilot or ASI may receive this instrument training from instructor pilot in an experimental powered-lift in accordance with the manufacturer's proposed training curriculum. See § 194.217(b)(1).	Instructor pilot may satisfy this requirement by providing instrument training to test pilot, FAA test pilot, or ASI in accordance with the manufacturer's proposed training curriculum. The instructor pilot must receive an endorsement from management official certifying that instructor pilot provided the training. See § 194.219(b)(1).
(2) The following cross-country flights— One 2-hour cross country flight in a powered-lift in daytime conditions that consists of a total straight-line distance of more than 100 nautical miles from the original point of departure; and One 2-hour cross country flight in a powered-lift in nighttime conditions that consists of a total straight-line distance of more than 100 nautical miles from the original point of departure; and	Test pilot, FAA test pilot, or ASI may complete all of the following cross-country flights— One 2-hour cross country flight in a powered-lift in daytime conditions that consists of a total straight-line distance of more than 50 nautical miles from the original point of departure; One 2-hour cross country flight in a powered-lift in nighttime conditions that consists of a total straight-line distance of more than 50 nautical miles from the original point of departure; and An additional cross-country flight with landings at a minimum of three points, with one segment consisting of a straight-line distance of at least 50 nautical miles from the original point of departure. The additional cross-country flight must include landings at different points than the first two cross-country flights. See § 194.233(a).	Instructor pilot may complete all of the same alternate cross-country flights as test pilot, FAA test pilot or ASI. See § 194.233(a).
(3) 3 hours in a powered-lift with an authorized instructor in preparation for the practical test within the preceding 2 calendar months from the month of the test.	Test pilot, FAA test pilot, or ASI may accomplish the practical test preparation with an instructor pilot (rather than an authorized instructor). See § 194.217(b)(2).	Instructor pilot may accomplish the practical test preparation with another instructor pilot (rather than an authorized instructor). See § 194.219(b)(2).
Solo Flight Time or Flight Time Performing the Duties of PIC		
Ten hours of solo flight time in a powered-lift or 10 hours of flight time performing the duties of PIC in a powered-lift with an authorized instructor on board (either of which may be credited toward the flight time requirement under § 61.129(e)(2), on the areas of operation listed in § 61.127(b)(5)) that includes—	Test pilot, FAA test pilot, or ASI may complete 10 hours of solo flight time under an endorsement from an instructor pilot or 10 hours of flight time performing the duties of PIC in a powered-lift with either a test pilot or an instructor pilot onboard. See § 194.217(b)(3).	The alternate provision for test pilots, FAA test pilot or ASI also applies to instructor pilots. See § 194.219(b)(3).
(1) One cross-country flight of not less than 300 nautical miles total distance with landings at a minimum of three points, one of which is a straight-line distance of at least 250 nautical miles from the original departure point. However, if this requirement is being met in Hawaii the longest segment need only have a straight-line distance of at least 150 nautical miles; and	Test pilot, FAA test pilot, or ASI may complete two cross-country flights with landings at a minimum of three points, with one segment consisting of a straight-line distance of at least 50 nautical miles from the original point of departure. The second cross-country flight must include landings at different points than the first cross country flight. See § 194.233(b).	Instructor pilot may complete the same alternate cross-country flights as test pilot, FAA test pilot, or ASI. See § 194.233(b).

TABLE 3—ALTERNATE PROVISIONS FOR A COMMERCIAL PILOT CERTIFICATE WITH A POWERED-LIFT CATEGORY RATING: TEST PILOTS AND INSTRUCTOR PILOTS—Continued

Current flight time requirements (§ 61.129(e))	Alternate provisions for test pilots, FAA test pilots, and FAA ASIs *	Alternate provisions for instructor pilots *
(2) 5 hours in night VFR conditions with 10 takeoffs and 10 landings (with each landing involving a flight in the traffic pattern) at an airport with an operating control tower.	<i>No alternative.</i>	<i>No alternative.</i>

* To use the alternate provisions below, the flights must be conducted in an experimental powered-lift at the manufacturer and the test pilots, ASIs and instructor pilots must be authorized by the Administrator to act as PIC of the experimental powered-lift. See proposed §§ 194.217(a) and 194.219(a).

TABLE 4—ALTERNATE PROVISIONS FOR A COMMERCIAL PILOT CERTIFICATE WITH A POWERED-LIFT CATEGORY RATING: INITIAL CADRE OF CHECK PILOTS, CHIEF INSTRUCTORS, ASSISTANT CHIEF INSTRUCTORS, AND TRAINING CENTER EVALUATORS

Current flight time requirements (§ 61.129(e))	Alternate provisions for initial cadre of check pilots, chief instructors, assistant chief instructors, and TCEs* (herein referred to as applicants)
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Powered-Aircraft Time

100 hours in powered-aircraft, of which 50 hours must be in a powered-lift	No alternative.
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PIC Flight Time

100 hours of PIC flight time, which includes at least— (1) 50 hours in a powered-lift, and (2) 50 hours in cross-country flight of which 10 must be in powered-lift	100 hours of PIC flight time, which includes at least— (1) 35 hours in a powered-lift, 15 of which may be in a Level C or higher FFS; and (2) 50 hours in cross-country flight of which 10 must be in powered-lift. An applicant who is not rated in the powered-lift may log up to 25 hours of PIC flight time in a powered-lift for flights that are conducted in accordance with a manufacturer’s training curriculum if the applicant is (1) the sole manipulator of the controls, (2) manipulating the controls of the powered-lift with an instructor pilot onboard, and (3) performing the duties of PIC. See §§ 194.216 and 194.221(c).
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Training on the Areas of Operation listed in § 61.127(b)(5)

20 hours of training on the areas of operation listed in § 61.127(b)(5) that includes at least— (1) 10 hours of instrument training using a view-limiting device including attitude instrument flying, partial panel skills, recovery from unusual flight attitudes, and intercepting and tracking navigational systems. 5 hours of the 10 hours required on instrument training must be in a powered-lift. (2) The following cross-country flights— One 2-hour cross country flight in a powered-lift in daytime conditions that consists of a total straight-line distance of more than 100 nautical miles from the original point of departure; and One 2-hour cross country flight in a powered-lift in nighttime conditions that consists of a total straight-line distance of more than 100 nautical miles from the original point of departure; and (3) 3 hours in a powered-lift with an authorized instructor in preparation for the practical test within the preceding 2 calendar months from the month of the test.	An applicant may receive this training from an instructor pilot (rather than an authorized instructor) if (1) training is conducted in accordance with the manufacturer’s training curriculum, and (2) applicant receives endorsement from instructor pilot certifying satisfactory completion of the curriculum. See § 194.221(b)(1). An applicant may receive this instrument training from instructor pilot in a type certificated powered-lift in accordance with the manufacturer’s training curriculum. See § 194.221(b)(1). An applicant may complete all of the following cross-country flights— One 2-hour cross country flight in a powered-lift in daytime conditions that consists of a total straight-line distance of more than 50 nautical miles from the original point of departure; One 2-hour cross country flight in a powered-lift in nighttime conditions that consists of a total straight-line distance of more than 50 nautical miles from the original point of departure; and An additional cross-country flight with landings at a minimum of three points, with one segment consisting of a straight-line distance of at least 50 nautical miles from the original point of departure. The additional cross-country flight must include landings at different points than the first two cross-country flights. See § 194.233(a). An applicant may accomplish the practical test preparation from an instructor pilot (rather than an authorized instructor). See § 194.221(b)(2).
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TABLE 4—ALTERNATE PROVISIONS FOR A COMMERCIAL PILOT CERTIFICATE WITH A POWERED-LIFT CATEGORY RATING: INITIAL CADRE OF CHECK PILOTS, CHIEF INSTRUCTORS, ASSISTANT CHIEF INSTRUCTORS, AND TRAINING CENTER EVALUATORS—Continued

Current flight time requirements (§ 61.129(e))	Alternate provisions for initial cadre of check pilots, chief instructors, assistant chief instructors, and TCEs* (herein referred to as applicants)
Solo Flight Time or Flight Time Performing the Duties of PIC	
<p>Ten hours of solo flight time in a powered-lift or 10 hours of flight time performing the duties of PIC in a powered-lift with an authorized instructor on board (either of which may be credited toward the flight time requirement under § 61.129(e)(2), on the areas of operation listed in § 61.127(b)(5)) that includes—</p> <p>(1) One cross-country flight of not less than 300 nautical miles total distance with landings at a minimum of three points, one of which is a straight-line distance of at least 250 nautical miles from the original departure point. However, if this requirement is being met in Hawaii the longest segment need only have a straight-line distance of at least 150 nautical miles; and</p> <p>(2) 5 hours in night VFR conditions with 10 takeoffs and 10 landings (with each landing involving a flight in the traffic pattern) at an airport with an operating control tower.</p>	<p>An applicant may complete 10 hours of solo flight time under an endorsement from an instructor pilot or 10 hours of flight time performing the duties of PIC in a powered-lift with an instructor pilot on-board (rather than an authorized instructor). See § 194.221(b)(3).</p> <p>An applicant may complete two cross-country flights with landings at a minimum of three points, with one segment consisting of a straight-line distance of at least 50 nautical miles from the original point of departure. The second cross-country flight must include landings at different points than the first cross country flight. See § 194.233(b). No alternative.</p>

* To use the alternate provisions below, the flights must be conducted in a type-certificated powered-lift at the manufacturer and the applicant must be authorized by the Administrator to serve as an initial check pilot, chief instructor, assistant chief instructor, or training center evaluator for the purpose of initiating training in a powered-lift under an approved training program under part 135, 141, or 142, as appropriate. See § 194.221(a).

TABLE 5—ALTERNATE PROVISIONS FOR A COMMERCIAL PILOT CERTIFICATE WITH A POWERED-LIFT CATEGORY RATING: PERSONS RECEIVING TRAINING UNDER A PART 135, 141, OR 142 APPROVED TRAINING PROGRAM

Current flight time requirements (§ 61.129(e))	Alternate provisions for persons receiving training under a Part 135, 141, or 142 approved training program* (herein referred to as applicants)
Powered-Aircraft Time	
100 hours in powered-aircraft, of which 50 hours must be in a powered-lift	No alternative.
PIC Flight Time	
<p>100 hours of PIC flight time, which includes at least—</p> <p>(1) 50 hours in a powered-lift, and</p> <p>(2) 50 hours in cross-country flight of which 10 must be in powered-lift</p>	<p>100 hours of PIC flight time, which includes at least—</p> <p>(1) 35 hours in a powered-lift, 15 of which may be in a Level C or higher FFS, and</p> <p>(2) 50 hours in cross-country flight of which 10 must be in powered-lift. An applicant who is not rated in the powered-lift may log up to 25 hours of PIC flight time in a powered-lift for flights that are conducted in accordance with an approved training program under part 135, 141, or 142 if the applicant is (1) the sole manipulator of the controls, (2) manipulating the controls of the powered-lift with an authorized instructor onboard, and (3) performing the duties of PIC. See §§ 194.216 and 194.223(c).</p>
Training on the Areas of Operation listed in § 61.127(b)(5)	
<p>20 hours of training on the areas of operation listed in § 61.127(b)(5) that includes at least—</p> <p>(1) 10 hours of instrument training using a view-limiting device including attitude instrument flying, partial panel skills, recovery from unusual flight attitudes, and intercepting and tracking navigational systems. 5 hours of the 10 hours required on instrument training must be in a powered-lift.</p>	<p>No alternative.</p> <p>No alternative.</p>

TABLE 5—ALTERNATE PROVISIONS FOR A COMMERCIAL PILOT CERTIFICATE WITH A POWERED-LIFT CATEGORY RATING: PERSONS RECEIVING TRAINING UNDER A PART 135, 141, OR 142 APPROVED TRAINING PROGRAM—Continued

Current flight time requirements (§ 61.129(e))	Alternate provisions for persons receiving training under a Part 135, 141, or 142 approved training program* (herein referred to as applicants)
<p>(2) The following cross-country flights—</p> <ul style="list-style-type: none"> • One 2-hour cross country flight in a powered-lift in daytime conditions that consists of a total straight-line distance of more than 100 nautical miles from the original point of departure; and • One 2-hour cross country flight in a powered-lift in nighttime conditions that consists of a total straight-line distance of more than 100 nautical miles from the original point of departure; and <p>(3) 3 hours in a powered-lift with an authorized instructor in preparation for the practical test within the preceding 2 calendar months from the month of the test.</p>	<p>An applicant may complete all of the following cross-country flights—</p> <ul style="list-style-type: none"> • One 2-hour cross country flight in a powered-lift in daytime conditions that consists of a total straight-line distance of more than 50 nautical miles from the original point of departure; • One 2-hour cross country flight in a powered-lift in nighttime conditions that consists of a total straight-line distance of more than 50 nautical miles from the original point of departure; and • An additional cross-country flight with landings at a minimum of three points, with one segment consisting of a straight-line distance of at least 50 nautical miles from the original point of departure. The additional cross-country flight must include landings at different points than the first two cross-country flights. <p>See § 194.233(a). No alternative.</p>

Solo Flight Time or Flight Time Performing the Duties of PIC

<p>Ten hours of solo flight time in a powered-lift or 10 hours of flight time performing the duties of PIC in a powered-lift with an authorized instructor on board (either of which may be credited toward the flight time requirement under § 61.129(e)(2), on the areas of operation listed in § 61.127(b)(5)) that includes—</p> <p>(1) One cross-country flight of not less than 300 nautical miles total distance with landings at a minimum of three points, one of which is a straight-line distance of at least 250 nautical miles from the original departure point. However, if this requirement is being met in Hawaii the longest segment need only have a straight-line distance of at least 150 nautical miles; and</p> <p>(2) 5 hours in night VFR conditions with 10 takeoffs and 10 landings (with each landing involving a flight in the traffic pattern) at an airport with an operating control tower.</p>	<p>No alternative.</p> <p>An applicant may complete two cross-country flights with landings at a minimum of three points, with one segment consisting of a straight-line distance of at least 50 nautical miles from the original point of departure. The second cross-country flight must include landings at different points than the first cross country flight.</p> <p>See § 194.233(b). No alternative.</p>
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* To use the alternate provisions below, the applicant must receive training at an approved training program under part 135, 141, or 142 for the purpose of obtaining a powered-lift category rating.

ii. Summary Tables for Obtaining an Instrument-Powered-Lift Rating

As noted, this rule finalizes requirements to facilitate airmen certification for an instrument-powered-

lift rating involves several alternate experience and logging requirements. To facilitate readability of the alternate requirements that will apply to persons seeking powered-lift ratings, the FAA has compartmentalized the rule

language into individual sections depending on the powered-lift ratings sought. Tables 6, 7, and 8 summarize the alternate provisions for an instrument-powered-lift rating.

TABLE 6—ALTERNATE PROVISIONS FOR AN INSTRUMENT-POWERED-LIFT RATING: TEST PILOTS AND INSTRUCTOR PILOTS

Current flight time requirements (§ 61.65(f))	Alternate provisions for test pilots, AA test pilots, and FAA ASIs*	Alternate provisions for instructor pilots*
Cross-Country Time as PIC		
50 hours of cross-country time as PIC, of which 10 hours must have been in a powered-lift.	A test pilot, FAA test pilot or ASI who is not rated in the powered-lift may log PIC flight time in the experimental powered-lift toward the 10-hour cross-country time requirement if (1) the test pilot is the sole manipulator of the controls, (2) the test pilot acting as PIC of the powered-lift, and (3) the flight is conducted for the purpose of R&D or showing compliance. See § 194.225(c).	An instructor pilot who is not rated in the powered-lift may log PIC flight time in the experimental powered-lift toward the 10-hour cross-country time requirement if (1) acting as PIC of the powered-lift, and (2) the flight is conducted for the purpose of crew training. See § 194.227(c).

TABLE 6—ALTERNATE PROVISIONS FOR AN INSTRUMENT-POWERED-LIFT RATING: TEST PILOTS AND INSTRUCTOR PILOTS—Continued

Current flight time requirements (§ 61.65(f))	Alternate provisions for test pilots, AA test pilots, and FAA ASIs*	Alternate provisions for instructor pilots*
Instrument Time on the Areas of Operation Listed in § 61.65(c)		
<p>40 hours of actual or simulated instrument time in the areas of operation listed in § 61.65(c), of which 15 hours must have been received from an authorized instructor who holds an instrument-powered-lift rating, and the instrument time includes:</p> <p>(1) 3 hours of instrument flight training from an authorized instructor in a powered-lift that is appropriate to the instrument-powered-lift rating within 2 calendar months before the date of the practical test; and</p> <p>(2) Instrument flight training on cross-country flight procedures, including one cross-country flight in a powered-lift with an authorized instructor that is performed under IFR, when a flight plan has been filed with an ATC control facility, that involves—</p> <ul style="list-style-type: none"> • A flight of 250 nautical miles along airways or by directed routing from an ATC facility; • An instrument approach at each airport; and • Three different kinds of approaches with the use of navigation systems. 	<p>A test pilot, FAA test pilot or ASI may receive 15 hours of instrument training on the areas of operation listed in § 61.65(c) from an instructor pilot (rather than an authorized instructor) if (1) the training is conducted in accordance with the manufacturer’s proposed training curriculum, and (2) the test pilot, FAA test pilot or ASI receives endorsement from instructor pilot certifying satisfactory completion of the curriculum. See § 194.225(b)(1).</p> <p>Test pilot, FAA test pilot, or ASI may accomplish the practical test preparation with an instructor pilot (rather than an authorized instructor). See § 194.225(b)(2).</p> <ul style="list-style-type: none"> • Test pilot, FAA test pilot, or ASI may complete the cross-country flight with an instructor pilot (rather than an authorized instructor). • Instead of completing one cross-country flight of 250 nautical miles, a test pilot, FAA test pilot, or ASI may complete two cross-country flights, each of which must involve a flight of 100 nautical miles along airways or by directed routing from an ATC facility.¹ See §§ 194.225(b)(4) and 194.235(a). 	<p>In lieu of receiving the 15 hours of instrument training on the areas of operation listed in § 61.65(c), an instructor pilot may provide this instrument training to the test pilot, FAA test pilot or ASI in accordance with the manufacturer’s proposed training curriculum. Instructor pilot must receive endorsement from management official certifying that instructor pilot provided the training. See § 194.227(b)(1).</p> <p>Instructor pilot may accomplish the practical test preparation with another instructor pilot (rather than an authorized instructor). See § 194.227(b)(2).</p> <ul style="list-style-type: none"> • Instructor pilot may complete the cross-country flight with another instructor pilot (rather than an authorized instructor). • Instructor pilot may complete the same alternate cross-country flights as test pilot. See §§ 194.227(b)(4) and 194.235(a).

*To use the alternate provisions below, the flights must be conducted in an experimental powered-lift at the manufacturer and the test pilots, ASIs and instructor pilots must be authorized by the Administrator to act as PIC of the experimental powered-lift. See §§ 194.225(a) and 194.227(a).

¹ The other requirements in § 61.65(f)(2)(ii) would continue to apply for persons not utilizing the relief under proposed § 194.235(b). Thus, each cross-country flight with the reduced 100-nautical mile distance must be performed under IFR when a flight plan has been filed with an ATC facility and must involve (1) an instrument approach at each airport and (2) three different kinds of approaches with the use of navigation systems.

TABLE 7—ALTERNATE PROVISIONS FOR AN INSTRUMENT-POWERED-LIFT RATING: INITIAL CADRE OF CHECK PILOTS, CHIEF INSTRUCTORS, ASSISTANT CHIEF INSTRUCTORS, AND TRAINING CENTER EVALUATORS

Current flight time requirements (§ 61.65(f))	Alternate provisions for initial cadre of check pilots, chief instructors, assistant chief instructors, and TCEs* (herein referred to as applicants)
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Cross-Country Time as PIC

<p>50 hours of cross-country time as PIC, of which 10 hours must have been in a powered-lift.</p>	<p>An applicant who is not rated in the powered-lift may log PIC flight time in the powered-lift toward the 10-hour cross-country time requirement for flights that are conducted in accordance with a manufacturer’s training curriculum if the applicant is (1) the sole manipulator of the controls, (2) manipulating the controls of the powered-lift with an instructor pilot onboard, and (3) performing the duties of PIC. See § 194.229(c).</p>
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Instrument Time on the Areas of Operation listed in § 61.65(c)

<p>40 hours of actual or simulated instrument time in the areas of operation listed in § 61.65(c), of which 15 hours must have been received from an authorized instructor who holds an instrument-powered-lift rating, and the instrument time includes:</p> <p>(1) 3 hours of instrument flight training from an authorized instructor in a powered-lift that is appropriate to the instrument-powered-lift rating within 2 calendar months before the date of the practical test; and</p>	<p>An applicant may receive 15 hours of instrument training on the areas of operation listed in § 61.65(c) from an instructor pilot (rather than an authorized instructor) if the training is conducted in accordance with the manufacturer’s training curriculum, and the applicant receives endorsement from instructor pilot certifying satisfactory completion of the curriculum. See § 194.229(b)(1).</p> <p>An applicant may accomplish the practical test preparation from an instructor pilot (rather than an authorized instructor). See § 194.229(b)(2).</p>
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TABLE 7—ALTERNATE PROVISIONS FOR AN INSTRUMENT-POWERED-LIFT RATING: INITIAL CADRE OF CHECK PILOTS, CHIEF INSTRUCTORS, ASSISTANT CHIEF INSTRUCTORS, AND TRAINING CENTER EVALUATORS—Continued

Current flight time requirements (§ 61.65(f))	Alternate provisions for initial cadre of check pilots, chief instructors, assistant chief instructors, and TCEs* (herein referred to as applicants)
<p>(2) Instrument flight training on cross-country flight procedures, including one cross-country flight in a powered-lift with an authorized instructor that is performed under IFR, when a flight plan has been filed with an ATC control facility, that involves—</p> <ul style="list-style-type: none"> • A flight of 250 nautical miles along airways or by directed routing from an ATC facility; • An instrument approach at each airport; and • Three different kinds of approaches with the use of navigation systems. 	<ul style="list-style-type: none"> • Applicant may complete the cross-country flight with an instructor pilot (rather than an authorized instructor). • Instead of completing one cross-country flight of 250 nautical miles, an applicant may complete two cross-country flights, each of which must involve a flight of 100 nautical miles along airways or by directed routing from an ATC facility.¹ <p>See §§ 194.229(b)(4) and 194.235(a).</p>

* To use the alternate provisions below, the flights must be conducted in a type-certificated powered-lift at the manufacturer and the applicant must be authorized by the Administrator to serve as an initial check pilot, chief instructor, assistant chief instructor, or training center evaluator for the purpose of initiating training in a powered-lift under an approved training program under part 135, 141, or 142, as appropriate. See § 194.229(a).

¹ The other requirements in § 61.65(f)(2)(ii) would continue to apply for persons not utilizing the relief under proposed § 194.235(b). Thus, each cross-country flight with the reduced 100-nautical mile distance must be performed under IFR when a flight plan has been filed with an ATC facility and must involve (1) an instrument approach at each airport and (2) three different kinds of approaches with the use of navigation systems.

TABLE 8—ALTERNATE PROVISIONS FOR AN INSTRUMENT-POWERED-LIFT RATING: PERSONS RECEIVING TRAINING UNDER A PART 135, 141, OR 142 APPROVED TRAINING PROGRAM

Current flight time requirements (§ 61.65(f))	Alternate provisions for persons receiving training under a Part 135, 141, or 142 approved training program* (herein referred to as applicants)
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Cross-Country Time as PIC

50 hours of cross-country time as PIC, of which 10 hours must have been in a powered-lift.	An applicant may credit up to 4 hours obtained in a Level C or higher FFS toward the requirement to obtain 10 hours of cross-country time as PIC in a powered-lift if (1) the FFS represents the powered-lift category, (2) the applicant was performing the duties of PIC, (3) the flight simulates a cross-country flight and includes the performance of instrument procedures under simulated instrument conditions and (3) the flights are conducted in accordance with an approved training program under part 135, 141 or 142. See § 194.231(c).
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Instrument Time on the Areas of Operation listed in § 61.65(c)

<p>40 hours of actual or simulated instrument time in the areas of operation listed in § 61.65(c), of which 15 hours must have been received from an authorized instructor who holds an instrument-powered-lift rating, and the instrument time includes: at least—</p> <p>(1) 3 hours of instrument flight training from an authorized instructor in a powered-lift that is appropriate to the instrument-powered-lift rating within 2 calendar months before the date of the practical test; and</p> <p>(2) Instrument flight training on cross-country flight procedures, including one cross-country flight in a powered-lift with an authorized instructor that is performed under IFR, when a flight plan has been filed with an ATC control facility, that involves—</p> <ul style="list-style-type: none"> • A flight of 250 nautical miles along airways or by directed routing from an ATC facility; • An instrument approach at each airport; and • Three different kinds of approaches with the use of navigation systems. 	<p><i>No alternative.</i></p> <p><i>No alternative.</i></p> <p>Instead of completing one cross-country flight of 250 nautical miles, an applicant may complete two cross-country flights, each of which must involve a flight of 100 nautical miles along airways or by directed routing from an ATC facility.¹</p> <p>See §§ 194.231(b) and 194.235(a).</p>
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* To use the alternate provisions below, the applicant must receive training at an approved training program under part 135, 141, or 142 for the purpose of obtaining a powered-lift category rating.

¹ The other requirements in § 61.65(f)(2)(ii) would continue to apply for persons not utilizing the relief under proposed § 194.235(b). Thus, each cross-country flight with the reduced 100-nautical mile distance must be performed under IFR when a flight plan has been filed with an ATC facility and must involve (1) an instrument approach at each airport and (2) three different kinds of approaches with the use of navigation systems.

7. Alternate Endorsement Requirements for Certain Persons Seeking Powered-Lift Ratings

Under the traditional airman certification framework in part 61, an applicant for a certificate or rating must

receive certain endorsements from an authorized instructor.²⁶⁹ The FAA identified the same barriers to endorsements as previously discussed

²⁶⁹ For example, §§ 61.31(d)(2), 61.51(h).

in sections V.F.2. and V.F.3. of this preamble insofar as part 61 defines “authorized instructor,” in pertinent part, as a person who holds a flight instructor certificate issued under part 61. Additionally, § 61.195(b) restricts a

flight instructor from conducting training in an aircraft unless the flight instructor holds the appropriate ratings on their flight instructor certificate. Instructor pilots at the manufacturer will provide training to test pilots, FAA test pilots, FAA ASIs, and the initial cadre of instructors, but may not meet the definition of “authorized instructor” under part 61. Additionally, the SFAR will permit instructor pilots to credit training they provide, which would create a barrier in receiving an endorsement, as the FAA maintains the concept of a general prohibition on self-endorsement.²⁷⁰ Therefore, the FAA proposed an alternate endorsement pathway in § 194.213. The FAA did not receive any comments specifically pertaining to the alternate endorsement requirements proposed in § 194.213 and adopts the section with two minor revisions, subsequently discussed.²⁷¹

The NPRM proposed § 194.213(a)(1) to permit instructor pilots to provide the required logbook or training record endorsements contained in part 61 for a commercial pilot certificate with a powered-lift category rating, an instrument-powered-lift rating, a powered-lift type rating, or a flight instructor certificate with powered-lift ratings to applicants who are (1) test pilots for the manufacturer of an experimental powered-lift, or (2) persons authorized by the Administrator to serve as an initial check pilot, chief instructor, assistant chief instructor, or training center evaluator (TCE) for the purpose of initiating training in a powered-lift under an approved training program under part 135, 141, or 142.²⁷²

Because this final rule extends the alternate pathway afforded to test pilots to FAA test pilots and ASIs (*i.e.*, §§ 194.217 and 194.225), new § 194.213(a)(1)(iii) adds FAA test pilots and aviation safety inspectors into the population of pilots for which an instructor pilot may provide an endorsement (*i.e.*, aligning with test pilots). Additionally, the FAA notes that § 194.219(b)(3) permits an instructor

pilot to satisfy the aeronautical experience requirement in § 61.129(e)(4) by logging at least 10 hours of solo flight time under an endorsement from another instructor pilot. Similarly, § 194.227(b)(3) permits an instructor pilot to accomplish the cross-country flight specified in § 61.65(f)(2)(ii) for an instrument-powered-lift rating without an authorized instructor, provided, in pertinent part, the instructor pilot obtains a logbook or training record endorsement from the instructor pilot certifying that the person completed the cross-country flight. Because these regulations permit an instructor pilot to provide an endorsement to another instructor pilot, but the instructor pilot will not be a part 61 authorized instructor, this final rule adds instructor pilots to the alternate endorsement requirements in § 194.213(a)(1)(i).

G. Training in an Approved Program Under Parts 135, 141, and 142

As discussed in section V.F.7. of this preamble, the FAA is adopting alternate requirements for a person to obtain a commercial pilot certificate with a powered-lift category rating and an instrument-powered-lift rating. Because the alternate eligibility framework provides relief to applicants under the SFAR, the FAA found it appropriate to limit the circumstances under which an applicant could use the relief. As discussed in the NPRM,²⁷³ the FAA found that part 135 operators, part 141 pilot schools, and part 142 training centers would best facilitate a training program aligned with the alternate framework set forth in the SFAR. Specifically, part 141 pilot schools and part 142 training centers are already structured to provide alternate methods to obtain training and testing for part 61 certification, including established mechanisms and oversight for curriculum, facilities, and personnel. Conversely, no regulatory framework generally exists for part 135 operators to conduct training and testing for initial ratings under part 61 because part 135 training and checking is primarily structured to qualify pilots to serve in a particular aircraft within the part 135 operational environment. However, the FAA found it appropriate to facilitate an option of training, testing, and checking for a powered-lift rating for part 135 operators for the limited purpose of the SFAR, as proposed in the NPRM and subsequently discussed herein.²⁷⁴

Therefore, the NPRM proposed that, to be eligible for some of the alternate requirements, a pilot must satisfactorily complete the applicable curricula for those ratings in an approved training program under part 135, 141, or 142. As proposed, after completion of the approved curricula, a person would be required to satisfactorily complete the applicable practical test to obtain the powered-lift rating.

The proposal to facilitate the alternate requirements via a training program under parts 141 and 142 and expand training program privileges to part 135 operators received general support. Specifically, AWPC agreed with the FAA’s approach that the SFAR training must be conducted as an approved course under part 135, 141, or 142, citing the clearly defined prerequisites to entry and the highly standardized and regulated course of instruction that would be offered. GAMA echoed this support, stating that relief provided in the SFAR necessitates training in approved courses under part 135, 141, or 142 to ensure standardized instruction with defined prerequisites.²⁷⁵ A4A also expressed general support and further recommended that the training curricula across all parts be required to comply with standardized curricula design, learning objectives, performance tasks, and evaluation criteria as determined by the FAA for the training and qualification of powered-lift pilots and flight instructors.

The following sections summarize the facilitation of the alternate requirements in each part and discuss comments received.

1. Part 135

As previously discussed, part 135 training and checking²⁷⁶ is traditionally intended to qualify a pilot to serve in a particular aircraft in a specific part 135 operation, whereby the pilot would already hold the certificates and ratings for such operations when they are hired. The following sections V.G.1.i. through v. of this preamble discuss the FAA’s proposal to modify this traditional framework as it pertains to training curricula, curriculum content, pilot eligibility, instructor qualifications, and

precedent-setting. See §§ 61.157(c), 61.157(f), and 61.63(d)(6)(ii).

²⁷⁵ Section V.F. of this preamble addresses GAMA’s additional comments pertaining to a competency and training-oriented curriculum, rather than an hours-based approach.

²⁷⁶ Part 135 training and checking typically includes policies and procedures specific to the part 135 operator and operation: for example, crew resource management, flight planning procedures, authorized approach procedures, and operations in weather conditions.

²⁷⁰ See § 61.195(i).

²⁷¹ The FAA notes that Eve provided a comment related to endorsements in the context of ICAO Annex 2.1.1.4. Specifically, Eve stated that the FAA should remove § 194.213 because 2.1.1.4 and removal of the category rating would no longer necessitate alternate flight instructor endorsements. Because the FAA is not implementing 2.1.1.4, as discussed at length in section V.F.3.i. of this preamble, this recommendation is rendered inapplicable.

²⁷² Under proposed § 194.213(a)(2), certain management officials within the manufacturer’s organization may provide an endorsement to an instructor pilot who provided the manufacturer’s training curriculum to a test pilot (§§ 194.219(b)(1)(ii) and 194.227(b)(1)(ii)). The final rule adopts this provision as proposed.

²⁷³ 88 FR 38946 at 38990 (June 14, 2023).

²⁷⁴ The FAA notes that this concept of crediting training in the operator’s approved training program toward training and endorsements requirement to certain part 61 requirements is not wholly

checking and testing to implement a training regime for powered-lift ratings for part 135 operators.

i. Airman Certification Training Curricula

To facilitate part 135 operators in establishing and implementing a training curriculum under which pilots can obtain the powered-lift ratings required for part 135 operations, the FAA proposed a temporary provision in § 194.243(a)(1). Under the proposed § 194.243(a)(1), a part 135 certificate holder would be able to implement a training curriculum to satisfy: (1) ground training, flight training, and aeronautical experience requirements in § 61.65 for an instrument rating;²⁷⁷ (2) ground training, flight training, and aeronautical experience requirements in § 61.63(b) for the addition of an aircraft category rating to a commercial pilot certificate; and (3) ground and flight training requirements in § 61.63(d) to add a type rating to a commercial pilot certificate. These sections would permit a part 135 operator to provide the necessary experience and training for their initial pilots to receive part 61 certificates, as well as qualify their pilots for part 135 operations.

As noted in the NPRM, a part 135 operator is not required to offer this part 61 training. Rather, this provision is intended to provide flexibility for part 135 operators to develop a sufficient number of qualified pilots for its operations. The FAA envisions that the pilots would complete the certification training before transitioning to the operator's part 135 training; however, the FAA would approve one curriculum if it meets all of the part 61 aeronautical experience requirements and the part 135 training requirements. A part 135 operator who wants to provide this type of training to its pilots would submit their curricula to the responsible Flight Standards Office for approval in accordance with § 135.325.²⁷⁸

²⁷⁷ As discussed in the NPRM, some part 135 operators will likely conduct only VFR operations. However, the FAA proposed that powered-lift pilots conducting VFR operations must nevertheless hold an instrument-powered-lift rating similar to the instrument-airplane rating that is required for pilots conducting part 135 VFR airplane operations. For reasons discussed in section V.J.5. of this preamble, powered-lift pilots will be required to hold an instrument rating even when operating under VFR. To facilitate pilots receiving an instrument rating, the FAA will allow part 135 operators to provide training for instrument ratings under an approved airman certification curriculum.

²⁷⁸ The FAA notes that guidance will be updated specifically in FAA Order 8900.1 Volume 3, Chapter 19 (*Flightcrew Member Training and Qualification Programs*) and Chapter 20 (*Check Airman, Instructor, and Supervisor Programs for Part 121 and 135 Certificate Holders*) to inform FAA ASIs on the approval and surveillance

Commenters generally supported the FAA's proposal to permit a part 135 certificate holder to provide training for powered-lift category and type ratings on a commercial certificate and an instrument-powered-lift rating through their approved curriculums. AWPC stated they agree with the FAA's approach to requiring this training through approved programs under parts 135, 141, and 142 because these courses apply defined prerequisites and deliver a highly standardized and regulated course of instruction. CAE also generally supported the FAA's proposal stating it would ensure standardized and regulated instruction with defined prerequisites. L3 Harris and Archer further echoed this support. Additionally, AWPC, CAE, GAMA, Archer, and L3Harris recommended that the FAA should add language to § 61.71 to include part 135 as an approved training program for powered-lift to clarify that graduates of a part 135 approved certification program have met the requirements of part 61.

Section 61.71 sets forth special rules for graduates of an approved training program outside of part 61. Specifically, § 61.71 acknowledges approved training programs under parts 141 and 142 as meeting the applicable aeronautical experience, aeronautical knowledge, and area of operation requirements under certain circumstances.²⁷⁹ Section 61.71(b) further acknowledges part 121 air carrier approved training curriculum and proficiency checks in certain circumstances as meeting the applicable requirements for an ATP certificate under § 61.157. The FAA determined it is unnecessary to revise § 61.71 to include part 135 training programs because part 194 contains the necessary language that enables part 135 operators to conduct part 61 training. As part 194 contains temporary allowances, it would not be appropriate to make a permanent amendment to § 61.71 because the SFAR explicitly allows conduct notwithstanding provisions in part 61. Section 194.243 and the amendment to § 61.1(a)²⁸⁰ would

structure of part 135 powered-lift training programs. This guidance will be integrated into FAA Order 8900.1 upon final rule publication and implementation.

²⁷⁹ § 61.71(a).

²⁸⁰ Specifically, under § 61.1(a), part 61 prescribes the requirements for issuing pilot, flight instructor, and ground instructor certificates, ratings, and authorizations; the conditions under which those certificates, ratings, and authorizations are necessary; the privileges and limitations of those certificates, ratings, and authorizations; and the requirements for issuing such certificates and ratings for persons who have taken courses approved by the Administrator under other parts of chapter I of title 14 of the Code of Federal Regulations. The FAA proposed to revise § 61.1(a)

sufficiently integrate part 135 training in lieu of certain part 61 requirements.

ii. Curriculum Content

Under proposed § 194.243(a)(1), an operator would be able to seek approval to offer training in conjunction with its part 135 operator training to qualify its pilots for part 135 operations. As proposed, the curriculum content from a part 135 operator seeking to provide this training would involve foundational ground and flight training that may be nontraditional or inapplicable to part 135 operations (*i.e.*, aeronautical experience such as solo flight time, cross-country flight time, or certain maneuvers in the ACS). As explained in the NPRM, the airman certification curriculum would be required to satisfy the aeronautical experience requirements, including (1) the 20 hours of training, in § 61.129(e) (as required by § 61.63(b)) or the applicable alternate requirements set forth by proposed part 194, (2) the requirements for an instrument rating in § 61.65(f) or the applicable alternate requirements set forth by proposed part 194, and (3) the requirements for adding a type rating in § 61.63(d).²⁸¹

Further, under § 135.324, a certificate holder may contract with or otherwise arrange to use the services of a part 142 training center to conduct training, testing, and checking, subject to certain training center requirements. This existing provision would be equally applicable to a part 135 operator's approved certification curricula under the SFAR (*i.e.*, a part 142 training center could deliver the part 135 operator's approved certification curriculum). Likewise, the operator could send its pilots to a part 141 pilot school or part 142 training center to obtain the necessary powered-lift ratings before returning to the part 135 operator to complete the required part 135 training and checking.

The FAA received comments from NATA and A4A (discussed below) encouraging use of the standardized curriculum approach to the certification curriculum in § 194.243(a), but otherwise the FAA received no substantive comments pertaining to the content of the proposed curriculum.

to account for part 194 requirements, similar to the allowance for current part 107, which would sufficiently integrate the part 135 training program in tandem with new § 194.243.

²⁸¹ As discussed in the NPRM, operators seeking to provide type ratings to powered-lift pilots who already hold powered-lift category ratings and instrument-powered-lift ratings would follow existing regulations in the same manner as operators using airplanes and rotorcraft can provide training and testing that result in the pilot receiving a type rating.

Accordingly, § 194.243(a) is adopted as proposed.

NATA recommended the FAA consider the standardized curriculum program for part 135 operators. NATA stated that the standardized curriculum concept, supported by FAA and industry in enabling safety and administrative benefits, provides a means to standardize curricula offered by part 142 training centers to part 135 operators as an option to meet the training requirements of part 135. NATA emphasized benefits such as enhanced training, testing, and checking; leveraging experience; streamlined approval processes; and administrative efficiencies. A4A echoed this general sentiment, recommending that part 141 pilot schools, part 142 training centers, and part 135 operators be required to comply with standardized curricula design, learning objectives, performance tasks, and evaluation criteria developed by the FAA.

The standardized curriculum concept provides a means to standardize curricula offered by part 142 training centers to part 135 operators as an option to meet the training requirements of subpart H of part 135.²⁸² This concept aims to provide an efficient means for approving training curricula for a specific aircraft or series of aircraft offered by part 142 training centers while increasing the consistency of training, testing, and checking delivered to part 135 operators. To note, standardized curriculum is not a complete training program;²⁸³ rather, it is the aircraft-specific segment of the part 135 training to be delivered by a part 142 training center in accordance with § 135.324(b) (and all applicable requirements under part 135). Traditionally, the Training Standardization Working Group (TSWG) collaborates with stakeholders to develop and recommend a standardized curriculum to the ARAC for a specific aircraft fleet. In turn, the ARAC presents the recommendations to the FAA for review, consideration, and possible publication and implementation.²⁸⁴ Once published by the FAA, if the POI determines it fits the needs of the operator, the standardized curriculum is considered to meet the aircraft-specific

requirements of a part 135 training program.

The FAA finds that part 135 training programs facilitating the entrance of this new category of aircraft must remain flexible and adaptive for the operator, retaining the ability to evolve with emerging trends, safety concerns, and operational considerations as powered-lift operations mature. The FAA agrees that the use of standardized curriculum could provide a benefit to part 135 powered-lift operators in the future. However, the FAA finds it impractical and premature to establish a TSWG and develop a standard part 135 curriculum for a powered-lift because no certificated powered-lift have completed the FSB process and, therefore, no operators currently use powered-lift (or qualified powered-lift FFS).²⁸⁵ However, the SFAR would not foreclose this as an option in the future should a specific type of powered-lift with a similar training footprint emerge along with significant insight into the training and operation of that powered-lift to develop a standardized curricula.

iii. Pilot Eligibility

The FAA also proposed eligibility standards for the pilots who may be trained under a part 135 airman certification training curriculum, which would be set forth by proposed § 194.243(a)(3). As proposed, a certificate holder may train a pilot for powered-lift ratings only if the pilot is employed by the part 119 certificate holder. The pilots would also be required to meet the certificate and rating requirements of proposed § 194.215(a) (*i.e.*, at least a commercial pilot certificate with either (1) an airplane category rating with single- or multiengine class rating and an instrument-airplane rating, or (2) a rotorcraft category rating with a helicopter class rating and an instrument-helicopter rating).

The FAA did not receive any comments on the proposed part 135 pilot eligibility provisions and adopts the provision as proposed.

iv. Part 135 Instructors

Currently, instructors in part 135 are not required to hold a part 61 flight instructor certificate. Rather, a part 135 instructor must meet the requirements set forth in §§ 135.338 and 135.340.²⁸⁶

²⁸⁵ The TSWG model is based on leveraging industry expertise to make recommendations to the FAA on part 135 curriculum content. Without any powered-lift currently operating, it will take time for the requisite expertise to develop in industry to properly inform the TSWG process.

²⁸⁶ These requirements include that the instructor be PIC qualified for the aircraft and operation (*e.g.*,

While the traditional part 135 instructor focuses on training pilots in the specific aircraft and operation, part 135 instructors under the SFAR will be training pilots on basic airman certification requirements (*i.e.*, part 61 requirements). To provide training on basic airman certification requirements, a person must generally hold a part 61 flight instructor certificate with appropriate ratings. Specifically, pursuant to § 61.3(d)(2), a person must hold a flight instructor certificate issued under part 61 to give training required to qualify a person for solo flight and solo cross-country flight and to give certain endorsements.²⁸⁷

The FAA recognizes there are certain scenarios, though, where a flight instructor certificate is not required. Under the narrowly tailored exception in § 61.3(d)(3)(ii), a flight instructor certificate is not required to provide training and endorsements if provided by the holder of an ATP certificate with the appropriate rating in accordance with an approved air carrier training program under part 121 or 135. However, when a pilot traditionally receives training at a part 135 operator, the pilot already holds the appropriate category and class ratings on their commercial pilot certificate. Therefore, the instructor pilot who holds an ATP certificate but not a part 61 flight instructor certificate would be training a pilot who already demonstrated the basic airman certification proficiency and competency to the airman certification standards. This is unlike the framework adopted in this final rule whereby the part 135 approved training program will include foundational training and testing required to add category and instrument ratings to a commercial pilot certificate in lieu of part 61 requirements.²⁸⁸

The FAA found it necessary to prevent a situation under which a part 135 instructor who holds an ATP certificate with powered-lift ratings

holding the airman certificates and ratings, successfully completing the required aircraft training phases, etc.), satisfactorily complete the approved part 135 instructor ground and flight training, and undergo continued observation by an FAA inspector, an operator check airman, or an aircrew designated examiner employed by the operator to ensure the quality and effectiveness of the instruction after initial instructor acceptance.

²⁸⁷ See § 61.3(d)(2)(ii) through (iv).

²⁸⁸ Because approved training programs under part 135 do not include training and testing required to add category and instrument ratings to a commercial pilot certificate, nor does part 61 accept part 135 training and checking activity in lieu of part 61 requirements for a commercial pilot certificate, the exception in § 61.3(d)(3)(ii) does not currently apply and creates a safety gap in allowing the holder of an ATP certificate to provide part 61 certification training. See § 61.167(a) for ATP certificate holder training privileges.

²⁸² www.faa.gov/pilots/training/standardized_curriculum.

²⁸³ The certificate holder would still be required to develop some training curricula on their own, such as an indoctrination or special operations curriculum.

²⁸⁴ See AC 142–1 *Standardized Curricula Delivered by Part 142 Training Centers*.

could provide training in a powered-lift to pilots seeking to add a powered-lift category rating and an instrument-powered-lift rating to their commercial pilot certificate through the part 135's airman certification curriculum. Specifically, as discussed in the NPRM, the FAA determined that a person must hold a flight instructor certificate issued under part 61 with the appropriate ratings to provide training for the purpose of adding a powered-lift category rating or an instrument rating to a commercial pilot certificate. This determination was based on the lack of powered-lift experience held by pilots completing the part 135 training program (who would be completing basic airman certification requirements) and the curriculum content required for the issuance of a commercial pilot certificate with a powered-lift category rating and an instrument-powered-lift rating (*i.e.*, foundational ground and flight training and aeronautical experience not traditionally included in a part 135 training curriculum.)²⁸⁹

The holder of a flight instructor certificate with a powered-lift category rating would be qualified to provide training on the tasks and maneuvers required in the approved certification training curriculum because the tasks and maneuvers are included on the powered-lift flight instructor practical test.²⁹⁰ Additionally, the flight instructor would have demonstrated the ability to provide effective training on the foundational tasks and maneuvers, demonstrate the skills required to perform those tasks and maneuvers within the approved standards, and analyze and correct common errors that occur during training of those tasks and maneuvers. For these reasons, the FAA proposed § 194.243(a)(2) to require an instructor in a part 135 airman certification training program to hold a flight instructor certificate with a

powered-lift category rating and instrument-powered-lift rating issued under part 61 (in addition to meeting the qualification requirements of §§ 135.338 and 135.340).

To ensure the narrow exception in § 61.3(d)(3)(ii) is not expanded in light of the FAA's proposal, the FAA proposed § 194.203(b) to specify that a person must hold a flight instructor certificate with the appropriate powered-lift ratings to conduct training in accordance with a training curriculum approved to meet the requirements of § 194.243(a)(1). Additionally, to ensure the ATP privileges contained in § 61.167(a) are not expanded as a result of the SFAR, the FAA proposed a limitation in § 194.205 to prohibit a person who holds an ATP certificate with powered-lift ratings from instructing other pilots in accordance with an approved training program under part 135 for the purpose of obtaining a commercial pilot certificate with a powered-lift category rating or an instrument-powered-lift rating.

ALPA and an individual commenter supported the requirement that part 135 instructors providing training for a commercial pilot certificate with powered-lift ratings and an instrument-powered-lift rating hold a part 61 flight instructor certificate with appropriate ratings. The individual stated that the SFAR would enable the part 135 instructors to provide foundational flight training to someone who does not already hold the category rating at the commercial level, which necessitates instructors trained under the same requirements as part 61 instructors in the interest of ensuring safety and effective training. ALPA supported the FAA's conclusion, as set forth in the preamble to the NPRM, that a person with a flight instructor certificate would be best suited to provide training on the foundational tasks, maneuvers, and skills, and provide any corrective feedback and analysis.

FlightSafety International, UPS Flight Forward (UPS FF), and L3Harris commented on the FAA's proposal to require a part 61 flight instructor certificate to provide training under the SFAR at a part 135 operator. FlightSafety International did not appear to disagree with the general concept to require a flight instructor certificate for part 135 instructors under the SFAR, but rather commented on the proposal in the context of aligning the type rating requirement with ICAO Annex 1, section 2.1.1.4. Specifically, FlightSafety International recommended the FAA revise proposed § 194.203(b) to require a flight instructor under part 135

to hold any category or class flight instructor certificate with the appropriate powered-lift type rating only (rather than a flight instructor certificate with a powered-lift category and type rating). FlightSafety International also proposed similar revisions (*i.e.*, any flight instructor certificate with only a powered-lift type rating) in §§ 194.205 and 194.243.

UPS FF opposed the flight instructor certificate requirement, stating that part 135 operators and part 121 airlines have long relied on the regulatory allowance to train and qualify pilots without holding a part 61 flight instructor certificate and asserted that such a requirement would result in less experienced part 135 instructors or add a financial burden to operators that fund their instructors in the completion of part 61 instructor training. UPS FF urged the FAA to take several factors into consideration, including a perceived pilot shortage, the introduction of new and unique aircraft into commercial service, and the desire to have experienced pilots training new entrants. UPS FF suggested the FAA leverage the Aircrew Program Designee (APD) process to support part 135 operators conducting training and checking resulting in the issuance of both a category and type rating to a part 61 certificate. Similarly, L3Harris opposed the requirement, stating it would not add any value or safety to the certification process and will burden instructors at air carriers.

First, for the reasons stated in section VII.A. of this preamble, the FAA is not implementing ICAO Annex 1, section 2.1.1.4 therefore FSI's suggestions are likewise not adopted.

As previously discussed, UPS FF correctly notes that parts 121 and 135 operators have traditionally relied on the allowance to train and qualify pilots without holding a part 61 flight instructor certificate. However, this allowance is narrowly tailored to the training and checking designed to prepare a pilot to operate in accordance with the air operator's certificate for which they are employed and for certification purposes extends solely to training required for a type rating. Under the new requirements in the SFAR, certificate holders under part 135 may submit a curriculum constituting a comprehensive airman certification training framework, which would go beyond the traditional scope of a part 135 training program. In other words, part 135 certificate holders are not presently permitted to train pilots for their initial part 61 category ratings and, therefore, the corresponding instructor

²⁸⁹ For the issuance of a powered-lift category rating on a commercial pilot certificate, the training must cover the knowledge areas specified in § 61.125(b) and the areas of operation contained in § 61.127(b)(5). For the issuance of an instrument-powered-lift rating, the training must cover the knowledge areas specified in § 61.65(b) and the areas of operation contained in § 61.65(c).

²⁹⁰ See Commercial Pilot for Powered-Lift Category ACS (FAA-S-ACS-2) and Flight Instructor for Powered-Lift Category ACS (FAA-S-ACS-27), both incorporated by reference under §§ 61.14 and 61.43(a). Because § 61.43(a) requires an applicant to perform the tasks specified in the areas of operation contained in the applicable ACS (or PTS), a person seeking a flight instructor certificate with a powered-lift category rating would be trained and tested on their understanding of these tasks and maneuvers, their application of that knowledge to manage associated risks, and their ability to demonstrate the appropriate skills and provide effective instruction for each of these tasks and maneuvers.

pilots are not required to hold part 61 flight instructor certificates.

The certification activity currently allowed to be accomplished through the completion of a certificate holder's training program is not analogous to the new certification curriculum for a commercial pilot certificate and instrument rating. First, to the extent that § 61.157(f) allows checks at an operator to satisfy the practical test requirements for an ATP certificate, the ATP certificate practical test requires no additional training but rather is an experience-based eligibility (*e.g.*, 1,500 total time as a pilot, etc.). Conversely, a commercial pilot certificate requires an applicant to complete training and acquire flight experience. To the extent that § 61.157(c) allows pilots training under a part 135 training program to forego the flight training for a type rating in § 61.157(b)(1) if they present a training record that shows completion of a certificate holder's approved training program for the aircraft type that also is distinguishable because a certificate holder's training program, like training for a type rating, is aircraft type specific. Accordingly, there is a correlation between the content of the operator's training program and the type rating training. It is for the exact reasons cited by UPS FF and L3Harris—the introduction of new and unique aircraft, a lack of experienced powered-lift pilots, and the desire to have experienced pilots training new entrants—that the FAA maintains the need for proficient flight instructors, who have been trained and tested themselves on these foundational airman certification tasks, maneuvers, and instructional abilities, to provide part 61 training.

Commenters recommended leveraging the aircrew program designee (APD) process to reduce the reliance on instructors holding a part 61 flight instructor certificate. An APD for an operator is a check pilot employed by the operator who is qualified and authorized to certify other pilots by conducting a certification examination, giving the operator the ability to facilitate certain airman certification for ATP certificates and type ratings (§§ 61.63 and 61.157). Under the SFAR, the company may still leverage APDs to conduct evaluations required for the newly enabled ratings. However, the use of an APD program does not reduce the importance of using a pilot with a flight instructor certificate for initial certification training and ensuring basic flight concepts are taught by an appropriately rated individual with an understanding of training initial applicants. Therefore, the SFAR would

not foreclose the use of an APD process under part 135, but individuals who provide flight training must be appropriately qualified as set forth in the SFAR.

The FAA notes that the requirement to hold a part 61 flight instructor certificate with powered-lift ratings applies only to part 135 instructors who train pilots seeking to obtain their initial powered-lift category and instrument ratings under a part 135 training program. The FAA is not altering the ability of an operator to use pilots who possess an ATP certificate to provide training under their approved part 135 training program with qualified PICs that hold their ATP certificate, as is the current status quo. This SFAR provision would only apply to training for initial powered-lift ratings under the part 135 training program to meet the part 61 requirements concurrently.

Therefore, this final rule adopts the part 135 flight instructor certificate provisions as proposed.

v. Checking and Testing

Part 135 initial training culminates in evaluations of the pilot's proficiency through the completion of a competency check under § 135.293(b) and, if conducting operations under IFR, a PIC instrument proficiency check under § 135.297. The FAA proposed several provisions in § 194.243(b) pertaining to part 135 airman certification and checking, which are adopted herein as proposed with one addition in new § 194.243(b), as subsequently discussed. First, § 194.243(b)(1) permits, at the completion of the certification curriculum and the part 135 operator training, a pilot to apply to add a powered-lift category rating concurrently with an instrument-powered-lift rating and an initial powered-lift type rating to their commercial pilot certificate if the person successfully completes the written or oral testing under § 135.293(a)(2) and (3), a competency check under § 135.293(b), and an instrument proficiency check under § 135.297 provided certain conditions are met.²⁹¹ Under § 194.243(b)(1)(iii)(A), the competency check must include the maneuvers and procedures required for

the issuance of a commercial pilot certificate with a powered-lift category rating and a powered-lift type rating.²⁹² Similarly, the instrument proficiency check must meet the requirements of § 135.297 as applicable to a PIC holding a commercial pilot certificate, which includes the maneuvers and procedures required for the issuance of an instrument-powered-lift rating.²⁹³ As described in §§ 135.293(e) and 135.297(c), competent performance of each maneuver and procedure on the competency check and instrument proficiency check requires that the pilot be the obvious master of the aircraft, with the successful outcome of the maneuver never in doubt. Finally, as set forth by § 194.243(c), the testing, competency check, and instrument proficiency check would be administered by an ASI or APD who is authorized to perform competency checks and instrument proficiency checks for the certificate holder, or a TCE with appropriate certification authority who is also authorized to perform competency checks and instrument proficiency checks for the certificate holder.

As proposed, certain part 135 regulations that apply to the competency check and instrument proficiency checks will not apply to the recognition of part 135 competency checks and instrument proficiency checks under the SFAR for initial certification purposes (*i.e.*, to meet § 194.243(b)(1)(iii)). Specifically, under § 194.243(b)(2), the allowance in § 135.301(b), which permits a pilot who fails a maneuver on a check to receive additional training and then repeat the maneuver, will not be applicable to the competency check and instrument proficiency check under the SFAR.²⁹⁴ Lastly, the allowance in § 135.293(d), which permits the substitution of a § 135.297 instrument proficiency check for a competency check, will not apply to the competency check for the powered-lift category rating. These exclusions are set forth in § 194.243(b)(3).

§ 61.43(a).

ALPA provided recommendations regarding competency checks, including

²⁹² See §§ 61.127(b)(5), 61.157(e)(3), and appendix A to part 61.

²⁹³ Since the instrument proficiency check is being used to meet the practical test requirements for an instrument-powered-lift rating, the check must include all approaches required by the Instrument Rating—Powered-Lift ACS, even if the pilot will not be authorized to conduct one or more of those approaches during part 135 operations (*e.g.*, circling approaches).

²⁹⁴ In other words, the pilot would be expected to meet the same standards as those set forth in

²⁹¹ As noted in the NPRM, the FAA recognizes that certain PICs in part 135 would not be required to complete an instrument proficiency check under § 135.297 (*e.g.*, PICs and SICs serving in VFR only operations and SICs serving in IFR operations). However, if the operator opts to pursue a training program under the SFAR to issue an instrument-powered-lift rating, the person would be required to successfully complete the § 135.297 instrument proficiency check to meet the requirements of proposed § 135.243(b) (see section V.J.5. of this preamble) and existing § 135.245(a).

the maneuvers and procedures required to issue a commercial pilot certificate with powered-lift category rating. Specifically, ALPA recommended the use of “continuing qualifications standards” as outlined in part 135, which ALPA stated are foundational in training and passing pilots in part 135. Additionally, ALPA urged the FAA to provide standards and guidance for test pilots choosing the maneuvers for the competency checks because the lack of a structured approach would increase a safety risk in validating a pilot’s competency. Finally, ALPA sought clarification on the outcome in a scenario where a pilot unsatisfactorily performs on a check and must recheck. ALPA specifically requested the FAA to comment on waiting periods and additional training requirements for such pilots.

First, in regard to ALPA’s suggestion that a continuing qualification standard be mandated amongst powered-lift operators, the FAA notes that all part 135 operators would be required to adhere to the regulations as applicable in part 135 and is unclear what additional qualifications standards ALPA contends would be beneficial for pilots. ALPA’s use of the term “continuing qualification” could be interpreted as the establishment of an Advanced Qualification Program (AQP), which is discussed in section V.G.1.v of this preamble. Any part 135 operator has the option of implementing an AQP, subject to approval by their POI; it is not, however, mandatory for powered-lift unless they operate as a commuter operation as required in § 194.247. While the FAA does not foresee a high volume of commuter powered-lift operations at the onset of this SFAR, these operations will eventually emerge; the FAA expects pilots to obtain the qualifications (ATP certificate) and manufacturers to develop aircraft that would meet the regulatory thresholds for commuter operations. However, any additional continuing qualification requirement would be difficult to standardize at this time for the same reasons that the FAA finds a standardized curriculum premature to implement. Additionally, the FAA notes that the SFAR would not foreclose an operator from initiating any additional benchmarks or qualification checks that operator deems necessary for safe operation. For example, Archer discussed imposition of a 500-hour minimum flight hour experience level for pilots in anticipation of part 135 PIC responsibilities. Similarly, Liliun indicated they would impose real-time monitoring through approved remote

technology to ensure operational safety is maintained during flight training.

In addition to the items outlined in the checking modules and because competency and proficiency checks can now result in a commercial pilot certificate with a powered-lift category and type rating and an instrument-powered-lift rating, the checking event will be required to accomplish all the required tasks in the appropriate ACS for a pilot applicant employed at a certificate holder. Specifically, under § 194.243(b)(1)(iii)(A), the competency check would be required to include the maneuvers and procedures required for the issuance of a commercial pilot certificate with a powered-lift category rating, an instrument-powered-lift rating, and a powered-lift type rating. Similarly, under § 194.243(b)(1)(iii)(B), the instrument proficiency check must meet the requirements of § 135.297 as applicable to a PIC holding a commercial pilot certificate, except that the instrument approaches to be included must include all instrument approaches required for the issuance of an instrument-powered-lift rating.

The FAA agrees with ALPA’s general contention that ASIs, APDs, and TCEs²⁹⁵ should be provided guidance and standards to conduct the checks pursuant to § 194.243(b). Currently, tables for pilot proficiency checks are outlined in FAA Order 8900.1.²⁹⁶ These tables will be updated with this final rule to account for checking modules in a powered-lift to include basic checking modules for a § 135.293 VFR competency check, § 135.293 IFR competency check, § 135.297 instrument proficiency check, and NVG tasks to be accomplished when appropriate.

Because § 61.43 requires the practical test for the issuance of a rating include all tasks specified in the areas of operation contained in the applicable ACS as incorporated by reference in § 61.14, it follows that the corresponding check must include these tasks as well. For purposes of training program submission, the FAA notes that a certificate holder’s module format may be either a simple outline, a table such as those contained in aforementioned FAA Order 8900.1 tables, or any other format that the POI finds clearly establishes the methods to be used and elements and events to be checked.

To the extent that ALPA sought clarification on unsatisfactory

²⁹⁵ While ALPA cited test pilots as choosing the maneuvers, the FAA notes that ASIs, APDs, and TCEs conduct checks for part 135 checks.

²⁹⁶ See Volume 3, Chapter 19, Section 7, tables 3–70 and 3–71.

performance during a check and the process for rechecking, as previously stated, the FAA excluded the use of certain part 135 regulations traditionally applicable to the competency check and instrument proficiency checks, as provided in § 194.243(b)(2). Section 135.301(b) allows that, if a pilot fails a maneuver on a check, the person giving the check may provide the pilot with additional training during the check and then the pilot must repeat the failed maneuver. The FAA chose to foreclose this option if an individual was obtaining an initial category certificate or rating to align with how a part 61 pilot certificate is granted today in alignment with § 61.43(c) which specifies that, if a pilot fails any area of operation, that pilot fails the practical test. For evaluations and checks not resulting in the issuance of a pilot applicant’s initial powered-lift ratings, the provisions in § 135.301 would be available as they normally are.

Further, because these checks essentially serve as a practical test for certification, successful completion of which is essential to ensuring comprehensive pilot proficiency, the FAA finds it necessary to treat checks in the same manner as a practical test in part 61 when a person cannot successfully demonstrate a task or maneuver. Where a check under part 135 would typically permit the pilot to receive additional training and repeat the maneuver, this final rule adopts new § 194.243(b)(4) that mirrors current § 61.49(a). In the case of a failed maneuver, the check will be recorded as an unsatisfactory evaluation and a notice of disapproval will be issued. To qualify for a recheck, the applicant will be required under § 194.243(b)(4) to (1) receive necessary training from an authorized instructor or instructor pilot and (2) obtain an endorsement from the authorized instructor or instructor pilot who conducted the training and determination that the applicant is proficient to pass the test attesting to the training.²⁹⁷ A new application for the ratings would have to be made prior to a subsequent attempt. The retraining could not occur as part of the same flight and evaluation sequence because the person would be required to reapply for the check after receiving training and an endorsement.

2. Part 141 Pilot Schools

As previously discussed, part 141 pilot schools serve as a structured

²⁹⁷ The applicant will also be required to comply with any requirements provided in the approved part 135 training manual for that operator.

program²⁹⁸ under which a person may obtain part 61 certificates and ratings; the FAA proposed to allow part 141 pilot schools to offer the training for the alternate experience requirements set forth by the SFAR. The FAA did not propose any relief from the personnel requirements of a part 141 pilot school (*i.e.*, subpart B of part 141). As such, an instructor at a part 141 pilot school would be required to hold a powered-lift category rating and an instrument-powered-lift rating on their commercial pilot certificate and a flight instructor certificate with a powered-lift rating or instrument-powered-lift rating.²⁹⁹ The instructor will also be required to hold a type rating on their pilot certificate that corresponds to the aircraft in which the training will be provided. As discussed in the NPRM, the FAA anticipates part 141 pilot schools will obtain the necessary training for powered-lift ratings from the manufacturers through the alternate pathways, discussed in section V.B. of this preamble, and the initial pool of instructors from the military pilots with certificates and ratings through the provisions of § 61.73.

Specific to part 141 pilot school requirements, CAE and NBAA stated that the requirement for Chief Instructors, Assistant Chief Instructors, and Designated Pilot Examiners to acquire the proposed 50 hours in type (or combined with a simulator of Level C or higher)³⁰⁰ will be difficult as there are currently no powered-lift to use for training and/or testing. Similarly, both commenters stated that flight training organizations and students will experience a burden in finding a powered-lift for training and testing toward a powered-lift rating for non-commercial use.

The FAA agrees with CAE and NBAA that the lack of civilian powered-lift for training and testing will create a unique burden for flight training organizations and students insofar as populations of pilots seeking training will not have

²⁹⁸ For the purpose of this preamble, when referring to training program under part 141, the FAA considers this term synonymous with training course outline or training curriculum. The FAA is noting the slight differentiation in terms here for clarification.

²⁹⁹ § 141.33(a)(3). See also 141.35(a)(1), 141.36(a)(1), and 141.37(a)(2)(ii).

³⁰⁰ The FAA notes that there are no specific requirements of time in an aircraft to receive a type rating. See § 61.63(d). The FAA understands this comment to mean the 50 hours of PIC time in a powered-lift, as the commenters both specified this amount of time earlier in their comments when remarking on similar concerns in the context of part 142. The FAA finds this comment is addressed in section V.F.2. of this preamble, where the FAA describes the reduction of PIC time in a powered-lift to 35 hours.

ready access to the aircraft like those populations currently enjoy with airplanes and helicopters. The intent of the SFAR and the respective alternate frameworks set forth by this final rule work in tandem to alleviate that burden as much as possible while upholding a level of safety for pilots seeking to engage in civilian commercial operations commensurate with the existing high level of safety for those operations.

The FAA notes that the SFAR does not solely address the facilitation of commercial operations. Rather, as stated in the NPRM, the intention expressed by industry to introduce these aircraft immediately into passenger-carrying commercial operations instigated the reconsideration of the existing airman regulations for powered-lift and address the absence of specific regulations for pilots in part 135, specifically. However, the SFAR does not create any additional barriers for “non-commercial” operations and, in fact, includes part 141 personnel along with part 135 and part 142 personnel in the opportunity to obtain training at the manufacturer for the purpose of forming the initial cadre of instructors. In addition, the FAA proposed, and adopts in this final rule as discussed in section V.F. of this preamble, alternative requirements for private pilot certification. In the context of a part 141 pilot school, once a population of qualified personnel exists, the part 141 pilot school would be free to apply to deliver any powered-lift training curriculum they are qualified to provide (*e.g.*, a private pilot certification course).

3. Part 142

A part 142 training center, likewise, provides an alternate means to accomplish part 61 training and certification, established primarily in response to advancement in flight simulation technology in the late 1990s.³⁰¹ Aligned with the intent for part 141 pilot schools, the FAA anticipates that a part 142 training center will establish the initial cadre of flight instructors under the SFAR’s alternate requirements by obtaining the necessary training at the manufacturer (see section V.F.2. of this preamble). After such, the part 142 training center could establish powered-lift training curricula utilizing the qualified TCEs to provide training to other instructor personnel at the training center.

Part 142 contains its own requirements for flight instructor

³⁰¹ Aircraft Flight Simulator Use in Pilot Training, Testing, and Checking and at Training Centers, 61 FR 34508 (July 2, 1996).

eligibility in § 142.47. Section 142.47(a)(3) requires an instructor who is instructing in an aircraft in flight to be qualified under the flight instructor requirements in subpart H of part 61. To the extent that a part 142 training center will obtain approval for a curriculum that includes a portion of flight training in a powered-lift in flight, the training center instructors will be required to hold the appropriate powered-lift ratings on their pilot and flight instructor certificates.³⁰² For instructors who conduct training in an FSTD, § 142.47(a)(5) requires that an instructor satisfy one of three options to provide instruction: (1) meet the commercial aeronautical experience requirements of § 61.129(a), (b), (c), or (e), as applicable, excluding the required hours of instruction in preparation for the commercial pilot practical test; (2) meet the ATP aeronautical experience requirements of §§ 61.159, 61.161, or 61.163,³⁰³ as applicable, if instructing in an FSTD that represents an “airplane requiring a type rating” or instructing in a curriculum leading to the issuance of an ATP certificate or added rating to an ATP certificate in any category of aircraft; or (3) be employed as an FSTD instructor for a training center providing instruction and testing to meet the requirements of part 61 on August 1, 1996.

Essentially, notwithstanding the third option, in the current regulatory environment, the part 142 instructor seeking to instruct in a powered-lift FSTD for a commercial pilot certificate would only be required to meet the aeronautical experience requirements for a commercial pilot certificate with a powered-lift category rating. Because § 142.47(a)(5)(ii) applies only to airplanes requiring a type rating, persons instructing in an FSTD in a powered-lift (which would all require a type rating under this final rule, as discussed in section V.A. of this preamble) would only be required to meet the aeronautical experience requirements of a commercial certificate with a powered-lift category rating (*i.e.*, § 61.129(e)), unlike how airplanes requiring a type rating are treated. In other words, § 142.47(a)(5)(ii) would be

³⁰² In addition to § 142.47(a)(3), § 142.49 sets forth training center instructor and evaluator privileges and limitations and restricts a training center from allowing an instructor to provide flight training in an aircraft unless that instructor is qualified and authorized in accordance with subpart H of part 61 (Flight Instructors Other than Flight Instructors with a Sport Pilot Rating).

³⁰³ These sections set forth the aeronautical experience requirements for a commercial certificate with an airplane single-engine rating, airplane multiengine rating, helicopter rating, and powered-lift rating.

inapplicable because the person instructing in a powered-lift FSTD would not be representing an airplane (the first criteria in the paragraph), nor would the person be instructing in a curriculum leading to the issuance of an ATP certificate or an added rating to an ATP certificate (the second criteria in the paragraph). In the NPRM, the FAA also noted this discrepancy concerning helicopters requiring a type rating.

As comprehensively discussed in the NPRM,³⁰⁴ the FAA found it necessary to ensure a person instructing in an FSTD for an aircraft requiring a type-rating possess a higher level of experience than that required for a commercial pilot certificate due to technological advancements in type-rated aircraft. Therefore, the FAA proposed to impose the same standard for powered-lift and rotorcraft instructors providing training in an FSTD as those required for airplanes by replacing the word “airplane” with “aircraft” in § 142.47(a)(5)(ii).

Most existing rotorcraft training center instructors already meet the aeronautical experience requirements of § 142.47(a)(5)(ii) for rotorcraft that require type ratings or do not offer standalone type-rated rotorcraft curriculum (e.g., the training center offers an ATP curriculum for the type-rated rotorcraft, thereby falling into the criteria in the second part of § 142.47(a)(5)(ii)). However, to facilitate integration of this regulatory change while not disrupting current practice for those instructors who may not currently satisfy this standard, the FAA proposed to except instructors that are currently instructing in an FSTD that represent a rotorcraft requiring a type rating from this proposed requirement in new § 147.47(a)(5)(ii)(A) and (B).

Additionally, the FAA recognized that implementation of this regulation may delay some operators initially by the lack of pilots possessing an ATP certificate with the appropriate powered-lift ratings. The FAA noted the availability of deviation authority in § 142.9 for powered-lift instructors (and rotorcraft instructors, given the regulatory change for this population of instructors). Section 142.9 functions to provide an avenue for relief from the ATP experience requirements of § 142.47(a)(5)(ii) if the FAA determines that it would not adversely affect the quality of instruction or evaluation.³⁰⁵

Many commenters, including NBAA, CAE,³⁰⁶ and Archer, opposed the FAA’s proposal to replace the term “airplane” with “aircraft,” thereby expanding the requirement for an FSTD instructor to meet the aeronautical experience requirements of §§ 61.159, 61.161, or 61.163, as applicable. Specifically, Archer stated the proposal is devoid of a clear, safety-based justification and lacks necessary supporting data to warrant its adoption. Archer urged the FAA to consider that the underlying reason for the type rating was the inability to establish coherent classes and recognize that if the FAA did establish classes of powered-lift then the type-rating requirement would disappear, as would the corresponding requirement for FSTD instructors in § 142.47(a)(5)(ii). Archer stated that the aeronautical experience requirements for FSTD instructors of large, complex, and turbojet powered type-rated airplanes should not be equally applicable to powered-lift because powered-lift are simple to fly and will be flown by predominantly commercial pilots without an ATP certificate. Archer also emphasized the comparison of the aeronautical experience expected from parts 141 and 135 instructors compared to part 142 instructors. Archer stated that the same FSTD that would require an instructor with an ATP certificate or equivalent aeronautical experience at a part 142 training center could be used for training under part 135 or 141 with only an authorized instructor, resulting in a burden to part 142 training centers. In sum, Archer urged the FAA to maintain the existing language in § 142.47(a)(5)(ii) preserving the distinction between “airplane” and “aircraft.” If the FAA continued to believe the proposed change is necessary, Archer provided suggested revised language to exempt part 142 powered-lift and rotorcraft FSTD instructors who also instruct in the aircraft being simulated from the

policies that the training center proffers in support of its request for relief.

³⁰⁶CAE and NBAA echoed their previous sentiment in the context of training in accordance with part 141 under the SFAR. They again stated that requiring the initial cadre of TCEs to be trained by the manufacturer would create a backlog for training by preventing part 142 training centers from qualifying initial instructors and TCEs. They estimated part 142 training centers would need 7 to 9 instructors per simulator, which will be difficult to achieve given (1) the perceived atypical requirement for a training center instructor to be a CFI, and (2) the requirement for instructors to have a powered-lift category rating. The commenters recommended removing the powered-lift category rating and the requirement for training center instructors to hold a CFI with no additional information on how these instructors would be alternatively and sufficiently qualified.

requirement to hold an ATP certificate or equivalent experience. Archer also disagreed with the FAA’s reliance on § 142.9 as an avenue for relief from the ATP experience requirements of § 142.47(a)(5)(ii), stating that the deviation approach may be cumbersome and elongated. GAMA requested the FAA apply ICAO Annex 1 language (*i.e.*, add a powered-lift type rating to an existing commercial certificate with airplane or helicopter ratings) and clarify that an instructor pilot may meet the aeronautical experience requirements of § 61.159 (airplane) or § 61.161 (rotorcraft), as appropriate to the specific aircraft type. GAMA also suggested the training instructor requirements to be specified in the FSB report for that aircraft.

First, Archer is correct that the FAA found it premature to identify concrete sets of similar characteristics to establish powered-lift classes at this time due to the wide variance in complexity, design, flight, and handling characteristics between powered-lift. This forms the basis for the requirement of a type rating. The operational characteristics and introduction of novel aircraft and operations necessitate that a person providing instruction maintain a higher threshold of proficiency in areas such as interacting with air traffic control, operating in an airport environment, navigating the operational challenges of flying the aircraft in weather, using crew resource management, and resolving maintenance discrepancies, all while complying with FAA regulations, procedures, manuals, and authorizations. Archer may be correct that some powered-lift may be simple to fly; however, the FAA does not have an adequate sample size with which to determine whether powered-lift are sufficiently simple enough such that training qualifications in an FSTD should be decreased. While one powered-lift may be overwhelmingly autonomous, another may encompass largely manual operations.

However, the FAA recognizes that, to Archer’s point, the underlying reasons for establishing a type rating for all powered-lift do not substantially align with the reasons an airplane or helicopter may require a type rating under § 61.31. Specifically, under § 61.31(a), a person who acts as a PIC of a large aircraft,³⁰⁷ turbojet-powered airplane, or other aircraft as specified by the Administrator through aircraft type certificate procedures must hold a type

³⁰⁷Pursuant to 14 CFR 1.1, large aircraft means aircraft of more than 12,500 pounds, maximum certificated takeoff weight.

³⁰⁴ 88 FR 38946 at 38996 (June 14, 2023).

³⁰⁵ See FAA Order 8900.1, Vol. 3, Ch. 54, Sec. 4. The FAA may consider the level of safety purportedly achieved by the request, the proposed revisions to the training center’s operating procedures and Quality Management Systems, and any accompanying justification, procedures, or

rating for that aircraft. The FAA determined the speed, complexity, and operating characteristics of large aircraft require the PIC to demonstrate proficiency in operating the specific aircraft; similarly, the FAA determined that the performance, environment, and operating characteristics of turbojet-powered airplanes require the PIC to demonstrate proficiency in operating the specific airplane.³⁰⁸ As adopted by this final rule, a PIC will be required to hold a type rating for every powered-lift to account for the lack of classes established at this time and diversity in powered-lift configurations, controls, and operating characteristics. It follows that not every powered-lift will be equally complex as a large aircraft or turbojet airplane just by virtue of requiring the pilot to hold a type rating under § 61.31(a).

Therefore, this final rule revises the proposed replacement in § 142.47(a)(5)(ii) of “airplane” requiring a type rating with generalized “aircraft” requiring a type rating (*i.e.*, enveloping large airplanes, large helicopters, turbojet powered airplanes, and all powered-lift, despite the size or engine type). Rather, this final rule will extend the requirements of current § 142.47(a)(5)(ii) to rotorcraft requiring a type rating (as proposed), “large” powered-lift (*i.e.*, powered-lift of more than 12,500 pounds maximum certificated takeoff weight), and turbojet powered powered-lift.³⁰⁹ This amendment holds powered-lift akin to the airplane type rating requirement, recognizing that large powered-lift and powered-lift that operate with turbojet engines are complex, high-speed, and high-altitude, and, therefore, require an increased caliber of experience when instructing in the simulator. Since every powered-lift requires a type rating, to avoid being overly expansive, the amendment does not tie the ATP experience requirement for powered-lift to those having a type rating, but instead to what normally triggers a type rating requirement in airplanes and helicopters. Part 142 instructors seeking to instruct in an FSTD representing a powered-lift of 12,500 pounds maximum certificated takeoff weight or less and powered-lift that do not use turbojet engines would not be required to meet the ATP requirements set forth

by § 142.47(a)(5)(ii); these instructors could simply meet the applicable aeronautical experience requirements of § 61.129(e) as set forth in § 142.47(a)(5)(i).

To improve readability of the regulation, the FAA adopts the revisions to § 142.47(a)(5)(ii) in a revised format. The introductory text in § 142.47(a)(5) will require a person to meet at least one of the requirements in paragraphs (i) through (iii). These are the three options currently in paragraph (a)(5)(i) through (iii) but, as subsequently discussed, this final rule adds an exception in new paragraph (a)(5)(iv). Paragraphs (a)(5)(i) and (iii) will retain the current requirement set forth in the regulations, respectively. Paragraph (a)(5)(ii) will require a person to meet the aeronautical experience requirements of §§ 61.159, 61.161, or 61.163, as applicable, in the scenarios set forth by new paragraph (a)(5)(ii)(A) (in an FSTD representing an airplane or rotorcraft requiring a type rating, a powered-lift over 12,500 pounds, or a turbojet powered powered-lift, with one exception) and new paragraph (a)(5)(ii)(B) (in a curriculum leading to the issuance of an ATP certificate or an added rating to an ATP certificate). Section 142.47(a)(5)(iv) will set forth the aforementioned exception to § 142.47(a)(5)(ii)(A). Specifically, new § 142.47(a)(5)(iv) excepts a person employed as an instructor and instructing in an FSTD representing a rotorcraft requiring a type rating from meeting the aeronautical experience requirements of § 142.47(a)(5)(ii) if the person is not instructing in a curriculum leading to the issuance of an ATP certificate or an added rating to an ATP certificate and the person was employed and met the remaining applicable requirements of § 142.47 on March 21, 2025. The FAA notes that exception was proposed in the NPRM but is simply redesignated in the adoption of this final rule.

Finally, the FAA recognizes that a person who obtains a commercial pilot certificate with a powered-lift category rating in accordance with the SFAR will not technically have met the aeronautical experience requirements set forth by § 61.129(e). For example, a pilot will have only completed 35 hours of PIC time in a powered-lift (§ 194.216(a)) rather than 50 hours (§ 61.129(e)(2)(i)).³¹⁰ Under current § 142.47(a)(5)(i), that fully certificated pilot would be required to seek 15 more

hours of PIC time in a powered-lift to meet the aeronautical experience requirements of § 61.129(e)(2)(i). The FAA does not find that a person should be required to attain additional experience after the person has met the regulatory aeronautical experience requirements as set forth in part 61 or through an abbreviated experience regulation (*i.e.*, part 141) and proven proficiency through the practical test. Therefore, this final rule adds the qualification option of simply holding a commercial pilot certificate with the appropriate ratings. The FAA emphasizes that meeting the aeronautical experience requirements as currently required remains an option without holding the certificate itself, as well. For these same reasons, this final rule adds the option to hold an unrestricted ATP certificate with the appropriate ratings to § 142.47(a)(5)(ii).

Finally, NBAA and CAE stated that, normally, part 142 training center instructors do not need to hold a flight instructor certificate or a flight instructor certificate with an instrument rating, but the SFAR requires a powered-lift type rating, instrument-powered-lift rating, a flight instructor certificate, and a flight instructor certificate with an instrument rating. The two commenters noted that if the aircraft is not type-certificated to enable IFR operations, the flight instructor certificate with instrument rating and instrument rating in the aircraft type will not be required. In sum, NBAA and CAE recommended that the FAA should continue the long-time policy that training center instructors do not need to hold the flight instructor certificate or flight instructor certificate with instrument rating provided they hold an ATP certificate.

The FAA agrees with NBAA and CAE that part 142 does not always require a flight instructor certificate or a flight instructor certificate with an instrument rating to instruct,³¹¹ and this final rule does not change the status quo expected of part 142 instructors outside of the previously discussed revisions in § 142.47(a)(5), which do not involve flight instructor certificate requirements. Specifically, this final rule continues to uphold the requirements of § 142.47, as discussed herein. In other words, if instructing in an FSTD for any curriculum, a part 142 instructor is not required to hold a flight instructor certificate. However, under § 142.47(a)(3), a training center instructor providing training in an

³⁰⁸ Pilot Rating Requirements, NPRM, 29 FR 13038 (Sep. 17, 1964). Pilot Rating Requirements, final rule, 30 FR 11903 (Sep. 17, 1965).

³⁰⁹ This corrects a discrepancy made in the 1996 final rule (61 FR 34508, July 2, 1996) whereby the word “airplane” was unintentionally substituted for “aircraft”, excluding rotorcraft complex enough to require a type rating from the ATP experience requirements.

³¹⁰ A similar gap exists for those pilots certificated in accordance with part 141 where a person may be eligible for a certificate after completing an abbreviated number of aeronautical experience hours.

³¹¹ Per § 142.47 a flight instructor certificate is only required if instructing in an aircraft in flight under a part 142 training center.

aircraft in flight must be qualified in accordance with subpart H of part 61, which includes the requirement to hold a flight instructor certificate. As with training in flight in airplanes and rotorcraft conducting at a part 142, flight training in a powered-lift in flight will require the part 142 instructor to hold a flight instructor certificate with the appropriate ratings.

H. Practical Tests

1. Practical Test Equipment and Waiver Authority

Section 61.43 provides the general procedures for a practical test. The FAA recently completed a rulemaking that amended § 61.43 to incorporate the PTSs and ACSs by reference (IBR).³¹² The rule revised § 61.43(a)(1) to delineate successful completion of the practical test as performing the tasks specified in the areas of operation contained in the applicable ACS or PTS. As it pertains to powered-lift, the FAA incorporated six powered-lift ACSs into part 61: (1) ATP and Type Rating for Powered-Lift Category, (2) Commercial Pilot for Powered-Lift Category, (3) Private Pilot for Powered-Lift Category, (4) Instrument Rating—Powered-Lift, (5) Flight Instructor for Powered-Lift Category, and (6) Flight Instructor Instrument for Powered-Lift Category. The six powered-lift ACSs specify the tasks within the given areas of operation that must be accomplished for purposes of receiving a powered-lift category rating, type rating, and/or instrument rating.

Correspondingly, § 61.45 sets forth the required aircraft and equipment for a practical test. Specifically, § 61.45(b) stipulates the equipment, other than controls, required of an aircraft used on the practical test and allows the use of an aircraft with operating characteristics that preclude the applicant from performing all the tasks for the practical test. However, when an applicant for a certificate or rating is unable to perform a required task due to aircraft capabilities, an appropriate limitation is placed on the applicant's certificate or rating. This limitation ensures the pilot cannot act as PIC of an aircraft that has capabilities that are inconsistent with the limitation on the pilot's certificate until the pilot satisfactorily demonstrates the task they have not performed.

Because the FAA will require that all pilots seeking to act as PIC of a powered-lift hold a type rating on their pilot certificate for the type of powered-lift they intend to operate, no need

exists for a limitation should the powered-lift be precluded from performing a task in an ACS. Therefore, the FAA proposed § 194.207(a) to permit an applicant to use a powered-lift that is precluded from performing all of the tasks required for the practical test without receiving a limitation on the applicant's certificate or rating. This would not adversely affect safety because the type-rated pilot could not act as PIC of a different powered-lift type that may perform untested task without completing another practical test in that type of powered-lift first, thereby demonstrating proficiency on the task that had been waived on the prior practical test.

As stated in the NPRM, because there are currently no type-certificated powered-lift, the FAA did not have the requisite information to determine which tasks might be deemed prohibited, unsafe, or incapable of being performed during the aircraft certification and evaluation processes to delineate such tasks in the proposed SFAR, nor was that information available for the IBR rule in the adoption of the six powered-lift ACSs. One commenter addressed the FAA's inability at this time to identify which tasks a powered-lift would be precluded from performing, suggesting that the FAA could address this information gap by speaking with the cadre of V-22, AW-609, V-280, F-35 and AV-8 test pilots and engineers via working groups.

As discussed in section V.B. of this preamble, the U.S. Armed Forces maintains and uses some of the powered-lift referenced by the commenter in military operations. However, no surplus military powered-lift have come into civil operations through the special airworthiness certification process nor does the FAA anticipate surplus military powered-lift to enter civil operations in the near term. Additionally, military aircraft may maintain certain characteristics that are unique to U.S. Armed Forces missions but are omitted in civilian powered-lift. For example, military powered-lift are used for applications ranging from troop and supply transport to attack operations. The technology, operating characteristics, and flight control implementation in military powered-lift may not correspond to the civilian operations anticipated for FAA type certificated powered-lift that are currently in development. Therefore, the information that may be gained by an inquiry into a specific military powered-lift and their operations will likely not result in meaningful or utile insights for determining appropriate

tasks to use or exclude in ACS development.

The FAA notes that this information continues to be unavailable to warrant making any permanent change to the final rule or the powered-lift ACSs at this time.³¹³ The FAA maintains that, because the tasks that a powered-lift may be incapable of performing and thus require waiver, as subsequently discussed, involve a fact-specific inquiry particular to a powered-lift type, the tailored type certification and FSB processes³¹⁴ are best suited to provide such information. Powered-lift types will be evaluated under the existing FSB process, which will determine the requirements for a pilot type rating, develop training objectives for the type rating, and conduct initial training for the manufacturer's pilots and FAA inspectors. The FSB would identify the operational limitations for the powered-lift type and ascertain what tasks in the ACS are inapplicable.³¹⁵ The FAA proposed to address training and testing on tasks a powered-lift is precluded from performing in §§ 194.207(b) and (c) and 194.239(a). The FAA did not receive comments on these provisions and adopts them as proposed, as subsequently summarized.

Therefore, because § 61.43(a) requires a pilot to demonstrate all tasks within the applicable ACS, the waiver authority in § 194.207(b) will account for the tasks inapplicable to a specific type of powered-lift. Waived tasks will be set forth in the limitations section of a designee's Certificate and Letter of Authority (CLOA) specific to each type of powered-lift in which the designee is authorized to conduct a practical test.

To account for the requirement that an applicant for a certificate or rating must receive and log flight training on

³¹³ Should information become available during the pendency of the SFAR revealing a certain task or element in the ACS as inapplicable to all powered-lift, the FAA could revise the ACSs through the rulemaking process at that time.

³¹⁴ The FSB is responsible for specification of minimum training, checking, currency, and type rating requirements, if necessary for U.S.-certificated civil aircraft. The Board members are drawn from the FAA's operations personnel (AED, headquarters, and Flight Standards field offices). See AC 120-53 as revised, Guidance for Conducting and Use of Flight Standardization Board Evaluations.

³¹⁵ The FAA understands there may be a scenario in which the type certification and FSB processes reveal additional tasks are necessary for certain powered-lift type ratings based on the powered-lift's unique characteristics. Should the FSBR and type certification process reveal any additional tasks that are not accounted for in the ACS but are essential to the safe operation of the specific type of powered-lift, the FAA may set forth these tasks in a type-specific appendix to the powered-lift ACSs, which would be incorporated by reference under § 61.14 and appendix A to part 61 in accordance with the Administrative Procedure Act.

the applicable areas of operation that apply to the aircraft category and class rating sought,³¹⁶ § 194.207(c) will relieve an applicant for a private pilot certificate or commercial pilot certificate with a powered-lift category rating concurrently with a powered-lift type rating³¹⁷ from the requirement to receive flight training on a task specified in an area of operation if the powered-lift is not capable of performing the task, provided the FAA has issued waiver authority for the task in accordance with the SFAR.

Similarly, part 141 pilot schools align their curriculum content for the issuance of a commercial pilot certificate with a powered-lift category rating with the areas of operation in part 61 via appendices to part 141.

Therefore, under § 194.239(a), a part 141 pilot school seeking approval of a course in a powered-lift resulting in a private or commercial pilot certificate will be permitted to waive training on a task specified in an area of operation if the powered-lift to be used in the course is not capable of performing the task and the FAA has issued waiver authority for that task in accordance with § 194.207(b).

The FAA also recognized that waived tasks may create a unique situation for those pilots seeking to serve as SIC in powered-lift operations. Section V.C. of this preamble discusses SIC considerations.

2. Permit Applicants To Take a Powered-Lift Type Rating Practical Test Without Concurrently Obtaining an Instrument-Powered-Lift Rating (§ 61.63(d))

Section 61.63(d) contains the eligibility requirements for a person seeking an aircraft type rating (on a certificate other than an ATP certificate), which would be directly applicable to powered-lift rating applicants. Specifically, § 61.63(d)(1) requires an applicant for an aircraft type rating or an aircraft type rating to be completed concurrently with an aircraft category rating to hold or concurrently obtain an appropriate instrument rating, except as provided in § 61.63(e). Additionally, § 61.63(d)(4) requires the applicant to perform the type rating practical test in actual or simulated instrument conditions, except as provided in § 61.63(e). Under § 61.63(e),

an applicant who provides an aircraft that is not capable of the instrument maneuvers and procedures required on the practical test may apply for the type rating or a type rating in addition to the category rating, but the type rating will be limited to “VFR only.” The NPRM proposed two circumstances under which the applicant should not be required to hold or concurrently obtain an appropriate instrument rating, subsequently discussed.

i. Applicants for an Initial Powered-Lift Type Rating To Be Obtained Concurrently With a Powered-Lift Category Rating

The FAA proposed, and adopts in this final rule, that all powered-lift would require a type rating to operate, as discussed in section V.A. of this preamble. Under the FAA’s current certification framework, an applicant for a powered-lift type rating would normally be required to take three practical tests concurrently: the practical tests for (1) a powered-lift type rating, (2) powered-lift category rating, and (3) an instrument-powered-lift rating because there would be no powered-lift for which a type rating is not required (*i.e.*, allowing the pilot to obtain a powered-lift category rating or instrument rating prior to the type rating).³¹⁸ Therefore, to obtain all three ratings, the applicant would be required to satisfactorily complete three practical tests concurrently. The FAA did not propose any change that would allow an applicant to apply for their initial powered-lift type rating without concurrently obtaining a powered-lift category rating. Rather, the FAA proposed in § 194.211(b)(1) to enable an applicant to take the instrument-powered-lift rating independent from the practical tests for the powered-lift category and type ratings.

The FAA did not propose to amend § 61.63(e), which sets forth the requirements for aircraft not capable of instrument maneuvers and procedures. Therefore, if a powered-lift is not capable of performing instrument maneuvers and procedures, an applicant for a type rating in that powered-lift

may obtain a “VFR only” limitation in accordance with § 61.63(e).

To provide flexibility consistent with that provided to applicants for an airplane or helicopter type rating,³¹⁹ the FAA proposed § 194.211(b) to allow an applicant for a powered-lift type rating to take the type rating practical test independent of the practical test for the instrument-powered-lift rating. Proposed § 194.211(b)(2) would also relieve an applicant from being tested on the areas of operation listed in § 61.157(e) that consist of performing instrument maneuvers and procedures in actual or simulated instrument conditions on the type rating practical test. As stated in the ATP and Type Rating for the Powered-Lift Category ACS, the applicant seeking a “VFR only” type rating would conduct tasks that are normally performed by reference to the instruments using visual references. Upon successful completion of the practical test for the type rating, the applicant would receive the powered-lift type rating with a “VFR only” limitation on their pilot certificate.

The purpose of issuing the “VFR only” type rating to an applicant who is applying for a powered-lift type rating concurrently with a powered-lift category rating is to reduce the burden on the applicant by enabling them to take the instrument rating practical test at a later date. Because the applicant will have obtained the 3 hours of flight training in preparation for the instrument rating practical test within the 2 calendar months preceding the month of the practical test for the type rating and category rating, the FAA found it reasonable to propose § 194.211(b)(3) to require the applicant to obtain the instrument-powered-lift rating and remove the “VFR only” limitation for the type rating within 2 calendar months from the month in which the applicant passes the type rating practical test.³²⁰ Under

³¹⁹ Under the current certification regime, a person seeking an airplane or helicopter type rating would normally already hold the required instrument rating. However, these persons could also seek to add the associated instrument rating at the same time as a type rating if they didn’t currently hold the associated instrument rating. In the case of an initial powered-lift certification the applicant would need to take the private or commercial test, the instrument rating test and the type rating test all at once. The SFAR removes the requirement to take all three tests at once, allowing the instrument rating to be taken at a later date.

³²⁰ The FAA notes that under current § 61.133(b)(1), a person who applies for a commercial pilot certificate with a powered-lift category rating would receive a limitation if that person does not hold an instrument-powered-lift rating. The limitation would prohibit the

³¹⁶ §§ 61.107(a), 61.127(a).

³¹⁷ The FAA does not find relief is needed in the case of a person who applies for an aircraft type rating added to an ATP certificate (or a type rating concurrently completed with an ATP certificate) because § 61.157(b) requires flight training from an authorized instructor on the areas of operation that apply to the aircraft type rating.

³¹⁸ Under § 61.63(e)(1), an applicant for a type rating or a type rating in addition to an aircraft category and/or class rating who provides an aircraft that is not capable of the instrument maneuvers and procedures required on the practical test may apply for the type rating, but the type rating will be limited to “VFR only.” Section 61.63(e)(1)(ii) sets forth how to remove the limitation. In this case, the applicant would only need to successfully accomplish two practical tests (*e.g.*, the practical test for the powered-lift category rating and the practical test for a powered-lift type rating) because of the exception set forth in current § 61.63(d)(1).

§ 194.211(b)(5), if a person does not remove the limitation within 2 calendar months from the month in which the person completed the type rating practical test, then the powered-lift type rating for which the “VFR only” limitation applies will become invalid for use until the person removes the limitation in accordance with § 194.211(b)(4) (*i.e.*, the person may no longer exercise the privileges associated with the type rating and the “VFR only” limitation).

To remove the “VFR only” limitation, proposed § 194.211(b)(4) would require the pilot to: (1) pass an instrument rating practical test in a powered-lift in actual or simulated conditions, and (2) pass a practical test in the powered-lift for which the “VFR only” limitation applies on the appropriate areas of operation listed in § 61.157(e) that consist of performing instrument maneuvers and procedures in actual or simulated instrument conditions. The FAA recognized that there would exist several overlapping tasks required for an instrument rating and the instrument tasks required for a type rating in order to remove the “VFR only” limitation. Therefore, proposed § 194.211(d) permits the pilot to perform the task a single time provided it is performed to the highest standard required for the task.³²¹

The proposed language in § 194.211(b)(4) concerning the completion of the type rating practical test differs slightly from the language in § 61.63(e)(1)(ii)(B), in that it permits a person to remove a “VFR only” limitation for that aircraft type after the applicant passes a practical test in that type of aircraft on the appropriate instrument maneuvers and procedures in § 61.157. The FAA’s proposed language in § 194.211(b)(4) clarifies that the cross-reference to § 61.157 refers to the areas of operation of which the practical test for a type rating is

commercial pilot from carrying passengers for hire in powered-lift on cross-country flights in excess of 50 nautical miles or at night.

³²¹ For example, a person would be required to perform precision approach procedures on both the instrument rating practical test and the type rating practical test. The draft Instrument Rating—Powered-Lift ACS requires the applicant to perform the precision approach procedure and to maintain a stabilized final approach from the final approach fix (FAF) to DA/DH allowing no more than 3/4-scale deflection of either the vertical or lateral guidance indications and maintain the desired airspeed ± 10 knots. The draft ATP or Type Rating Powered-Lift Category ACS also requires the applicant to perform the precision approach procedure, but to a higher standard (*i.e.*, the applicant must maintain a stabilized final approach from the Final Approach Fix (FAF) to DA/DH allowing no more than 1/4-scale deflection of either the vertical or lateral guidance indications and maintain the desired airspeed ± 5 knots).

comprised (*i.e.*, specifically the areas of operation listed in § 61.157(e)(3)).³²² Furthermore, the FAA notes that, pursuant to § 61.63(d)(4), the type rating practical test must be performed in actual or simulated instrument conditions. For consistency with current § 61.63(d)(4), proposed § 194.211(b)(4)(ii) would make clear that the practical test required to remove the “VFR only” limitation for a powered-lift type rating, which is a component of the powered-lift type rating practical test, must be completed in actual or simulated instrument conditions.³²³

To note, the FAA did not propose to amend § 61.63(d)(1). Rather, § 194.211 simply adds an option in the SFAR for applicants to take the instrument rating practical test separate from the practical tests for a powered-lift type rating and a powered-lift category rating. Thus, applicants for a powered-lift type rating would still have the option to take all three practical tests concurrently pursuant to § 61.63(d)(1).

The FAA received several comments on this proposed framework.

GAMA,³²⁴ CAE, Eve, and a Joint letter from AOPA, GAMA, HAI, NATA, NBAA, and VFS largely opposed the FAA’s proposal, noting that the SFAR effectively creates a powered-lift instrument rating requirement by requiring the “VFR Only” limitation to be removed within 2 calendar months. Although CAE, Eve, and the joint letter commenters generally supported the option for a private pilot to retain the

³²² The areas of operation for a person seeking a powered-lift type rating are contained in § 61.157(e). A person who holds a type rating with a “VFR only” limitation is required to pass the portion of the type rating practical test that includes the instrument maneuvers and procedures (*e.g.*, the portion of the practical test that was not previously completed). Therefore, only certain areas of operation listed in § 61.157(e) are appropriate. The ATP and Type Rating for Powered-Lift Category ACS specifies which areas of operation and which tasks must be completed for the removal of a “VFR only” limitation.

³²³ See also § 61.157(b)(3).

³²⁴ GAMA formally resubmitted a letter sent to the FAA on July 21, 2022, where GAMA provided recommendations for the FAA to consider. In reference to existing § 61.3(e)(1) through (4), GAMA suggested that an appropriate instrument rating should include either an airplane or helicopter instrument rating plus type specific instrument training. Due to the wide variety of aircraft within the powered-lift category, GAMA recommended that type ratings should have a VFR only operating limitation unless the approved course of training is certified by the authority to include IFR operations and VFR On-top. A VFR only operating limitation should be attached to the applicable powered-lift type rating. Recent instrument flight experience must be maintained in the type. GAMA also recommended the exact same reasoning for allowing for a VFR type and noted §§ 61.57 and 61.58. See *FAA–2023–1275–0086 Attachment GAMA23–45A1-Recommendations-Powered-Lift-SFAR–220721*.

VFR only limitation, they specifically opposed the requirement for a pilot to remove this rating in order to continue to exercise commercial pilot privileges, citing that proposal was inconsistent for pilots exercising the privileges of a private or commercial pilot certificate if the pilot were not operating under IFR rules. To support their position, these commenters noted that certain helicopter pilots conducting VFR only operations under part 135 are not required to hold an instrument rating in accordance with § 135.243(b)(4). CAE and the joint commenters drew parallels that because powered-lift have vertical takeoff and landing capabilities, they should also not be required to have an instrument rating. These commenters argued that a type rating practical test would also mitigate any concerns because the ATP ACS would ensure that the pilot would have enough instrument training and proficiency specific to the powered-lift type in which the rating is sought.

CAE specifically argued that a separate instrument-powered-lift rating is unnecessary since many instrument skills and knowledge items are agnostic to the aircraft category in which they take place. CAE also argued that the safety objective for VFR only items is to exit inadvertent IMC conditions in which an airplane or helicopter instrument rating would be sufficient to prepare a pilot for in a powered-lift. They also argued that under current regulations, an airplane instrument rating serves as an instrument rating for glider pilots in accordance with § 61.3(e)(3). L3Harris echoed this sentiment and recommended the FAA allow for an instrument rating held in any category to be sufficient so long as a pilot holds an airplane category rating with instrument-airplane or instrument-helicopter rating. FSI recommended the FAA delete the VFR only requirement for a commercial pilot seeking a powered-lift rating because it is too restrictive and would not allow the pilot to build time and experience in the aircraft. They further suggested that the pilot would continue to build valid experience while operating in VFR conditions.

First, the FAA notes that currently a private pilot that receives a type rating on an airplane that requires a type rating (large or turbojet powered), for example, must either hold an instrument rating or concurrently receive an instrument rating at the time of the practical test in accordance with § 61.63(d). Additionally, if the aircraft is not capable of instrument maneuvers and procedures the applicant for a type rating may be issued a VFR only

limitation in accordance with § 61.63(e). The FAA also contends that the proposed regulation aligns with the status quo for private pilots expected to receive a type rating and notes that § 194.209(c) allows for a private pilot to indefinitely hold a VFR only rating on his or her pilot certificate.

The FAA disagrees that allowing for a pilot seeking to operate a powered-lift during commercial revenue operations to indefinitely hold a VFR only limitation would be in the interest of safety. Furthermore, as discussed in section V.J.5.ii. of this preamble, the FAA has determined that an instrument rating is necessary in VFR powered-lift operations to ensure that the pilot has the necessary knowledge and skills to safely navigate and exit an emergency involving an inadvertent instrument meteorological condition (IIMC). In general, many accidents result when pilots who lack the necessary skills or equipment to fly in marginal VMC or IMC attempt flight without outside references.

When considering the capabilities of a powered-lift, the FAA notes that, similar to a helicopter, a powered-lift has the ability to conduct off airport operations. Therefore, a pilot operating a powered-lift would encounter the similar situations leading to IIMC when operating a powered-lift in off-airport operations. As it has previously found with helicopter ambulance operations,³²⁶ the FAA has determined that a pilot operating a powered-lift who receives an instrument rating is better equipped to maintain situational awareness and maneuver a powered-lift into a safe environment when encountering IIMC. Moreover, as further discussed in section V.L. of this preamble, the FAA noted the cruise profile and its similarities in speed and operation to an airplane. Further, the FAA recognized that although helicopter operations are permitted with pilots who do not hold an instrument rating, helicopters that experience IIMC account for 15% of fatal accidents behind inflight loss of control and low

³²⁵ For powered-lift that are not large aircraft or turbojet-powered, the FAA intended to seek comment on whether it should consider allowing a pilot after the 2 calendar months had elapsed to continue to exercise commercial pilot privileges. Although the FAA errantly referenced private privileges in this solicitation for comment, the commenters widely commented on what the FAA intended to seek comment on and thoroughly commented on whether the FAA should allow for the limitation to be removed, with emphasis on allowing for the holder of a commercial pilot certificate to indefinitely hold a VFR only rating during commercial operations.

³²⁶ 79 FR 9932, 9957 (Feb. 21, 2014), adding § 135.603 requiring an instrument rating for helicopter ambulance pilots.

altitude operations object strikes.³²⁷ High profile accidents involving Hawaii Air Tour operations³²⁸ have most recently resulted in many recommendations made by the NTSB to the FAA and the USHST, and the FAA is considering future rulemaking in this area.³²⁹ Notably, because the requirement to hold an instrument rating or concurrently obtain one applies to aircraft requiring type ratings, it does not apply to helicopters that do not require a type rating. However, all powered-lift will require a type rating and, as such, the pilot will be required to hold an instrument-powered-lift rating unless, as previously stated, the aircraft is not capable of instrument maneuvers and procedures.

The FAA disagrees with commenters that suggested that holding any instrument rating should be sufficient and that an instrument rating specific to powered-lift is unnecessary. For reasons similar to those discussed in section V.F.2. of this preamble regarding the necessity of a powered-lift category rating, the FAA finds that an instrument rating specific to powered-lift category is necessary to ensure the applicant is sufficiently qualified to perform instrument flight procedures in a powered-lift.

³²⁷ According to the U.S. Helicopter Safety Team (USHST) data, the count of U.S. fatal helicopter accidents by calendar year where due to IIMC was assigned as the single “priority” occurrence category in the event. For context, in the 10 years from 2009–2018, IIMC was the 3rd highest occurrence category, accounting for about 15% of the U.S. fatal helicopter accidents. Among all occurrence categories, it only trailed (1) Loss of Control—Inflight (22%) and (2) Low Altitude Operations Object Strikes (19%).

³²⁸ Kailua Neighborhood Board commented to the rule regarding concerns with tour helicopters and other small aircraft increasing operations over densely populated areas causing concern for public safety. The neighborhood board urged the FAA to consider NTSB recommendations for Air Tour Companies operating under 14 CFR part 135. While the FAA finds global changes to air tours out of scope of this rulemaking, the FAA does note that, as described in this section, pilots operating air tours in powered-lift will be required to hold an instrument rating as part of this SFAR.

³²⁹ The USHST is a volunteer group of US government and industry stakeholders formed in 2013 to improve the safety of civil helicopter operations. Its efforts include analyzing NTSB helicopter accident data, assigning a single occurrence category to best characterize each event, and using the results of its analysis to prioritize intervention strategies to reduce fatal accidents (USHST 2017). The USHST’s most recent analysis included data from 198 fatal helicopter accidents between 2009 and 2018. Although this review ranked inadvertent flight into IMC (also referred to internationally as unintended flight into IMC) as the third-most common category, the USHST noted that inadvertent flight into IMC may be the precursor to accidents involving in-flight loss of control (which ranked first), low-altitude operations (which ranked second), or CFIT (which ranked fifth) (USHST 2021b). During a previous review (which included data between 2009 and 2013), inadvertent flight into IMC ranked second (USHST 2017).

Section 194.215(a) requires persons seeking to meet the alternate requirements for a powered-lift category rating to hold an instrument-airplane or -helicopter rating ensuring these persons have experience operating an airplane or helicopter under IFR and have demonstrated proficiency on the instrument rating practical test. These prerequisites for the alternate pathway ensure that the initial cadre of powered-lift pilots have a solid foundational skill set and extensive experience prior to adding powered-lift ratings to their commercial pilot certificate. While these prerequisites ensure the foundational skills and extensive experience, holding an instrument-airplane rating or an instrument-helicopter rating does not ensure that an applicant seeking to meet the alternate pathway requirements has the necessary skills to proficiently accomplish instrument procedures in a powered-lift specifically.

While there is some overlap in the practical tests for instrument-airplane ratings and instrument-helicopter ratings, there are also some significant differences that would result in a “gap” in the knowledge, skills and experience of pilot operating a powered-lift if a powered-lift pilot were permitted to hold “any” instrument rating. For example, an airplane pilot may be required to perform a circling approach to landing (*i.e.*, the pilot is not approaching the runway to which they were performing the instrument approach straight on). As a result, that pilot is required to fly the instrument procedures to higher minimums (visibility and cloud clearance) because the maneuver must be performed with reference to the airport environment and increases pilot workload. A helicopter pilot is not tested on this maneuver on the instrument rating test because they are not subject to the same situation of high-speed approaches, and helicopters do not need a runway as they are capable of landing on the ramp. If a powered-lift pilot held only an instrument-helicopter rating, this would result in a gap in experience and proficiency in instrument approaches for powered-lift which are capable of runway approaches.

As another example, unusual attitude recoveries are unique to each category of aircraft and are tested in each when an applicant seeks an instrument rating in a new category other than what is held on their pilot certificate. Nose-high attitudes present the pilot with a decreasing airspeed and nose-high attitude which if not corrected could result in adverse conditions or even loss of control in instrument conditions. This situation requires different

instrument procedures to be performed depending on the aircraft being operated. In an airplane, the pilot must apply forward elevator pressure to lower the nose and prevent a stall while simultaneously increasing power and leveling the wings. If this airplane recovery procedure were attempted in a helicopter experiencing nose-high attitude, it would place the helicopter in a potentially hazardous situation. Applying abrupt forward cyclic to correct the attitude without consideration could put the helicopter in a Low G condition which in certain helicopter rotor systems results in a catastrophic mast bumping situation that is often deadly.

In a helicopter, the recovery procedure for a nose high unusual attitude requires the pilot to correct the bank and pitch simultaneously while avoiding applying abrupt forward cyclic to correct the attitude. Since a powered-lift is a hybrid aircraft, an unusual attitude recovery might look like the recovery in an airplane; however, it might also look like an unusual attitude recovery in a helicopter. Alternatively, it may look completely different depending on the powered-lift's capabilities. Given this, the practical test for an instrument-powered-lift rating encompasses the necessary tasks specific to a powered-lifts operational capabilities and requires a pilot operating a powered-lift under IFR to demonstrate the proficiency in instrument procedures applicable to powered-lift. Moreover, the FAA recognizes that a person would encounter several overlapping tasks when taking the powered-lift type rating practical test and the instrument-powered-lift rating practical test concurrently. Given this, as discussed, the FAA permits in 194.211(d) an applicant person to perform overlapping tasks on the powered-lift type rating practical test and the instrument-powered-lift rating practical test a single time provided the task is performed to the highest standard required for the task. Therefore, when the tests are taken concurrently, there are minimal extra tasks that an applicant must perform.

Additionally, the FAA disagrees with commenters suggesting FAA had precedent in recognizing instrument ratings for another category because of the requirements of § 61.3(e)(3) (permitting a person to act as PIC of a glider under IFR or in weather conditions less than the minimums prescribed for VFR flight if the pilot holds, among other requirements, an instrument-airplane rating). The FAA proposed a "glider cloud-flying rating"

in 1969³³⁰ because advocate groups requested the FAA to more easily facilitate cloud flights by glider pilots. The FAA proffered that the operation of a glider within the clouds differs from instrument operations in powered aircraft and held that "glider cloud-flying" primarily only utilized the vertical components associated with a cloud formation to sustain flight within the clouds or to gain altitude for the continuance of a VFR gliding flight. The FAA noted that navigation by reference to instruments or radios aids would not normally be involved. The FAA further stipulated that, although it was trying to relieve a perceived burden by requiring a "full instrument rating," instrument operations in powered aircraft were far more complex than what glider cloud flying would entail. The glider pilot would only be concerned with attitude and speed control, whereas the pilot of a powered aircraft is concerned with other matters such as navigation, position reporting, altitude control, power settings, holding procedures, instrument letdown, and instrument approaches. Although the FAA proposed these requirements, the FAA later withdrew the proposal.³³¹

The FAA disagrees that comparing credit of an instrument rating in the glider scenario is a basis for granting relief from a powered-lift instrument rating. A powered-lift is a powered aircraft and would not be utilizing this approach to gain altitude to continue on to VFR gliding flight. An instrument rating would be sufficient in the circumstances currently permitted around § 61.3(e)(3) but not those in which commenters were stipulating that were applicable to powered-lift.

Another commenter suggested that the requirement to remove the VFR only restriction within 2 calendar months is too restrictive. The FAA disagrees with this as normally an applicant would be required to meet all experience requirements and receive the instrument rating simultaneously with the type rating. The purpose of allowing the two months to acquire the instrument rating is to provide some relief for the pilot applicant so they do not have to take an initial category, instrument, and type rating practical test at the same time.

Eve suggested that the requirement to remove the VFR limitation should not be applicable to commercial pilots and that they should be able to operate powered-lift VFR only.

As noted in section V.H.2.i of this preamble, the FAA provided this relief to allow an applicant to accomplish the

powered-lift instrument rating at a later date. As discussed in section V.A. of this preamble, all powered-lift will require a type rating and therefore be subject to holding an instrument rating. In limited circumstances where the powered-lift is not capable of instrument maneuvers and procedures, the FAA notes that, as with other categories of aircraft, § 61.63(e) does not require an instrument rating when a type rating is sought in an aircraft that is not capable of instrument maneuvers and procedures. If an applicant uses a powered-lift that is not capable of instrument maneuvers and procedures for a practical test, then that applicant will receive a VFR only limitation that does not need to be removed as specified in § 61.63(e).³³²

Eve further suggested an amendment to § 61.63 that would only require those who are applying for a type rating in a turbojet powered or large aircraft to hold an instrument rating.³³³ The FAA disagrees with this suggested change; an aircraft that requires a type rating and is not turbojet powered or large but is complex and fully capable of operating under IFR should require a pilot who operates this aircraft to hold an instrument rating for that category of aircraft to ensure a standard level of competence and safety across all type-rated aircraft operating in the NAS.

Eve commented further that, because some aircraft will be limited in range and endurance, a powered-lift may be limited in such a way that it wouldn't be practically or operationally capable of instrument maneuvers or procedures required on the practical test even though it may be equipped to do so. Eve suggested a change to § 61.64(f)(1) to alter the requirements to complete an instrument approach only to those aircraft capable of instrument flight. The FAA finds that this concept is contradictory. Specifically, Eve details that the aircraft is equipped for instrument flight but limited to VFR only by the AFM. The aircraft's operational limitations in the AFM are

³³² The FAA notes that if a powered-lift is equipped according to § 91.205(d), it would be capable of performing instrument maneuvers and procedures required under the instrument practical test, even if the powered-lift is not certified for IFR or certain IFR-specific functions are disabled.

³³³ Although the FAA is taking a similar approach in § 142.47 to delineate changes similar to the commenter's suggestion, the FAA is not taking that same approach here in the interest of safety. If an applicant was receiving instruction in an aircraft, they would need to hold pilot certificates in accordance with part 61. Section 142.47 narrowly applies to personnel giving instruction in a simulator under different parameters. The FAA chose not to alter according to Eve's suggestion and continue with the current regulatory framework provided for in § 61.63(d)(1).

³³⁰ 34 FR 6484.

³³¹ 37 FR 14239.

not pertinent to the practical test. For example, a Robinson R-44 helicopter can be equipped with the necessary avionics to successfully complete an instrument rating practical test. However, this aircraft is not IFR-certified and may not be operated under IFR or in weather conditions less than the minimums prescribed for VFR (*i.e.*, IMC).

This situation is no different for a powered-lift which is equipped for instrument flight but operationally limited. The practical test could be completed, and an instrument rating issued in the aircraft even though it could never be operated under IFR. Additionally, the FAA notes that many powered-lift will seek to operate on expedited departures in which the frequency of departure dictates a “departure procedure” to ensure separation of aircraft. This skill is congruent with that required of a pilot who holds an instrument rating and is capable of conducting these maneuvers with proficiency.

Finally, Archer requested the FAA clarify what “not capable of instrument maneuvers and procedures means.” Section 61.45(d) states: “[a]n applicant for a practical test that involves maneuvering an aircraft solely by reference to instruments must furnish: (1) equipment on board the aircraft that permits the applicant to pass the areas of operation that apply to the rating sought; and (2) a device that prevents the applicant from having visual reference outside the aircraft, but does not prevent the examiner from having visual reference outside the aircraft, and is otherwise acceptable to the Administrator.” For further clarification an applicant would then review the required approaches and maneuvers required by the applicable ACS for the instrument rating sought. For example, the Instrument Rating Powered-Lift ACS requires the applicant to complete two different non-precision approaches and a precision approach. If the aircraft does not have the equipment installed to conduct those approaches, it would not meet the requirements. It would be impossible to codify in the regulation the exact equipment necessary to complete an instrument rating practical test due to the various avionics installations and broad number of approach types available.

ii. Obtaining Powered-Lift Type Ratings With “VFR Only” Limitations on a Private Pilot Certificate

In light of the current regulatory framework for private pilots with airplane and helicopter ratings, the limited privileges associated with the

private pilot certificate, and the underlying reasons for requiring type ratings for all powered-lift, the FAA proposed in § 194.211(b)(6) to except certain private pilots from the requirement to remove the “VFR only” limitation set forth in proposed § 194.211(b)(3). Specifically, a private pilot who obtains a “VFR only” type rating for a powered-lift that is less than (or equal to) 12,500 pounds maximum certificated takeoff weight and not turbojet-powered would not be required to remove the “VFR only” limitation within the 2-calendar month time period (or any specific time frame).³³⁴

In addition to proposing an exception in proposed § 194.211(b)(6) that would enable private pilots of certain powered-lift to retain the “VFR only” type rating indefinitely, the FAA proposed § 194.211(c)(1), which would allow for these private pilots to obtain additional “VFR only” type ratings on their private pilot certificates, provided the powered-lift are not large or turbojet-powered. Consistent with current § 61.63(d)(4) and (e) and proposed § 194.211(b)(2), the applicant would not be required to perform the VFR only type rating practical test in actual or simulated instrument conditions.

While the FAA did not propose to require private pilots to remove “VFR only” limitations when those limitations apply to powered-lift that are not large aircraft and not turbojet-powered, the FAA proposed rule language that would provide these private pilots with the option to do so. A private pilot would remove the “VFR only” limitation in the same manner as discussed in this section (*i.e.*, through proposed § 194.211(b)(4)).

Outside of comments pertaining to the VFR Only limitation as already addressed, the FAA did not receive comments on § 194.211, the FAA adopts the section as proposed.

iii. Clarification of Requirements for a Practical Test in an Aircraft That Requires a Type Rating

The FAA proposed to clarify certain regulations to clearly communicate that a person may not furnish an aircraft that

requires a type rating (or an FSTD representing an aircraft requiring a type rating) for the practical test without meeting the eligibility requirements for a type rating³³⁵ and applying for a type rating (unless the person already holds the type rating).³³⁶ These amendments prevent situations where applicants seek category or class ratings in an aircraft that requires a type rating (or corresponding FSTD) without fully demonstrating mastery of the aircraft furnished for the practical test. The proposal included amendments in part 61 to §§ 61.39(a)(3), 61.43(g), and 61.47(d).

First, the FAA proposed to revise paragraph § 61.39(a)(3), which requires a person applying for a practical test to meet the training and aeronautical experience for the certificate or rating sought through the creation of two subparagraphs: (i) and (ii). Section 61.39(a)(3)(i) will retain the language in paragraph (a)(3). New subparagraph (a)(3)(ii) would require an applicant seeking an initial category and class rating, if a class rating is required, on a private, commercial, or ATP certificate in an aircraft that requires a type rating (or an FSTD that represents an aircraft that requires a type rating) to either meet the eligibility requirements for a type rating in that aircraft or already hold that type rating on the person’s pilot certificate. In other words, regardless of whether an applicant tests in an aircraft or tests in an FSTD, if the applicant furnishes an aircraft (or FSTD representing an aircraft) that requires a type rating for the practical test, then the applicant must be eligible for the type rating and apply for the type rating practical test unless the applicant already holds the type rating.

Second, the FAA proposed new § 61.43(g) to clarify that a practical test for an ATP certificate with category and class ratings (if a class rating is required) in an aircraft that requires a type rating, or in a corresponding FSTD, includes the same tasks and maneuvers as a practical test for a type rating. This proposed change would foreclose the concept that a lesser test can be administered for category and class ratings at the ATP certificate level.

Third, the FAA proposed new § 61.47(d) to restrict an examiner from

³³⁴ A private pilot has limited privileges compared to a commercial pilot. Current § 61.113(a), which sets forth private pilot privileges and limitations, serves as a sufficient safeguard to ensure an appropriate level of safety. Specifically, a person who holds a private pilot certificate is generally prohibited from acting as PIC of an aircraft that is operating for compensation or hire, or that is carrying passengers or property for compensation or hire. Therefore, a private pilot with a “VFR only” type rating would not be permitted to operate the powered-lift for compensation or hire or carry persons or property for compensation or hire.

³³⁵ To be eligible for a type rating practical test, a pilot must receive training on the areas of operation listed in § 61.157(e) that apply to the aircraft type rating. §§ 61.63(d)(2) and 61.157(b). The detailed tasks associated with each area of operation are provided in the applicable ATP and Type Rating ACS.

³³⁶ The FAA inadvertently proposed regulatory language that would have revised § 61.64(a)(1). This proposed language is not adopted in the final rule as the proposal was erroneous.

conducting a practical test for the issuance of an initial category and class rating (if a class rating is required) in an aircraft that requires a type rating (or corresponding FSTD) to an applicant who does not already have the type rating unless, first, the applicant meets the eligibility requirements for a type rating³³⁷ and, second, the practical test contains the tasks for a type rating specified for the areas of operation at the ATP certificate level. The FAA also proposed to revise the heading of § 61.47 to more accurately describe the regulations set forth in the section.

The NPRM specifically noted that, in the case of an airplane or rotorcraft, an applicant retains the option of furnishing an aircraft that does not require a type rating if the applicant seeks only category and class ratings. For powered-lift, which as proposed would all require type ratings, an applicant would be foreclosed from seeking a powered-lift category rating without concurrently obtaining a type rating.

The FAA received one clarifying question pertaining to the trio of amendments. AIR VEV requested clarification regarding the language in § 61.39 as to how it would be possible to hold a type rating prior to issuance of an initial category. The FAA notes this is not currently permitted through part 194 or other regulations. If a person seeks a type rating, it must be obtained concurrently with the associated category for which the type rating is applied.³³⁸ Therefore, an applicant for a type rating in a powered-lift will need to concurrently obtain the powered-lift category. The FAA proposed the verbiage in § 61.39(a)(3)(ii) to address a situation where a person would hold, for example, a commercial pilot certificate with a powered-lift category rating and type rating. The person then seeks an ATP certificate with a powered-lift category rating. The person would already hold the type rating on their commercial pilot certificate, which would meet the latter half of the regulation in question.

I. Miscellaneous Amendments

1. Aeronautical Experience for Private Pilot Applicants (§ 61.109(e)(5))

Section 61.109 provides the aeronautical experience requirements an applicant must meet to be eligible for a private pilot certificate specific to the respective category and class, if

applicable, rating sought. For a powered-lift category rating, an applicant must meet the requirements in § 61.109(e), which includes 10 hours of solo flight time in an airplane or a powered-lift.³³⁹ However, in light of the different operating capabilities of airplanes compared to powered-lift, the FAA concluded that the skills acquired during solo flight time in an airplane are not interchangeable with the skills acquired during solo flight time in a powered-lift, which are necessary to obtain proficiency.³⁴⁰ Therefore, the FAA proposed to amend § 61.109(e)(5) to require an applicant for a private pilot certificate with a powered-lift category rating to obtain 10 hours of solo flight time specifically in a powered-lift. In addition to providing an adequate level of safety, requiring the applicant to obtain solo flight time in the category of aircraft for which the rating is sought would ensure consistency with the aeronautical experience requirements in § 61.109 that apply to persons seeking airplane and helicopter ratings. The FAA adopts the revision to § 61.109(e)(5) as proposed and responds to comments in the following sections.

First, HAI generally expressed that 10 hours of solo time in each model of powered-lift is problematic for practical reasons and time should be allowed to be logged in a helicopter. The FAA notes that each PIC of a powered-lift must, as adopted by this final rule, have a type rating on their certificate, which will require training in the specific type of powered-lift the PIC seeks to operate. However, § 61.109(e) sets forth the requirements for a private pilot certificate with a powered-lift category rating. Neither the current regulations nor the regulations as adopted by this final rule require 10 hours of solo time in each model of powered-lift. Rather, § 61.109(e) will simply require that an applicant for a private pilot certificate must have 10 hours of solo flight time in a powered-lift. This requirement broadly references powered-lift as a category of aircraft and does not narrowly scope the 10 hours to a specific type of powered-lift. The same concept applies to the requirements for airplanes and helicopters. The 10 hours of solo time for airplane single-engine and helicopter ratings by § 61.109(a) and (c) must be completed in the category

and class of aircraft for which the rating is sought, and, similarly, the 10 hours of solo flight time for an airplane multiengine rating by § 61.109(b) must be completed in any airplane; these flight time requirements are not specific to the model of aircraft the pilot seeks to operate.

Next, L3Harris stated that § 61.109(e)(5) should allow for a reduction in solo time for number of flights made, such as two flights equaling one hour. AIR VEV, similarly, generally suggested that the required aeronautical experience in § 61.109(e) combine flight hours and total flights, similar to aeronautical experience requirements in the glider category. Currently, the only provisions in part 61 that permit a certain number of flights to be substituted for hours exist in § 61.56 and § 61.159.³⁴¹ For the same reasons as discussed at length in section V.F. of this preamble, the FAA declines at this time to permit this kind of substitution for a commercial pilot certificate with a powered-lift category rating. Additionally, the substitution in § 61.56(b) and aeronautical experience requirements as it applies to gliders are also not applicable to remedy the powered-lift airman certification challenges.

First, the substitution of training flights as set forth in § 61.56(b) is only applicable in the case of a glider flight review, after a person has obtained the appropriate certificates and ratings. Additionally, glider flights cannot be predicted to be a certain length, as they are unpowered and dependent upon winds, convection, and other items that rely on certain extraneous factors (e.g., towed to altitude by a powered aircraft for flights to occur). Therefore, the rule allows the substitution of numbers of flights to equate for an hour of flight time due to the unpredictability of the length of glider flights. The required 10 hours is a minimal time crucial to ensure an applicant for private pilot certificate with powered-lift ratings is capable of operating the powered-lift, especially considering the private pilot certificate is traditionally the first and foundational building block certificate in the airman certification framework.

³⁴¹ Specifically, under § 61.56(b), glider pilots may substitute a minimum of three instructional flights in a glider flight review with certain conditions in lieu of the one hour of flight training required for a flight review under § 61.56(a). Additionally, under § 61.159(b), when seeking an ATP certificate with an airplane category rating, a person who has performed at least 20 night takeoffs and landings to a full stop by substituting each additional night takeoff and landing to a full stop for 1 hour of night flight time to meet the requirement of § 61.159(a)(2) (100 hours of night flight time).

³³⁷ The FAA notes that an examiner cannot conduct a practical test if the applicant does not meet the eligibility requirements for that certificate or rating.

³³⁸ § 61.63(d).

³³⁹ See § 61.109(e)(5).

³⁴⁰ For example, when flying an airplane, the applicant will not encounter the vertical take-off and landing characteristics fundamental to a powered-lift (e.g., aerodynamics events such as effective translational lift and transverse flow effect that are specific to a rotor system transitioning from hovering to forward flight).

Finally, one individual stated that the proposed rule did not mention “Settling with Power” or “Vortex Ring State.” The commenter stated these aerodynamic conditions should be stressed with powered-lift pilots, primarily non-helicopter pilots.

The FAA agrees that settling with power and vortex ring state are conditions essential to a pilot’s powered-lift training and did not intend to exclude their significance in the examples of vital powered-lift piloting conditions. However, § 61.109 does not prescribe specific aeronautical experience tasks or areas of operation. Instead, the powered-lift ACSs, which set forth the aeronautical knowledge, risk management, and flight proficiency standards for certification, include these conditions on the practical test.³⁴² Because an applicant for a certificate or rating must perform the tasks specified in the applicable ACS,³⁴³ it follows a pilot and instructor would ensure the receipt of training on these conditions (regardless of any previously held certificate). In fact, for most certificates and ratings, an applicant must obtain an endorsement from a flight instructor certifying that the applicant is prepared for the practical test.³⁴⁴ As such, the flight instructor must be confident that the applicant can successfully perform all the tasks and maneuvers on the practical test.

2. Removal of §§ 61.63(h) and 61.165(g)

The FAA proposed to remove certain paragraphs pertaining to category and class ratings for the operation of an aircraft with an experimental certificate. To ensure that pilots operating under regulations before a 2004 final rule change³⁴⁵ requiring appropriate category and class ratings complied with the revised provisions, the FAA

³⁴² See Area of Operation XI, Emergency Operations, Task D. Additionally, these conditions are included in the risk management items in Area of Operation V (Takeoffs, Landings, and Go-Arounds), and VI (Performance Maneuvers).

³⁴³ See § 61.43(a).

³⁴⁴ Section 61.39(a)(6) requires that the applicant have an endorsement in the applicant’s logbook certifying that they have received and logged training time within 2 calendar months preceding the month of application in preparation of the practical test.

³⁴⁵ Before 2004, § 61.31 allowed a pilot to operate an experimental aircraft carrying passengers without a category and class rating when permitted by the aircraft’s operating limitations. In 2004, the FAA amended § 61.31 to require persons to hold the appropriate category and class rating when carrying a passenger regardless of the aircraft’s airworthiness certificate. Certification of Aircraft and Airmen for the Operation of Light-Sport Aircraft, final rule, 69 FR 44772, 44829 (Jul. 27, 2004). This amendment was adopted as § 61.31(k)(2)(iii)(B) but is currently codified as § 61.31(l)(2)(iii)(B). 74 FR 42499, 42548 (Aug. 21, 2009).

added §§ 61.63(k) and 61.165(f), which are currently situated as §§ 61.63(h) and 61.165(g).³⁴⁶ These provisions set forth the requirements to apply for a category and class rating limited to a specific make and model of experimental aircraft. Among other requirements, a person must have logged 5 hours of flight time while acting as PIC in the same category, class, make, and model of aircraft between September 1, 2004, and August 31, 2005. After more than 15 years since initial codification, the FAA anticipated that individuals who were operating under the pre-2004 requirements have already used §§ 61.63(h) and 61.165(g) to obtain a limited category and class rating. As a result, the FAA proposed to remove §§ 61.63(h) and 61.165(g).

The FAA received one comment on this proposed removal. FlightSafety International opposed removal of § 61.63(h), stating that removal would reduce flexibility for the FAA, pilots, and OEMs because it will not allow the new powered-lift pilot to obtain an experimental aircraft type rating. The FAA disagrees that retaining these requirements would provide flexibility in new powered-lift pilots obtaining an experimental aircraft type rating. The requirements listed in current §§ 61.63(h) and 61.165(f) are only applicable in very limited circumstances because the 5 hours of flight time required must have been logged between September 1, 2004, and August 31, 2005, to ensure that the pilots who were previously operating without a category and class rating under the pre-2004 regulations could continue operations safely (rather than requiring the full requirements for a category and class rating to those pilots).

Therefore, these provisions were intended to provide relief to a group of pilots operating two decades ago and would be largely inapplicable to powered-lift pilots today. Section V.A. of this preamble provides additional discussion about experimental certificates and the use of operating limitations to require pilots to hold category and class ratings for all experimental aircraft and additional authorizations for certain experimental aircraft even when no passengers are carried on board.

In the low likelihood that a powered-lift pilot did use these provisions and log time during the prescribed time period, the FAA provided notice in the

³⁴⁶ These paragraphs mirror each other, differentiated only by the applicability based on certificate level. Section 61.63 applies to those persons holding a recreational, private, or commercial pilot certificate; § 61.165(g) applies to those persons holding an ATP certificate.

NPRM that these paragraphs would be removed upon the effective date of the final rule. Therefore, any certificate holders that have not yet obtained a limited category and class rating under §§ 61.63(h) and 61.165(g), but wish to do so, would have until January 21, 2025 to utilize the provisions. Therefore, the FAA adopts the removal of §§ 61.63(h) and 61.165(g) as proposed.

3. ATP Privileges and Limitations (§ 61.167)

Section 61.167 prescribes the privileges and limitations for an ATP certificate holder, including those scenarios when an ATP certificate holder may instruct other pilots. Currently, this privilege only applies to ATP certificate holders who have met, in pertinent part, the aeronautical experience requirements of § 61.159 (aeronautical experience requirements for an airplane category rating) and § 61.161 (aeronautical experience requirements for a rotorcraft category and helicopter class rating). The FAA proposed to amend § 61.167(a)(2) to broaden the privileges to include applicability to certificate holders who have met the aeronautical experience requirements in § 61.163 (*i.e.*, persons with an ATP certificate with a powered-lift category rating) to ensure that persons who obtain an ATP certificate with the appropriate powered-lift ratings may instruct other pilots in air transportation service in powered-lift, consistent with what is permitted for persons who hold an ATP certificate with either airplane or helicopter ratings. The FAA noted that, under proposed § 194.205, the proposed change to § 61.167(a)(2) would not permit an ATP with powered-lift ratings to conduct training in the part 135 operator’s airman certification curriculum proposed in § 194.243(a).

The FAA received comments specific to ATP certificates with a powered-lift category rating, however, these comments are addressed in other sections of this preamble. Comments suggesting relief to the aeronautical experience requirements for an ATP certificate with a powered-lift category rating are addressed in section V.I.3 of this preamble. Comments specific to the flight training privileges specific to an ATP certificate with a powered-lift category rating under proposed § 194.205 are discussed in section V.G.1.iv of this preamble. The FAA did not receive comments pertaining to the expansion of privileges to include persons with an ATP certificate with a powered-lift category rating in

§ 61.167(a)(2) and adopts the provision as proposed.

4. Second-in-Command Time in Part 135 Operations

Currently, §§ 61.159 and 61.161 allow a pilot to credit SIC time logged under an SIC professional development program (PDP) toward certain flight time requirements for an ATP certificate with an airplane category or a rotorcraft category and helicopter class rating.³⁴⁷ The FAA proposed to amend § 61.163 to add paragraph (c) to allow SIC time logged under an SIC PDP to be counted toward the total time as a pilot required by § 61.163(a) and the specific flight time requirements for ATP certification set forth in § 61.163(a)(1), (a)(2), and (a)(4) (e.g., cross-country time, night flight time, and instrument flight time). A person may not credit the SIC time logged under an SIC PDP toward the powered-lift-specific flight time requirements of § 61.163(a)(3) because the aircraft operated under an approved SIC PDP must be a multiengine airplane or a single-engine turbine-powered airplane. Rather, the proposal would align the logging of SIC flight time acquired under an SIC PDP toward an ATP certificate with powered-lift category rating with that as permitted for an ATP certificate with an airplane category rating or a rotorcraft category and helicopter class rating.

The FAA noted that ICAO currently has a standard for logging flight time to meet the standards for certificates and ratings in aircraft other than powered-lift. ICAO has recommended practices for logging time in powered-lift that are not yet standards but mirror the logging standards for other categories of aircraft.³⁴⁸ However, ICAO does not

³⁴⁷ An SIC PDP allows the certificate holder's pilots to log SIC time in certain operations conducted under part 135 in an airplane or operation that does not otherwise require an SIC. See § 135.99(c)(2). The FAA did not propose any revisions to the aircraft requirements for an SIC PDP as set forth in § 135.99(c); therefore, this final rule does not enable a part 135 operator to seek approval of an SIC PDP in a powered-lift.

³⁴⁸ ICAO Annex 1, Sections 2.6.3.1.2 and 2.6.4.1.2 are standards relative to the credit of flight time in airplanes and helicopters, whereas § 2.6.5.1.3 is a recommendation pertaining to powered-lift and not a standard. Section 2.6.3.1.2 states for airplanes "When the applicant has flight time as a pilot of aircraft in other categories, the Licensing Authority shall determine whether such experience is acceptable and, if so, the extent to which the flight time requirements of 2.6.3.1.1 can be reduced accordingly. Section 2.6.4.1.2 states for helicopters, "When the applicant has flight time as a pilot of aircraft in other categories, the Licensing Authority shall determine whether such experience is acceptable and, if so, the extent to which the flight time requirements of 2.6.4.1.1 can be reduced accordingly." Section 2.6.5.1.3 is currently a recommendation for powered-lift and states, "When the applicant has flight time as a pilot of aircraft

recognize the crediting of flight time when a pilot is not required by the aircraft certification or the operation under which the flight is being conducted. As a result, SIC time accrued in accordance with an approved PDP program and credited toward the flight time requirements of a certificate or rating in accordance with part 61 as described results in an ICAO limitation being placed on the pilot's certificate until such time that the pilot can demonstrate flight time logged meets the ICAO standard and is reflected in their logbook in accordance with § 61.51.³⁴⁹ While these standards are only recommended practices at this time, the FAA presumes the ICAO recommendations for powered-lift will become standards in the future, given the mirroring standards for airplanes and helicopters. Therefore, the FAA proposed to add paragraphs (d) and (e)³⁵⁰ to § 61.163 to include the requirement for the ICAO limitation and the requirements for removing the limitation. The FAA did not receive comment on these paragraphs (§ 61.163(c), (d), and (e)) and adopts the provisions as proposed.

5. References to Category and Class

During the rulemaking process, the FAA identified several regulations in various parts containing references to the category and class of aircraft; however, the FAA did not propose or establish classes of powered-lift in this rulemaking. As a result, the requirements for the appropriate class of aircraft would present a problem for powered-lift pilots in part 61, subpart K of part 91, part 135, part 141, and part 142. The FAA, therefore, proposed to update the regulatory references to category and class to make clear that the reference to class is only appropriate if the regulations require classes for the category of aircraft. The FAA proposed two different approaches to remedy the discrepancy. First, to account for the lack of powered-lift classes in part 61, the FAA proposed to directly amend the following sections: §§ 61.3(e)(1)–(2), (f)(2)(i)–(ii) and (g)(2)(i)–(ii); 61.45(a)(1)(i) and (a)(2)(ii)³⁵¹;

in other categories, the Licensing Authority should determine whether such experience is acceptable and, if so, the extent to which the flight time requirements of 2.6.5.1.1 could be reduced accordingly."

³⁴⁹ See §§ 61.159(e) and (f), 61.161(d) and (e).

³⁵⁰ As discussed in section V.I.4. of this preamble, this final rule adopts new paragraph (c) to allow a pilot to credit SIC time logged under an SIC PDP toward certain flight time requirements for an ATP certificate with a powered-lift category rating.

³⁵¹ The FAA notes that while the NPRM preamble discussed this revision to § 61.45(a)(1)(i) and (a)(2)(ii), the amendatory instructions in the NPRM

61.51(f)(2); 61.57(a)(1)(ii), (b)(1)(ii), and (g)(1) and (4); and 61.64(a)(1) and (g)(1).

To account for the lack of powered-lift classes in subpart K of part 91 and parts 135, 141, and 142, the FAA proposed regulations under the SFAR,³⁵² which would clarify when references to class are inapplicable when a powered-lift is used under those respective parts.

First, § 91.1055(b)(2) allows deviation from flight-time hour requirements for PICs and SICs operating program flights if an existing program manager adds a new category and class of aircraft to its fleet not used before in its operation. The FAA proposed § 194.245(b) to clarify that the reference to class in § 91.1055(b)(2) is inapplicable when a powered-lift is used for the operation under subpart K of part 91.

Next, as it pertains to part 141, §§ 141.35(a)(1), 141.36(a)(1), 141.37(a)(2)(ii), and 141.37(a)(3)(ii) set forth certain qualification requirements, including class ratings, for chief instructors, assistant chief instructors, and check instructors.³⁵³ Additionally, the appendices of part 141 reference classes of aircraft in the context of course content. To account for the inapplicability of classes as it pertains to powered-lift, the FAA proposed § 194.241, which would remove the qualification requirement to hold a class rating in §§ 141.35(a)(1), 141.36(a)(1), 141.37(a)(2)(ii), and 141.37(a)(3)(ii) when a powered-lift is used in the course. Proposed § 194.241(a) and (b) delineate the certificates and ratings a person must hold to be designated as a chief instructor, an assistant chief instructor, or a check instructor (for checks and tests that relate to flight training and ground training) when a powered-lift is used in the course. To note, in delineating the ratings that must be held on the pilot certificate for

erroneously did not include the revisions to § 61.45. Due to the general nonsubstantive nature of this revision and the discussion in the NPRM preamble, the FAA finds that the public received adequate notice of this revision.

³⁵² The FAA chose to propose SFAR provisions rather than permanent amendments to allow the agency time to assess which permanent changes would be needed in part 141 to accommodate the use of powered-lift in the certification and rating courses long-term.

³⁵³ Specifically, §§ 141.35(a)(1), 141.36(a)(1), and 141.37(a)(2)(ii) require chief flight instructors, assistant flight instructors, and check instructors to hold a commercial pilot certificate or ATP certificate and a current flight instructor certificate; for flight training, these certificates must contain the appropriate aircraft category, class, and instrument ratings (if required) for the aircraft category and class of aircraft to be used in the course. For checks and tests related to ground training, § 141.37(a)(3)(ii) requires the check instructor to hold a current flight instructor certificate or ground instructor certificate with the ratings appropriate to the category and class of the aircraft used in the course.

persons seeking designation as a chief instructor, an assistant chief instructor, or a check instructor (for checks and tests that relate to flight training), the FAA proposed to add the requirement that such person must hold a powered-lift type rating.³⁵⁴

Additionally, proposed § 194.249(b) would make the references to class contained in course content in the appendices to part 141 inapplicable when a powered-lift is used for a course of training. The FAA also identified a technical amendment change to part 141.37(a)(3)(ii) discovered during the pendency of this rulemaking that was not proposed in the NPRM. Currently, part 141.37(a)(3)(ii) states that “Except for a course of training for a lighter-than-air rating, hold a current flight instructor certificate or ground instructor certificate with ratings appropriate to the category and class of aircraft used in the course.” This language is incorrect in that there is no category or class of aircraft listed on a ground instructor certificate; rather, the language after ground instructor should be tied with the flight instructor certificate. The FAA is therefore adopting an amendment editorial in nature to correct the error.

The FAA proposed § 194.249 to resolve the inapplicability of class in parts 135 and 142. Specifically, §§ 135.4(b)(2), 135.247(a)(1) and (2), and 135.603 set forth, first, similar deviation to that in § 91.1055(b)(2) and, second, certain requirements for PICs³⁵⁵ in aircraft carrying passengers or in helicopter air ambulance operations. The FAA proposed § 194.249(a) to clarify that the references to class in these regulations are inapplicable when a powered-lift is used for the operation under part 135. Additionally, §§ 142.11(d)(2)(ii), 142.49(c)(3)(iii),

³⁵⁴ A person who holds a flight instructor certificate is subject to the limitations contained in § 61.195. Specifically, § 61.195(e) prohibits a flight instructor from giving training in an aircraft that requires the PIC to hold a type rating unless the flight instructor holds a type rating for the aircraft on their pilot certificate for that aircraft. Because a PIC of a powered-lift would be required to hold a type rating, to provide flight training in a powered-lift, the flight instructor would be required to hold a type rating for the powered-lift as well.

³⁵⁵ Section 135.4(b)(2) allows deviation from certain crewmember experience requirements if the certificate holder adds to its fleet a new category and class of aircraft not used before in its operation. Section 135.247(a)(1) and (2) require certain takeoffs and landings as the sole manipulator of the flight controls in an aircraft of the same category, class, and type, if a type rating is required, in which that person is to serve. Finally, § 135.603 requires the PIC of a helicopter air ambulance operation to meet the requirements of § 135.243 and to hold either a helicopter instrument rating or an ATP certificate with a category and class rating for that aircraft, not limited to VFR.

142.53(b)(1), and 142.65(b)(1) set forth certain requirements for issuance or amendment of training specifications, instructor and certificate holder privileges and limitations, and instructor training and testing.³⁵⁶ Similarly, the FAA proposed § 194.249(c) to clarify that references to class of aircraft in these sections do not apply when operating powered-lift or FSTDs representing powered-lift under part 142.

The FAA did not receive any comments on these amendments and adopts the amendments as proposed.

J. Part 135 Pilot Qualifications

1. Statement of the Issue and Introduction

As discussed in the NPRM, the current regulatory framework of part 135, particularly subparts A, E, G, and H, was initially codified without the contemplation of powered-lift operations. Specifically, unlike part 61 where the 1997 final rule introduced powered-lift into the CFR for airman certification, powered-lift could not operate in part 135 and, therefore, revisions were unnecessary at that time. Therefore, the NPRM proposed to introduce powered-lift into the regulatory training and qualification paradigm in part 135, rather than simply updating or modifying existing powered-lift requirements, through a twofold framework: permanent regulatory amendments and temporary SFAR requirements.

These requirements are intended to facilitate the training and qualification of the initial groups of part 135 pilots, flight instructors, and check pilots. In many instances, the training and qualification requirements applicable to airplane pilots in part 135 would also be applied to powered-lift pilots by virtue of the use of the term “aircraft.”³⁵⁷ Because the FAA anticipates that during operations powered-lift will quickly transition to horizontal flight using the wings like an airplane to afford powered-lift a much larger operational

³⁵⁶ Specifically, 142.11(d)(2)(ii) discusses entitlement to training specifications that contain the category, class and type of aircraft that may be used for training, testing, and checking; 142.49(c)(3)(iii) requires an instructor to hold the certificates and ratings specified by part 61 appropriate to the category, class, and type of aircraft in which instructing, 142.53(b)(1) requires certain flight hours and takeoffs and landings for simulator instructors in the same category, class, and type (if required) replicated by the simulator, and 142.65(b)(1) sets forth crewmember position requirements for flight testing, flight checking, or line operational simulation.

³⁵⁷ Pursuant to 14 CFR 1.1, “aircraft” means a device that is used or intended to be used for flight in the air, which would inherently include powered-lift.

range and faster speeds to optimize operational capabilities, powered-lift pilots must possess many of the same skills and experience as their airplane pilot counterparts in certain instances. Conversely, due to the operational differences in the capability of powered-lift and integration of powered-lift into the NAS for civilian use, there are instances where existing airplane or helicopter training and qualification rules do not readily apply, which requires new temporary or permanent requirements.

2. Relevant History and Background

Part 135 prescribes operating requirements for commuter and on-demand operations. Specifically, subpart A prescribes the operations and personnel that are affected by the part, and subpart E details flight crewmember qualification requirements. Subparts G & H set forth the testing and training requirements for crewmembers. The NPRM provided a comprehensive history of the part 135 training and checking regime,³⁵⁸ which continually seeks to provide the highest level of safety and risk-mitigation in commuter and on-demand operations. This SFAR and permanent amendments described herein are intended to provide an equivalent level of training, checking, and testing for powered-lift operations as those expected of airplane and helicopter operations.

3. Rules Applicable to Operations Subject to Part 135 (§ 135.3)

Section 135.3 prescribes the rules that apply to persons conducting operations under part 135. This section is generally applicable to all operations under part 135, regardless of aircraft category; however, paragraph (b) applies only to airplanes. Specifically, § 135.3(b) requires that those certificate holders conducting commuter operations under part 135 with airplanes in which two pilots are required by the type certificate of the airplane must comply with subparts N and O of part 121 (Training Program and Crewmember Qualifications, respectively) instead of the requirements of subparts E, G, and H of part 135.

As discussed in the NPRM, the FAA determined that the same safety standard imposed in § 135.3(b) for commuter operations involving airplanes for which two pilots are required by type certification should apply to powered-lift requiring two

³⁵⁸ 88 FR 38946 at 39009 (June 14, 2023).

pilots by type certification.³⁵⁹ However, the FAA noted that subparts N and O of part 121 are specific to multiengine airplanes, and the FAA did not amend part 121 to accommodate powered-lift operations under that part. Additionally, certain requirements in subparts N and O to part 121 require compliance with appendices E and F of part 121³⁶⁰ (Flight Training Requirements and Proficiency Check Requirements, respectively), which are applicable to airplanes, as well. In the absence of amending part 121 (specifically, subparts N and O and the referenced appendices) to accommodate powered-lift-specific training and checking, the powered-lift flightcrew member would be inherently precluded from performing some airplane-specific tasks that are incongruent with powered-lift operational capabilities, creating a safety risk of insufficient training and checking.

Therefore, to facilitate an appropriate level of training and checking for certificate holders conducting commuter operations under part 135 with powered-lift requiring two pilots by the type certificate, the FAA proposed § 194.247(b) to create an alternative means of compliance with § 135.3(b).³⁶¹ For these operations, the FAA proposed that certificate holders comply with subpart Y of part 121, which allows for an Advanced Qualification Program (AQP). This program provides for approval of an alternate method for qualifying, training, certifying, and otherwise ensuring the competency of persons required to be trained under parts 121 and 135.³⁶² This proposal facilitates a rigorous safety standard for training and checking without (1) imposing the inapt multiengine airplane requirements of subparts N and O (and the applicable appendices) on powered-lift commuter operators in part 135 or (2) overhauling the framework of part 121 to include powered-lift which are

not entering part 121 operations at this time.

ALPA supported the FAA's decision not to amend part 121 to accommodate powered-lift operations, stating that considerable data must be collected and analyzed before expanding into part 121 operations.

The FAA found that, in lieu of modifying subparts N and O of part 121 to accommodate the integration of certain powered-lift commuter operations, implementing the AQP would uphold a similarly rigorous safety standard for training and checking. The FAA proposed the use of AQP to align more closely with the training and under subparts N and O of part 121 as prescribed in § 135.3. Compliance with AQP, normally a voluntary program, shall be mandatory for powered-lift commuter operations, given the unsuitability of the current N and O language to powered-lift. AQP provides an alternative method for qualifying and training pilots to ensure competency while providing an equivalent level of safety to those required by a subpart N and O training program. Additionally, the flexible, performance-based standard of an AQP will best suit the SFAR's novel training paradigm for powered-lift through the integration of safety program data, scenario-based training and evaluations, crew resource management (CRM) training, customization to the certificate holder's unique demographic and flight operation, and innovative instructional methods and technology.

The FAA proposed § 194.247(b) to require certain elements within the AQP in recurrent ground training for PICs every 36 months. This is to ensure that the training received by powered-lift pilots under subpart Y of part 121 to that required for PICs in airplane commuter operations in which two pilots are required by type certification. Specifically, the FAA proposed § 194.247(b)(2)(i) to require that these PICs receive training, instruction, and facilitated discussion on leadership and command and mentoring as part of their initial, recurrent, and upgrade ground training. This requirement is similar to the initial, recurrent, and upgrade ground training requirements that govern airplane commuter operations.³⁶³ Proposed § 194.247(b)(2)(ii) requires that mentoring training include techniques for instilling and reinforcing the highest standards of technical performance, airmanship, and professionalism in newly hired pilots. Finally, proposed § 194.247(b)(4) includes requirements

for initial and upgrade flight training for PICs to contain sufficient scenario-based training incorporating crew resource management and leadership and command skills, to ensure the pilot's proficiency as PIC.

The FAA received one comment specifically pertaining to the amendments proposed in § 194.247. AWPC opposed the requirement to adhere to subpart Y of part 121. AWPC contended that requiring powered-lift operators to adhere to subpart Y is excessive and burdensome because the programs require more time, larger staffing, and higher costs than other training programs, which would be incongruent to apply only to powered-lift operators. Instead, AWPC suggested that powered-lift part 135 operators should adhere to the same regulations as helicopter part 135 operators.

The FAA recognizes that establishing an AQP may place a burden on operators.³⁶⁴ However, it is important to recognize that these burdens (*e.g.*, detailed job task analysis, increased evaluator and trainer requirements, development of performance measurement tools and qualification standards) are offset by the significant benefits offered by an AQP. Unlike traditional training programs, which use maneuver-based training and evaluation and often segment simulation events in a manner that fails to realistically build up the accident error chain, AQP scenario-based training and evaluation more closely simulate the actual flight conditions known to cause most fatal carrier accidents. This approach aligns training and evaluation with known causes of human error, focusing on both crew and individual performance as well as integrating flight training with CRM skill training. Moreover, AQP offers greater efficiency to operators by allowing for proficiency based training, as opposed to prescriptive programmed hours.

Whether a training program falls under subparts N and O of part 121, subparts E, G, and H of part 135, or subpart Y of part 121, the financial burden of adding a new category of aircraft, such as powered-lift, to a certificate holder's operations is similar. All training programs require a front-end analysis of the certificate holder's operation, aircraft, line environment, and job functions for each duty position. Additionally, the regulations require the development of FAA-approved operational manuals and training and qualification of all instructors and

³⁵⁹ Specifically, the NPRM discusses the intention of reducing accidents and incidents related to human performance in commuter operations and ensuring a balanced mix of training and checking to enhance public and passenger safety. 88 FR 38946 at 39010 (June 14, 2023).

³⁶⁰ In accordance with § 121.424 of subpart N, flight training must include at least the maneuvers and procedures specified in appendix E to part 121. In accordance with § 121.441 of subpart O, proficiency checks must include at least the maneuvers and procedures specified in appendix F to part 121.

³⁶¹ The FAA notes that the proposal to use an AQP is temporary, as set forth in the SFAR rather than a permanent regulation. As intended with the SFAR in general, as additional information becomes available on the training and checking necessary to effectuate safety for certain part 135 commuter powered-lift operations, the FAA may revise this standard as appropriate.

³⁶² § 121.901.

³⁶³ 14 CFR part 121, subpart N.

³⁶⁴ The cost for the AQP information collection for AQP is included in the PRA section of this rulemaking.

evaluators in adding a new category of aircraft to a certificate. The process of adding a new aircraft category requires data collection and analysis processes for both the initial and final approval of training programs and the issuance of the appropriate operation specifications. The FAA notes that 24 certificate holders, which includes one part 135 operator, to date, have voluntarily chosen to implement the AQP over the standards in part 121 N&O. This voluntary adoption of AQP supports that certificate holders have determined the benefit of implementing an AQP exceeds its costs.³⁶⁵ As well, of the ten projects undergoing type-certification at the FAA, only one project requires two pilots by type certification (the AW-609), and thus subject to the subpart Y of part 121.

As previously discussed, § 135.3(b) sets forth certain training program and qualification requirements specifically for commuter operations that use airplanes in which two pilots are required by type certification; conversely, § 135.3(c) sets forth training program and qualification requirements for those aircraft to which paragraph (b) does not apply but who opt to use part 121 training standards.

The FAA maintains that allowing powered-lift to make use of the “opt in” provision in § 135.3(c) to utilize subparts N and O of part 121 is unworkable. As previously explained, subparts N and O of part 121 are multiengine airplane specific and, at this time, the FAA is not amending part 121 to accommodate powered-lift operations. For example, subparts N and O contain left and right seat requirements whereas some powered-lift may only have one seat, training hour requirements are tied to airplane types, and extended envelope training is tailored to airplane characteristics that may not be applicable to powered-lift. Additionally, powered-lift may present new requirements (such as tandem seating for pilots) or different flight envelopes not currently covered by subparts N and O. Having an N and O section that does not adequately address powered-lift issues in full would create a training gap among powered-lift pilots and not satisfy the intent of the training program.

As ALPA commented, the permanent integration of powered-lift into part 121 operations is premature; amending part 121 for powered-lift operations requires

extensive analysis of operational history based on lessons learned from the initial SFAR period and part 135 operations. The application of subparts N and O as written would mandate that a powered-lift flightcrew perform some airplane-specific tasks incongruent with powered-lift operational capabilities. These subparts do not include specific tasks that are imperative to powered-lift operations. This as-is application could result in PICs that are insufficiently trained and checked on some maneuvers that powered-lift possess the operational capability to conduct.

Likewise, the application of subparts E, G, and H under part 135 to powered-lift is insufficient due to the expectation of safety during commuter operations. As discussed in the NPRM, the FAA adopted a final rule in 1995, upon recommendation from the NTSB, to require airplanes that require two pilot crewmembers to comply with the training, checking, and qualification requirements of part 121 (*i.e.*, subparts N and O).³⁶⁶ Specifically, the FAA considered the number of passengers and types of operations that the part 135 commuter carriers conduct and determined that comprehensive training requirements set forth by part 121 achieved a stronger level of safety. Specifically, part 121 training, to include CRM, benefits these types of passenger-carrying operations because it provides more emphasis on training, whereas the part 135 rules (*i.e.*, subparts E, G, and H) rely more heavily on testing and checking requirements. Powered-lift that require two pilots by type certification will be similarly complex as airplanes in both operating characteristics and in types of operation and require a similarly high caliber of pilot training to ensure the public is as safe as they would be in a part 121 operation.³⁶⁷

Powered-lift operations are expected to be operating in densely populated areas, landing in complex airspace, and are significantly novel in that the true diversity and complexity of future operations are difficult to predict. Powered-lift operations will be able to operate similar to current helicopter operations in take-off and landing along with confined landing areas while also having a predominant amount of the flight similar to an airplane at higher altitudes and speeds. Helicopters are

excepted from the same requirements as airplanes because they generally do not take on the complex nature of airplane commuter operations, which may often be conducted under IFR, with numerous passengers in busy, complex airspace, and in aircraft with complex systems and/or crew resource management demands. If powered-lift are expected to take their place among or, alternatively, replace some airplane commuter operations, they must achieve the same level of safety expected by the public.

The unique nature of powered-lift as an entrant aircraft and significant differences between types necessitate specific training tailored to the operator’s actual environment. Therefore, the FAA determined the AQP is the most appropriate mechanism to facilitate a customized, data-informed training program able to leverage technological and training innovation. The data driven component of an AQP will ensure that carriers are able to more precisely identify critical training requirements for their novel operations that may be unique to the type of powered-lift. In addition, AQP provides a trained-to-proficiency model that uses planned hours, that exceeds the training and checking paradigm imposed under subparts N and O of part 121.

In further reviewing the AQP requirements in subpart Y of part 121, the FAA found that §§ 121.903(c) and 121.921(a) contain the word “airplane” versus the term “aircraft,” which is used in the remainder of regulations in subpart Y. Notwithstanding the reference to aircraft in §§ 121.903(c) and 121.921(a), the intent of the NPRM remains the same—to conduct training under subpart Y rather than subparts N and O—and the regulatory impact cost analysis unchanged. In the final rule, the FAA is requiring commuter operators to use AQP in subpart Y of part 121 as proposed. However, the FAA modified § 194.247(b)(1) to apply requirements of §§ 121.903(c) and 121.921(a) to powered-lift.

After thorough analysis of all these factors, including any additional burden to the certificate holder, the FAA has determined to maintain the position that commuter operations under part 135 should be required to train under an AQP in accordance with subpart Y of part 121. As noted, the FAA’s decision is based on the inapplicability of part subparts N and O in part 121 and the fact that subparts E, G, and H of part 135 are not sufficient in the level of training needed for powered-lift commuter operations. The use of AQP for powered-lift reflects a commitment to achieving a high standard of safety and operational efficiency.

³⁶⁵ Over 90% of part 121 pilots are trained under an AQP program, with 25 part 121 AQP’s approved and 1 pending. There is currently 1 part 135 operator and 2 other part 135 operators in the approval process. All of the 121s and 135s are opting to comply with AQP.

³⁶⁶ Final rule: Air Carrier and Commercial Operator Training Programs, 60 FR 65940 (Dec. 20, 1995).

³⁶⁷ The FAA proposed to use the phrase “two pilots as required by the aircraft flight manual”. For the final rule, the FAA decided to use the term “as required by type certification” to appropriately mirror § 135.3.

4. Applicability of Rules for Eligible On-Demand Operations (§ 135.4)

Section 135.4 describes pairing and experience limitations as well as operational limitations for eligible-on demand operations. Section 135.4 applies to powered-lift; however, § 135.4(a)(3), when describing pilot operating limitations, applies only to fixed-wing aircraft. Section 135.4(a)(3) provides certain conditions when the pilot-in-command shall make all take-offs and landings while conducting an eligible-on demand operation. The FAA maintains that powered-lift may have more complex landing situations than fixed-wing when operating under conditions listed in (a)(3)(i) and (a)(3)(ii),³⁶⁸ and that the experience mandated by the regulation should be applied to powered-lift as well.

The FAA proposed in § 194.307 to apply the pilot operating limitations in § 135.4(a)(3) to powered-lift. The FAA did not receive any comments, and the section is adopted as proposed.

5. Pilot in Command Qualifications (§ 135.243)

Section 135.243 prescribes qualifications for pilots serving as PIC in certain passenger-carrying part 135 operations, passenger and cargo flights under VFR, and passenger and cargo flights under IFR. Such qualifications include minimum certificates, ratings, and hours of pilot time, cross-country time, night flight time, and, if applicable, actual or simulated instrument time. Certain PIC requirements in § 135.243 apply to all aircraft (*i.e.*, § 135.243(b)(1)–(2), (c)(1)(2)); therefore, these requirements that generally apply to PICs in any aircraft in part 135 operations apply to PICs of powered-lift. Other PIC requirements are specific to the category (*i.e.*, airplane) or class (*i.e.*, helicopter) of aircraft being flown (*e.g.*, § 135.243(b)(3) applies to airplanes; § 135.243(b)(4) applies to helicopters). For these sections that do not include a specific provision for powered-lift, the FAA proposed certain permanent changes to incorporate powered-lift specific requirements into § 135.243. This section discusses each proposed revision, relevant comments to the proposal, and resulting final amendments.

i. Section 135.243(a)

Section 135.243(a) prescribes the general requirements for a person to

³⁶⁸ These conditions relate to prevailing visibility at the airport, visual range for the runway, runway conditions (*e.g.*, water, snow, ice), crosswinds, and windshear.

serve as PIC in certain passenger-carrying operations. Specifically, under § 135.243(a), to serve as PIC in a passenger-carrying operation of (1) a turbojet airplane, (2) an airplane with a passenger-seat configuration of 10 seats or more, or (3) a multiengine airplane in a commuter operation, a person must hold an ATP certificate with appropriate category and class ratings and, if required, an appropriate type rating for that airplane. Similarly, § 135.243(a)(2) requires a person to hold an ATP certificate, appropriate type ratings, and an instrument rating to serve as PIC in passenger-carrying operations of a helicopter in scheduled interstate air transportation³⁶⁹ within the 48 contiguous states.

As previously noted, the FAA proposed to add specific requirements for powered-lift as permanent changes³⁷⁰ to align with the existing requirements specific to airplanes and helicopters. Without adding a provision for powered-lift to § 135.243(a), § 135.243(b) and (c) would dictate PIC qualifications for powered-lift in certain passenger-carrying operations based on whether the operation is conducted under VFR or IFR (*i.e.*, only a commercial pilot certificate with a powered-lift category rating and a type rating would be required). Leaving the regulation unchanged would result in less stringent PIC requirements for powered-lift PICs in complex passenger-carrying operations than those required to serve as PIC of an airplane or helicopter.

Therefore, the FAA proposed to permanently add paragraph (a)(3) to § 135.243 to require the PIC of a powered-lift to hold an ATP certificate with a powered-lift category rating and an appropriate type rating not limited to VFR for that powered-lift, when serving as PIC in: (1) on-demand passenger-carrying turbojet-powered powered-lift

³⁶⁹ Interstate air transportation is defined in 14 CFR 1.1: the carriage by aircraft of persons or property as a common carrier for compensation or hire, or the carriage of mail by aircraft in commerce: (1) Between a place in a State or the District of Columbia and another place in another State or the District of Columbia; (2) Between places in the same State through the airspace over any place outside that State; or (3) Between places in the same possession of the United States;

Whether that commerce moves wholly by aircraft of partly by aircraft and partly by other forms of transportation.

³⁷⁰ As discussed in the NPRM, a permanent revision aligns with the permanent revisions in part 61 requiring the PIC in powered-lift operations to hold a type rating (*i.e.*, § 61.31) and existing requirements within § 135.243 for airplanes and helicopters. The FAA may propose subsequent amendments to modify the certification standards for powered-lift PICs within § 135.243(a) as more operational information is collected during the life of the SFAR. See 88 FR 39013 (June 14, 2023).

operations; (2) on-demand operations in a powered-lift having a passenger seating configuration, excluding crewmember seats, of 10 or more; and (3) powered-lift commuter operations other than turbojet-powered powered-lift (hereinafter collectively referred to as “certain part 135 commuter and on-demand powered-lift operations”). Consequently, as proposed, if a powered-lift PIC could not satisfy the ATP certificate requirements, that operator would be limited to conducting part 135 on-demand operations with non-turbojet-powered powered-lift containing less than 10 passenger seats until the ATP certificate requirements are satisfied. As proposed, under § 135.243(a)(3), a PIC would not be permitted to serve as PIC with a powered-lift type rating with a “VFR only” limitation in the aforementioned part 135 operations.³⁷¹

ALPA disagreed with the FAA’s proposed requirement for powered-lift PICs to hold an ATP certificate and type rating only for on-demand operations involving 10 or more passenger seats. ALPA recommended that instead, if an ATP certificate is required for traditional helicopter operations, an ATP certificate should also be required for similar powered-lift operations regardless of seat capacity, to ensure the highest level of safety in this novel aircraft type and its operations.

Bristow stated that operators of powered-lift in commuter operations will be required to have an ATP certificate, but there is no relief provided in the proposed rules that allows pilots to obtain experience necessary for an ATP certificate. The commenter contended that the small pool of military pilots with powered-lift experience will hamper AAM commuter services. The commenter also noted that AAM operations will be different than the other operations requiring the PIC to hold an ATP certificate—functioning more like taxi/bus services than as an alternative to commercial aircraft service.

In response to ALPA’s comment on the scope of ATP certificate requirement, the FAA notes that the regulatory text as proposed and finalized in this rulemaking will apply to more operations than just those where the powered-lift passenger-seat configuration consists of 10 seats or more (excluding each crewmember

³⁷¹ The FAA proposed a permanent change to replace the outdated reference to commuter operations as defined in “part 119” with “part 110” in §§ 135.243(a)(1) and 135.244(a) in light of the transfer of definitions from § 119.3 to a new part 110. final rule: Operations Specifications, 75 FR 7482 (Feb. 10, 2011).

seat). The ATP certificate and type rating requirement also will be required for (1) turbojet-powered powered-lift, and (2) powered-lift in commuter operations as defined in part 110. Thus, a PIC will be required to hold an ATP certificate and type rating for a commuter operation as defined in part 110 even if the powered-lift itself had a passenger-seat configuration of only four. The FAA has determined that, similar to the airplane operations that require a pilot to hold an ATP certificate, the aforementioned powered-lift operations involve greater complexity and therefore require the highest level of pilot proficiency and experience. This requirement is commensurate with the public's expectations for safety in commercial operations involving routine scheduled flights.

The NPRM provided extensive discussion in support of the requirement to hold an ATP certificate with a powered-lift category rating and appropriate type rating not limited to VFR for certain part 135 commuter and on-demand powered-lift operations.³⁷² Primarily, the operations that are envisioned for powered-lift are virtually identical to those existing airplane and helicopter operations in part 135 that require ATP certification. As such, PIC qualifications must remain consistent across operations to address the similar level of risk in the complex operations (e.g., passenger carriage, duration of flight time, operating systems, high-traffic areas in the NAS, etc.). This complexity necessitates robust knowledge, training, and flight time to achieve the highest level of safety.

To the extent that ALPA suggests that the ATP certificate requirement should apply to the same operations applied to helicopter operations (*i.e.*, all interstate operations regardless of passenger capacity), the FAA does not agree. PICs in on-demand and non-common carriage operations in smaller powered-lift that are not turbojet-powered are not required to hold the ATP certificate when conducting interstate operations. If the FAA applied the same rule as helicopters, these interstate operations in smaller powered-lift would require the PIC to hold an ATP certificate. The FAA finds that an ATP certificate for these types of operations typically involve smaller and less complex aircraft, flying for a shorter duration of time with a lower passenger-carrying capacity.

Under the hypothetical application of § 135.243(a)(2) to powered-lift, virtually all passenger carrying operations that

crossed state lines would require an ATP certificate. In addition, a blanket requirement of an ATP certificate for powered-lift for all flights would be a higher requirement than any other existing aircraft in similar operations and create an undue burden for powered-lift operations. This paradigm most aptly balances the need for increased experience in complex operations and operating environments without overly burdening other operations where a greater amount of flight time, training, and qualification is not necessary.

Bristow's comments provide a perspective that AAM operations will be different than the most traditional commercial operations that require the PIC to hold an ATP certificate. However, the pilot requirements in § 135.243(a)(3) apply to all part 135 commuter operations, and the characteristics of AAM operations described by Bristow, such as shorter, more predictable routes within urban environments and lower altitudes, do not justify lessening these requirements. While some AAM operations may resemble taxi or bus services in their function of ferrying passengers over relatively short distances, the complexities and potential risks of commuter operations are significantly greater.

The argument that such operations could be equated to ground transportation overlooks the inherent complexities of aviation, where the consequences of failures or emergencies can be immediate and significantly different than the AAM operations described by Bristow. The FAA maintains that the safety requirements and pilot qualifications, including the requirement for an ATP certificate, must reflect the potential risks and complexities associated with all part 135 commuter operations in all powered-lift designs. The AAM operational characteristics described by Bristow, although distinct, do not inherently diminish the potential criticality or safety implications of emergencies that might occur during powered-lift operations.

To the extent that Bristow expressed concerns that the FAA proposed no relief from the ATP certificate requirements to accommodate ATP certificate requirement in § 135.243(a)(3), the FAA foresees numerous paths to obtain the experience needed to serve in a commuter operation. Initial cadre programs under the SFAR and part 135 operations not requiring an ATP certificate will allow pilots to begin amassing experience needed to serve in more demanding commuter operations.

Finally, the FAA may not base a proposed regulation solely on a perceived lack of appropriately qualified pilots, and it sees no compelling safety case for reducing the experience requirements for a new category of aircraft. Reducing the experience requirements for ATP certification, particularly for a novel and limited segment like AAM, would not align with the FAA's mandate to uphold appropriate standards of safety. Therefore, § 135.243(a) is being finalized as proposed.

ii. Section 135.243(b) and (c)

Except as specified in § 135.243(a), § 135.243(b) and (c) establish the minimum pilot certificate, ratings, and flight time that a PIC must have when conducting part 135 VFR operations and part 135 IFR operations, respectively. Specifically, under § 135.243(b)(1) and (c)(1), to serve as a PIC of an aircraft under VFR or IFR, the person must hold at least a commercial pilot certificate with the appropriate category, class, and type rating (if type rating is required) for that aircraft. Additionally, dependent on whether the PIC seeks to operate under VFR or IFR, the PIC must meet certain flight time requirements set forth by § 135.243(b)(2) and (c)(2). Because these requirements apply to PICs of all aircraft, they would equally apply to powered-lift PICs.

However, § 135.243(b)(3) and (4) and (c)(3) and (4) prescribe additional requirements specific to airplanes and helicopters regarding instrument ratings and flight time requirements. Notably, these paragraphs do not account for the requirements applicable to PICs operating powered-lift under VFR or IFR. Therefore, the FAA proposed to permanently amend § 135.243(b) and (c) to set forth parallel requirements for powered-lift operations under VFR and IFR.

Specifically, paragraphs (b)(5) and (c)(5) would require the PIC of a part 135 VFR operation and a part 135 IFR operation in a powered-lift to hold an instrument-powered-lift rating or an ATP certificate for the powered-lift category. These requirements largely mirror the existing requirements for PICs of part 135 airplane operations under VFR (or VFR over-the-top in the case of helicopters) and IFR in airplanes and helicopters (*i.e.*, for airplane, an instrument rating or an ATP certificate with an airplane category rating; for helicopters, an instrument-helicopter rating or an ATP certificate with a category and class rating for that aircraft, not limited to VFR).

Several commenters, including Archer, Eve, GAMA, and L3Harris,

³⁷² 88 FR 38946 at 39012 (June 14, 2023).

opposed proposed § 135.243(b)(5) requiring an instrument-powered-lift rating or an ATP certificate with a powered-lift category rating for operations under VFR. Archer disagreed with the FAA's assessment that the operational characteristics of powered-lift are sufficiently different from helicopters to justify requiring an instrument-powered-lift rating for part 135 VFR operations. Archer stated that the type certification process will demonstrate that their aircraft features the same key operating characteristics as helicopters and, further, that the requirement for initial commercial powered-lift pilots to hold an airplane or helicopter instrument rating would provide an additional layer of safety beyond that which is currently required for part 135 VFR helicopter pilots. Archer further contended their specific model will have similar configuration as a helicopter.

Eve also recommended having powered-lift treated as helicopters in this regard and to incorporate instrument "awareness training" in commercial training and checking. Additionally, L3 supported striking out powered-lift from the proposed § 135.243(c)(5) text. L3 recommended that any instrument rating, such as an airplane instrument rating, should be able to satisfy the instrument rating requirement in § 135.243(c)(5).

The FAA requires an instrument rating for part 135 VFR airplane operations because if an airplane encounters inadvertent instrument meteorological conditions (IIMC), the pilot must have the necessary knowledge and skills to maintain safe control of the airplane, transition to instruments, coordinate with ATC, and maneuver the airplane to an emergency instrument approach and landing at an airport. The FAA currently does not require an instrument rating for part 135 VFR helicopter operations, recognizing their capabilities for slow flight and ability to land in a variety of conditions. While powered-lift shares many characteristics with helicopters, a primary consideration in requiring an instrument rating for VFR operations is the powered-lift cruise profile. The FAA anticipates that other than necessary for takeoff and landing, many powered-lift will be optimized to primarily utilize lift provided by the wing for as long as practical to maximize efficiencies in fuel consumption, speed, and range similar to an airplane. This means many will operate at increased altitudes and faster airspeeds and may require more time and distance to avoid IIMC and complete an emergency approach and landing compared to a helicopter. While

some powered-lift may have the ability to fly at slower airspeeds when operating in the vertical-lift flight mode, this requires additional pre-flight planning to ensure the aircraft has sufficient fuel/energy reserves to complete the flight in the vertical-lift flight mode.³⁷³ However, IIMC events are not planned, therefore the fuel/energy reserves on the aircraft may be insufficient to transition from the wing-borne to the vertical-lift flight mode and complete the flight in VFR conditions. Because not all powered-lift types will have sufficient capability to avoid and recover from IIMC as readily as their helicopter counterparts, the FAA has determined the instrument rating provides a core competency that will increase safe outcomes when unexpectedly transitioning from VMC to IMC conditions.

While the FAA recognizes that some manufacturers' aircraft may have the ability to transition rapidly into hovering flight modes or will operate at slower airspeeds, the rule must encompass the entirety of possible powered-lift designs. Some designs may not have the capability of entering slow flight, and if they do, it may be extremely time limited due to power consumption to complete a safe recovery at a suitable landing area. Others may not have the capability to transition into slower-flight modes in time to avoid an instrument encounter. In time, classes may emerge that will allow for a diversification of rules among the powered-lift fleet.

Due to their ability to have multiple configurations of flight, it is important that powered-lift specific instrument skills be applied. Configuration changes during approach, novel systems, and automation, as well as unique emergency procedures make having an instrument rating in category critical to the expected level of safety demanded of part 135 operations. The FAA has created instrument ratings that are category and sometimes class (in the case of helicopters) specific instead of being a universal rating on all categories for the very reason that these categories and individual classes are unique enough in operation that the training must be tailored as such.

Many proposed operating areas for powered-lift are in densely populated

urban areas, where an IIMC encounter may pose significant public risk if a loss of control occurs. Requiring powered-lift pilots to have an instrument rating during VFR operations on par with airplane requirements ensures that PICs of powered-lift possess the proper skills to safely conduct flight in the event of IIMC where pilot error can immediately become critical.

Eve suggested that requiring an IFR rating is an overreach, given some powered-lift may not even be capable of instrument flight. The rationale behind the requirement is not to allow the aircraft to be flown IMC when conditions deteriorate (as it is a VFR only operation), but instead to ensure the pilot has the skills, experience, and knowledge in the category to keep the aircraft under control both during and before IIMC. Eve further suggested that many models will likely be operating along planned routes, near forecast weather, and short distances. This cannot be predicted for all types across the category, however, and innovative uses of powered-lift may rapidly expand beyond this possible area of operations. Although a powered-lift may not be type-certified for IFR operations, pilots can still acquire an instrument rating using these aircraft. This is similar to the situation with many helicopters, which may not be type certified for IFR flight, yet pilots often obtain their instrument ratings in these helicopters by conducting simulated IMC training in VMC.

There may be future aircraft designs such that the skill, knowledge, and experience that the instrument rating for VFR operations otherwise brings will no longer be necessary. In addition, the environment where some powered-lift operations occur may be isolated, limited, or strictly controlled, proving that the instrument rating for VFR operations may be unnecessary to maintain safety. However, until further data is collected through operational use and experience of powered-lift, the FAA is maintaining the instrument rating or ATP requirement for powered-lift PICs operating under VFR, aligning the regulation with the requirements imposed for airplanes.

GAMA, as part of its argument that powered-lift are add-on ratings to the existing categories of rotorcraft or airplane, suggested that § 135.243 should be amended to allow for the instrument rating (when required under the above regulation) to be held in airplane or rotorcraft category (since there would be no powered-lift category in this case). Recency would be accomplished in the aircraft type. This

³⁷³ Powered-lift operators wishing to utilize helicopter weather minimums and helicopter VFR fuel reserves must demonstrate that their aircraft can meet certain performance and operational criteria to ensure the powered-lift can safely conduct a landing in vertical-lift flight mode at any point along the flight route. Absent this capability, the powered-lift is required to adhere to the airplane standards for weather minimums and fuel reserves.

is based on ICAO developed guidance as stated in GAMA's comment.

Due to the novelty of powered-lift, blended capabilities, their differing capabilities, use of advanced technology, and unique applications, the FAA has decided it is more prudent to develop powered-lift as their own independent category. It is not required that the FAA align all its regulations with ICAO recommendations regarding powered-lift. Having a separate category as airplane or rotorcraft would make holding a category specific instrument rating tailored closer to the powered-lift capabilities and type of operations. Therefore, the FAA adopts the provision as proposed.

6. Operating Experience (§ 135.244)

Section 135.244 specifies that before serving as PIC in a commuter operation in part 135, a pilot must accomplish operating experience on the make and basic model aircraft to be flown. This section, through use of the term "aircraft," applies to powered-lift. The hours of operating experience required are set forth in § 135.244(a)(1) through (4) and are tailored to specific aircraft types: single-engine aircraft, multiengine reciprocating engine-powered aircraft, multiengine turbine-engine powered aircraft, and turbojet-powered airplanes. These categories, established in the 1980s, did not foresee the use of powered-lift in part 135. Further § 135.244(b) prescribes the manner and timing through which the pilot must accomplish the operating experience and specifically requires the operating experience to be accomplished in the aircraft. Section 135.244(b) had no proposed changes in the NPRM due to the reference to aircraft and would include powered-lift.

To address this concern in § 135.244(a)(1) through (4) which do not include specific hours of operating experience for powered-lift, the FAA proposed in § 194.247(c) to require 20 hours of operating experience in make and basic model of powered-lift before serving as PIC in part 135. This 20-hour operating experience requirement parallels the requirement for multi-engine turbine airplanes, which share similar characteristics in terms of complexity. Additionally, § 194.247(c) would exempt powered-lift from the legacy operating experience requirements under § 135.244(a). By placing the powered-lift requirement in the SFAR, the FAA would retain the flexibility to adjust the 20-hour operating experience requirement as new data and insights become available to align the operating experience

requirements with powered-lift operations.

Eve submitted comments regarding the amendment of §§ 135.244(b) and 194.247. Similarly, L3Harris provided comments on the same amendments. Eve and L3Harris did not challenge the number of hours prescribed under § 194.247(c); however, they commented that scenario-based flight training or line-oriented flight training in an FSTD equivalent to a Level C or higher in category, class, and type, while under the direct observation of a qualified instructor, should replace 50 percent of the hours required in § 194.247(c). They further contended that each hour of operating experience be replaced with "one full operating cycle." As noted in section V.F. of this preamble, the FAA interprets the term "operating cycle" as it is defined in § 121.431 as a complete flight segment consisting of a takeoff, climb, enroute portion, descent, and a landing.

Section 135.244(a) arose from a series of accidents in commuter operations in which the PIC had little to no flight in the particular make and model of aircraft they were to fly in revenue operations.³⁷⁴ While line-oriented and scenario-based flight training are useful training experiences, time obtained in an FSTD may not adequately replicate the range of real-world operational scenarios that were the purpose of the original rule. The FAA emphasizes that, while FSTDs provide valuable training opportunities, they currently do not fully simulate the complexities of the NAS, including factors such as ATC communications, air traffic, ground operations, and other operational elements inherent in a part 135 commuter operation.

This recommended modification to allow operating experience to be accomplished in FSTD would be difficult to limit only to powered-lift as such allowance is not currently permitted in established categories of aircraft that part 135 pilot will have far more extensive experience flying in the NAS.³⁷⁵ Such a significant change for all categories of aircraft necessitates a thorough evaluation of potential safety implications across different operational contexts, which has yet to occur. This departure from "real-world" experience

³⁷⁴ 45 FR 7540 (Feb. 4, 1980).

³⁷⁵ As commenters have noted, they anticipate difficulties meeting even the minimum flight time requirements in powered-lift necessary for certificates and ratings whereas airplane and helicopter pilots will have built the majority of their flight time in airplanes and helicopters. It would be difficult to support relief from an in-flight requirement by allowing FSTD time for operating experience especially given the other increases FSTD use permitted in this final rule.

would be beyond the scope of the current rulemaking effort. The FAA recognizes the advancements in simulation technology and its growing role in pilot training. The FAA is actively evaluating the use of FSTDs in training to this degree, and it is conceivable that advancements in FSTD technology and demonstrated equivalency in safety outcomes may warrant a reevaluation of the current stance in the future. However, the rationale for FSTDs to provide a level of training equivalent to real-world operations is a subject of ongoing assessment.

In addition, the evaluation of new and emerging simulation technology, such as the use of virtual reality (VR) devices on qualified FSTDs, and the ability to realistically simulate scenarios/situations is also currently being evaluated by the FAA. There are current pathways that would allow for operators to have that technology assessed under part 60 as discussed in section IV.C. of this preamble. At this time, the use of such immersive simulation technologies have not been fully evaluated for use on qualified FSTDs; nor are they currently utilized in training to this degree.

The requirement for operating experience in actual aircraft operations is rooted in ensuring the highest level of safety and public confidence in commercial aviation. Thus, the FAA maintains the importance of actual in-flight experience in the basic make and model of aircraft to be flown. This experience encompasses many "real-world" occurrences such as air traffic control, certain weather conditions, passengers, ground obstacles/hazards, or other factors that can play an important role in the development of a pilot's aeronautical decision-making skills and operational proficiency in the actual passenger-carrying part 135 commuter operations.

To the extent that commenters recommended replacing each hour of flight with an "operating cycle" when there is already a provision to reduce the flight hours by fifty percent for each takeoff and landing, this allowance would potentially reduce hours even further than currently allowed by § 135.244(b)(4). That section already permits the substitution of hours with takeoffs and landings. Replacing hours with operating cycles would further decrease hours and reduce the experience level of initial PICs in commuter operations to unacceptable levels.

While the FAA appreciates the suggestions put forth by the commenters, the current regulatory approach requiring actual aircraft

operating experience as prescribed in § 135.244(b) will be maintained. The FAA will continue to monitor advancements in FSTD technology and their potential application in pilot training programs. Any future changes to the regulatory requirements will be considered through a comprehensive rulemaking process, ensuring stakeholder engagement and adherence to safety priorities.

Eve commented that § 61.64 requires pilots who completed their practical test in a flight simulator without meeting certain experience requirements to complete 25 hours of supervised flight with a qualified pilot-in-command before their PIC restriction is lifted. Eve argued that in the cases in which a pilot is completing the supervised operating experience mandated by § 61.64, the operating experience requirements of §§ 135.244 and 194.247 may be considered satisfied.

A pilot can concurrently comply with the requirements of supervised operating experience of § 61.64 if the operating experience requirements and provisions of §§ 135.244 and 194.247 are also complied with. The time requirements for the applicable regulations address differing objectives of the operating experience. Section 61.64 addresses experience not received in the actual aircraft, whereas § 135.244 provides passenger-carrying experience to a new pilot who is learning about the operation. The requirements under § 135.244(b) are more restrictive, as they require the observations to be conducted during part 135 commuter passenger-carrying operations. In the case of an aircraft not previously used by the certificate holder in part 135 operations, operating experience acquired in the aircraft during proving flights or ferry flights may be used. As a result, part 61 SOE cannot replace the part 135 operating experience requirements—it would not, on its own, satisfy the requirements of § 135.244(b). However, should the § 61.64 requirements be satisfied during § 135.244(b) operating experience, completing them concurrently (as opposed to one in lieu of another) is possible. In this case, the pilot satisfying the requirements of § 61.64 must meet all requirements to serve in a part 135 commuter operation.

HAI contended twenty hours of PIC in each make/model of powered-lift is impractical, and that training in the basic make/model of any other type of aircraft is considered sufficient without providing any additional safety argument.

The FAA chose twenty hours in the aircraft to mirror multi-engine turbine engine-powered requirements. The FAA

expects many powered-lift, due to their novel nature and complex systems, to be on par with the level of complexity as these multi-engine turbine engine jets. The powered-lift category presently includes aircraft as complex as the AW-609, which is neither small nor simple in systems or operation. The rule must be inclusive of and appropriate to all powered-lift that may exist within the category. In time, if classes emerge in powered-lift that are significantly more or less complex, higher or lower minimums may be implemented. With regard to the comment that 20 hours of PIC in each make and model is impractical, HAI did not provide any explanation for its statement. To the extent that HAI suggests that time in any make and model of powered-lift should count for all makes and models of powered-lift, this allowance would be inconsistent with the requirements imposed on other categories of aircraft in § 135.244. As HAI provided no safety justification for disparate requirements, the FAA is finalizing § 194.247 as proposed.

7. Second in Command Qualifications (§ 135.245)

In the NPRM, the FAA proposed revising § 135.245, which sets the certification requirements for SICs operating aircraft, to specifically include reference to powered-lift where appropriate. The FAA notes that a majority of the section did not require amendment as the existing language in § 135.245(a) and (d) already reference “aircraft,” a term that includes powered-lift.³⁷⁶ However, the FAA proposed amendment to § 135.245(c)(1) to add powered-lift, which will ensure the instrument currency requirements for airplane and helicopter SICs are likewise applicable to powered-lift. These proposed changes standardize the SIC instrument experience requirements across powered-lift, airplanes, and helicopters for SICs who serve in IFR operations.

In its comments, GAMA proposed amending § 135.245, recommending that the SIC instrument rating requirement for powered-lift be satisfied with either an airplane or helicopter instrument rating. This approach contemplates powered-lift as an add-on type rating to existing airplane or helicopter categories, per ICAO guidance, rather than a separate powered-lift category.

Furthermore, GAMA recommended that powered-lift type ratings should carry a VFR-only operating limitation,

³⁷⁶ The FAA notes that § 135.245(b) applies only to helicopters, and that provision is unchanged in this final rule.

unless the approved course of training is certified by the authority to include IFR operations and VFR On-top. Additionally, GAMA suggested modifications to § 135.245(c)(1), paragraphs (ii) and (iii), to align them with ICAO guidance. The totality of these comments reflect GAMA’s recommendation for integrating powered-lift into the existing regulatory framework by applying ICAO guidance applicable to airplanes or helicopters.

The FAA revised § 135.245(c) to align the SIC instrument experience requirements uniformly across powered-lift, airplanes, and helicopters. This alignment ensures that the instrument experience requirements are consistent across the categories of aircraft, addressing the core of GAMA’s recommendation for alignment. Further, having the SIC instrument experience requirements for powered-lift increases safety as explained in section V.J.5.ii. of this preamble.

Regarding GAMA’s proposal that the FAA align all its regulations with ICAO guidance regarding powered-lift, the FAA has decided on a different path. After thorough consideration, detailed in section V.J.7. of this preamble, the FAA has determined that the skill level and knowledge required for pilots of powered-lift necessitate a more conservative stance instead of applying ICAO recommendation to § 135.245.

The FAA adopts the provision as proposed in the NPRM.

8. Pilot Qualifications: Recent Experience (§ 135.247)

Section 135.247 specifies the recent takeoff and landing experience that a PIC must complete within the preceding 90 days to carry passengers in an aircraft. Under § 135.247(a)(3), the PIC of a turbine-powered airplane type certificated for more than one pilot must complete an alternative to the night takeoff and landing requirements. To complete an alternate path, a PIC must serve as PIC of a turbine-powered airplane that is type-certificated for more than one pilot crewmember and comply with the requirements listed in the regulation.

Based on the active certification projects for powered-lift, the FAA expected that a majority of powered-lift will not be type-certificated for more than one pilot crewmember. For the reasons stated in the NPRM, the FAA did not propose extending the alternative experience requirements in § 135.247(a)(3) to powered-lift and, therefore, proposed no amendments to § 135.247.³⁷⁷

³⁷⁷ 88 FR 38946 at 39016 (June 14, 2023).

The FAA did not receive any comments on excluding powered-lift from the alternate provisions set forth by § 135.247(a)(3). Therefore, no regulatory changes are adopted in this final rule.

9. Initial and Recurrent Pilot Testing Requirements (§ 135.293)

In the NPRM, the FAA proposed amendments to § 135.293, which pertain to initial and recurrent pilot testing requirements, to incorporate powered-lift where appropriate. While § 135.293 remains largely unchanged, modifications have been made to the following sections to accommodate powered-lift.

Section 135.293(a)(9) specifies rotorcraft pilot testing requirements on recognizing and avoiding of hazardous visibility conditions like flat-light, whiteout, and brownout. The FAA proposed extending these requirements to powered-lift pilots, ensuring they are trained to recognize and avoid hazardous visibility conditions applicable to powered-lift.

In § 135.293(b), which specifies the requirement for pilots to complete a practical skills and techniques competency check in the aircraft every 12 months, the FAA proposed that powered-lift pilots also complete these checks for each type of powered-lift they operate. This proposal ensures that powered-lift pilots maintain the same level of competency and proficiency as required for other aircraft types.

Section 135.293(c) mandates competency checks for rotorcraft include demonstrations of maneuvering solely by reference to instruments and transitioning into VMC following an inadvertent encounter with IMC. Section 135.293(c) also requires that for non-IFR-certified rotorcraft, the pilot must perform maneuvers that are appropriate to the rotorcraft's installed equipment, the certificate holders' operations specifications, and the operating environment. Recognizing the critical importance of these skills, the FAA proposed applying these same evaluation and maneuver requirements to powered-lift pilots to ensure they possess the necessary capabilities to handle similar conditions.

Finally, regarding § 135.293(h), the FAA proposed a permanent change to remove the compliance date memorialized in this paragraph and reserve it, as the compliance date has already passed.

GAMA's comments recommend applying ICAO guidance to read the terms "helicopter" or "rotorcraft" to apply to "powered-lift." Specifically, GAMA proposes that § 135.293(a)(9),

(b), (c), and (h), as addressed above, should be applicable to powered-lift.

In response to GAMA's comments to apply ICAO guidance, the FAA notes that the proposed language for § 135.293(a)(9) already aligns with this perspective by requiring powered-lift pilots to undergo testing for hazardous weather condition recognition and avoidance. Regarding § 135.293(b), the FAA adopts language similar to multi-engine airplanes due to the complexity and unique nature of each powered-lift type, achieving similar outcomes to what helicopter-specific language would have necessitated. For § 135.293(c), the FAA's proposal incorporates the more restrictive helicopter requirement for powered-lift, in line with GAMA's suggestions. Finally, for § 135.293(h), the FAA's proposal included the application of these sections to powered-lift.

The FAA adopts the amendments to § 135.293 as proposed.

10. Pilot in Command: Instrument Proficiency Check Requirements (§ 135.297)

i. Pilot in Command: Instrument Proficiency Check Requirements (§ 135.297(a) and (b))

Section 135.297 prescribes the instrument proficiency check (IPC) requirements for the PIC of a part 135 IFR operation. The requirements in § 135.297(a) and (b) would apply to powered-lift PICs in part 135 operations as written.

The FAA did not receive any comments suggesting these provisions should not be applicable to powered-lift; therefore, no amendments are adopted in this final rule and § 135.297(a) and (b) will apply to pilots in command of powered-lift.

ii. Pilot in Command: Instrument Proficiency Check (IPC) Requirements (§ 135.297(c))

The FAA proposed amendments to § 135.297(c) to include powered-lift in the IPC requirements for PICs. The regulation defines instrument checking maneuvers for PICs flying an airplane under § 135.243(a) (turbojet of 10 or more seats or a multi-engine commuter) or PICs of airplanes and helicopters conducting IFR operations under § 135.243(c). In addition to not addressing powered-lift IPC maneuver requirements, this regulation contains a regulatory gap in that it does not include a standard for helicopter operations conducted under § 135.243(a). The FAA proposed to amend § 135.297(c)(1)(i) to broadly refer to "aircraft" to ensure consistency in the

instrument proficiency check requirements across categories of aircraft.

GAMA, as part of its broader argument that powered-lift should be considered add-on ratings to the existing categories of rotorcraft or airplane, proposed that the instrument proficiency check requirements for powered-lift in § 135.297(c)(1) match requirements with those of helicopters. GAMA's recommendation would have powered-lift adhere to the instrument proficiency check requirements of a helicopter, which prior to this final rule would have applied instrument procedures and maneuvers at the commercial pilot certificate level to all § 135.297 checks for powered-lift even those operations that require the PIC to hold an ATP certificate (*i.e.*, § 135.243(a)). The FAA maintains that every aircraft category should be evaluated on ATP instrument procedures and maneuvers when the operation requires the PIC to hold an ATP certificate. Limiting this evaluation requirement to airplanes while allowing helicopter and powered-lift operations to conduct checks at the commercial-instrument level would undercut the same rationale for holding the ATP certificate in the first place.

Therefore, the FAA adopts § 135.297(c).

iii. Pilot in Command: Instrument Proficiency Check Requirements (§ 135.297(g))

Section 135.297(g) specifies the checking requirements for PICs authorized to use an autopilot system in place of an SIC. The FAA proposed permanently amending paragraph (g)(3), which currently only references airplanes, to require that if the PIC is authorized to use an autopilot system in place of an SIC in any aircraft, the PIC must demonstrate proficiency in its use. This amendment will ensure all PICs are checked on autopilot systems to the same standard. Additionally, to provide sufficient time for existing rotorcraft operators to update their checking programs, if necessary, the FAA proposed a compliance date of six months after the effective date of the final rule for this paragraph.

The FAA did not receive any comments on the alternate provision set forth by § 135.297(g). The provision is adopted as proposed.

11. Initial and Transition Training and Checking: Flight Instructors (Aircraft), Flight Instructors (Simulator) (§ 135.340)

The FAA did not propose any changes in the NPRM to §§ 135.339 and 135.340

and, therefore, did not receive any comments on these provisions but finds amendments necessary due to related changes in this final rule. Section 135.340, which prescribes initial and transition training for instructors in aircraft and simulators, as currently written, applies to powered-lift flight instructors. To ensure the ATP certificate privileges contained in § 61.167(a) are not expanded as a result of the SFAR's airman certification training curriculum, the FAA proposed a temporary limitation to prohibit ATP certificate holders with powered-lift ratings from instructing other pilots for the purpose of obtaining a commercial pilot certificate with a powered-lift category rating or an instrument-powered-lift rating.

Regulatory language in §§ 135.339 and 135.340 currently stipulates requirements that prevent flight instructors or check airmen from qualifying in aircraft without two pilot seats, which creates a conflict with the proposed SFAR single set of flight controls pathways. Specifically, § 135.339(e)(3) requires training and practice in conducting flight checks from both the left and right pilot seats for normal, abnormal, and emergency procedures to ensure competence in conducting the required pilot flight checks. Similarly, § 135.339(e)(4) requires safety measures likely to develop during checking to be taken from either pilot seat for emergency situations. Section 135.340 contains similar requirements necessitating dual controls in paragraphs (e)(3) and (e)(4) for flight instruction.

In the case of single-pilot-seat powered-lift, the requirements under §§ 135.339 and 135.340 are not applicable due to there being no distinction between left and right pilot seats. Consequently, the FAA introduced regulatory flexibility within these sections to accommodate training in single-seat powered-lift. The amendments allow the collection of relevant data and other pertinent information during the SFAR period, which may inform future updates to the regulations as needed.

Therefore, the FAA is revising §§ 135.339 and 135.340 to reflect training required from both the pilot seat and the observer seat (when applicable) to ensure instructors and check pilots are properly trained on techniques and procedures to observe all required maneuvers when using the single controls pathway.

12. Pilots: Initial, Transition, and Upgrade Ground Training (§ 135.345)

Section 135.345 establishes the requirements for initial, transition, and upgrade ground training for pilots and includes the requirements for what training must be completed. Powered-lift will be included under the proposed expanded scope of § 135.227(b) (as discussed in section VI.D.4. of this preamble), which will require training under § 135.354(b)(6)(iv) in certain icing-related requirements. Currently, § 135.354(b)(6)(iv), is limited to airplane operators seeking authorization to take off during ground icing conditions. To address this issue, the FAA proposed extending § 135.345(b)(6)(iv) to include powered-lift through § 194.247(d), which will require the icing-related training when applicable.

The FAA did not receive any comments objecting to or suggesting modifications to § 194.247(d). Therefore, the FAA adopts the provision as proposed.

K. Part 142 Training Centers

To accommodate powered-lift in part 142 training centers, and harmonize requirements for airplanes, powered-lift, and rotorcraft, the FAA proposed to amend certain part 142 requirements. Specifically, the FAA proposed to amend §§ 142.11(d)(2)(iii), 142.47(c)(2), 142.53(b)(2) and (b)(3), and 142.57(c) to permit the use of FSTDs for powered-lift training, testing, and checking. These amendments will also harmonize the eligibility and testing requirements for instructors providing inflight training in powered-lift and training in an FSTD for all aircraft categories.

1. Subpart A—General Requirements (§ 142.11(d)(2)(iii))

Subpart A of part 142 prescribes the requirements governing the certification and operation of training centers and provides an alternative means to accomplish the training required by part 61, 63, 65, 91, 121, 125, 135, or 137. Section 142.11 sets forth the application requirements for issuance of a new or amended training center certificate and training specifications. Because the FAA expects training centers to use powered-lift FSTDs for training, testing, and checking, the FAA proposed an amendment to § 142.11(d)(2)(iii) to remove the terms “airplane” and “rotorcraft” and use the term “aircraft” to include powered-lift. With this amendment, training centers will be able to apply for training specifications and receive authorization for the use of FAA qualified powered-lift FSTDs, in addition to existing airplane and

rotorcraft requirements. The FAA did not receive comments on this amendment and adopts the amendment, as proposed.

2. Subpart C—Personnel and Flight Training Equipment Requirements (§§ 142.47(c)(2) and 142.53(b)(2) and (b)(3))

Subpart C prescribes the personnel and flight training equipment requirements for a certificate holder that is providing training to meet the requirements of part 61. First, § 142.47 prescribes the eligibility requirements for instructors in an approved flight training course and, as relevant to this rulemaking, requires each instructor to satisfactorily complete a written test accepted by the Administrator as being of equivalent difficulty, complexity, and scope as the tests provided by the Administrator for the flight instructor airplane and instrument flight instructor knowledge tests. The FAA proposed to amend § 142.47(c)(2)(ii) to apply to the successful completion of the written test for the specific category of aircraft in which the instructor will instruct. The FAA did not receive comments on this amendment and adopts the amendment as proposed. Section V.G.3. of this preamble discusses additional amendments adopted within § 142.47.

Next, § 142.53 prescribes further training center instructor training and testing requirements. Among other requirements, each instructor who instructs in a flight simulator for an ATP certificate test, type rating test (or both) must meet one of three requirements set forth in § 142.53(b)(1) through (3). Two of these options include participation in an approved line-observation program under part 121 or part 135, with certain parameters,³⁷⁸ or participation in an approved in-flight observation training course, with certain parameters.³⁷⁹ However, each of these options are airplane specific,³⁸⁰ leaving an instructor in another category of aircraft only the first compliance option in § 142.53(b)(1) (*i.e.*, in flight operations).

The FAA found, and maintains, a line-observation program as described in § 142.53(b)(2), or an inflight observation program as specified in § 142.53(b)(3), provide equivalent training and experience for FFS instructing in a rotorcraft or powered-lift as these options do in airplanes. Additionally, expanding the options to rotorcraft and powered-lift provides flexibility to select the best option for the instructor and training center.

³⁷⁸ § 142.53(b)(2).

³⁷⁹ § 142.53(b)(3).

³⁸⁰ §§ 142.53(b)(2)(i) and (b)(3)(i).

Therefore, the FAA proposed to amend paragraphs (b)(2) and (b)(3) to change the word “airplane” to “aircraft” to encompass all aircraft categories. The FAA did not receive comments on these option expansions and adopts the amendment as proposed.

Finally, § 142.57 prescribes the requirements for training center certificate holders and applicants that use aircraft for flight instruction. Specifically, § 142.57(b), as currently written, requires aircraft used for flight instruction to be at least a two-place aircraft with engine power controls and flight controls easily reached from both pilot stations. However, § 142.57(c) provides an exception to this requirement and allows a part 142 training center to use an airplane for flight instruction with certain controls³⁸¹ that are not easily reached and operated in a conventional manner by both pilots if the certificate holder has determined the instruction can be given in a safe manner considering the location of controls and their operation. Because the FAA’s original intention in implementing this regulation was to apply the exception to all aircraft, rather than only airplanes, the FAA proposed revising the exception in § 142.57(c) to apply to all aircraft. The FAA did not receive comments on the expanded flexibility and adopts the amendment as proposed. This preamble further discusses § 142.57 in the context of dual controls in section V.K.2.

Adding Inceptors to the List of Controls in § 142.57(c)

While the FAA did not receive comments on the proposed amendment to § 142.57(c) adopted herein, Eve recommended that inceptors be added to the types of controls referred to in § 142.57(c) as excepted from § 142.57(b). In other words, Eve’s proposed amendment would permit and expand the exception to controls that are required to be easily reached and operated in a conventional manner by both pilots during flight instruction. Eve did not provide supporting arguments for the exclusion of inceptors as compared to other controls; however, the FAA maintains that these controls in particular are critical to maintaining safety in in-flight instruction and, therefore, declines to expand the exception to inceptors.

Section 142.57(c) identifies several controls excepted from meeting the standard in § 142.57(b) in recognition that certain uniquely configured aircraft

could be safely operated in the context of flight instruction: nose-wheel steering, switches, fuel selectors, and engine air flow controls. In a broad context, inceptors are flight-critical controls on fly-by-wire aircraft used to adjust the flight path of an aircraft that are not excepted from the requirements of § 142.57(b). As previously defined in footnote 35 of this preamble, the term “inceptor” refers to a wide variety of non-traditional pilot controls through which pilot inputs are managed for the purpose of operating the powered-lift.

Due to the breadth of piloting tasks and systems that inceptors govern, systems that are critical must be accessible by both pilots during flight training. Given these considerations, as well as the wide variety of powered-lift designs and control features expected, the FAA does not find it appropriate to extend relief in § 142.57(c) to inceptors at this time. The FAA considered the challenges imposed by some new-entry powered-lift which may have only one set of controls (e.g., inceptors) or one pilot station, which is discussed in section V.D. of this preamble.

3. Temporary Alternate Means To Satisfy Minimum Curriculum Content in Training Courses Under Part 142 (§ 194.251)

Finally, the FAA proposed to relieve an applicant from the requirement to receive flight training on a task (or perform the task on a practical test) in accordance with an examiner’s waiver authority because the powered-lift is incapable of performing the task. In turn, the FAA proposed that a training course for which approval is requested is not required to include training on a task specified in an area of operation if the powered-lift is not capable of performing the task, provided the FAA has issued waiver authority for that task in accordance with § 194.207(b). The FAA proposed this relief in § 194.251 and did not receive any comments on this provision. As discussed in section V.H.1. of this preamble, the FAA adopted the described training and testing relief as proposed; therefore, this final rule adopts § 194.251 as proposed.

L. Subpart K of Part 91 Pilot Qualifications

Subpart K of part 91 allows for fractional owners and their respective management company to share operational control of an aircraft. This subpart details certain operational considerations pertaining to fractional ownership programs to include safety standards for pilot training and qualifications. In the NPRM, the FAA discussed how the current regulatory

framework as well as proposed amendments would be applicable to fractional ownership programs using powered-lift.

Section 91.1053 prescribes the FAA certification and ratings required to serve as a pilot in aircraft under a fractional ownership program and is applicable to powered-lift as written. Section 91.1053(a)(2)(i) requires the PIC of a powered-lift to hold an ATP certificate and applicable type ratings to conduct operations under subpart K of part 91. The FAA proposed a permanent amendment to § 91.1053(a)(2)(i) to clarify that the type rating required to operate under subpart K of part 91 cannot be limited to VFR-only operations.

The FAA received one comment in response to this proposal from Eve who proposed that the FAA apply the same requirements of pilot qualifications as already specified in § 135.243(b)³⁸² to fractional operators under subpart K of part 91. Eve suggested their proposal will allow future operators to foster the market from a less complex start, which the FAA interprets to mean an entrance into the market that is on par with similarly situated airplane operators, as well as address the current shortage of professional pilots available in the U.S. market. Eve also proposed revising the pilot qualification minima in § 135.243(b) to allow an airplane or helicopter instrument rating in place of a powered-lift instrument rating. Eve suggested this revised version of § 135.243(b) could also be incorporated into § 91.1053 to apply to subpart K of part 91 operators. The FAA determined that there is a significant safety advantage to being instrument rated in the category of aircraft flown and that instrument experience in other categories does not automatically provide the knowledge or skills to safely pilot the aircraft in an inadvertent instrument conditions encounter.³⁸³ The FAA, accordingly, adopts § 91.1053 as proposed.

Section 91.1055 prescribes pilot operating limitations and pairing requirements for fixed-wing program

³⁸² Section 135.243(b) outlines who may serve as PIC of an aircraft under VFR, and it includes a person who (1) holds at least a commercial pilot certificate with certain ratings, (2) has had at least 500 hours time as a pilot, including cross-country flight time and at night, (3) for an airplane, holds an instrument rating or an ATP certificate with an airplane category rating, or (4) for helicopter operations conducted VFR over-the-top, holds a helicopter instrument rating or an ATP certificate with a category and class rating for that aircraft, not limited to VFR.

³⁸³ As discussed, § 135.243(b) contains the PIC qualification requirements for aircraft operated under VFR.

³⁸¹ Section 142.57(c) specifically delineates controls such as nose-wheel steering, switches, fuel selectors, and engine air flow controls.

aircraft. The regulation requires the PIC to execute takeoffs and landings under certain operational conditions when the SIC has less than 100 hours of flight time as SIC in the aircraft make and model and type, if a type rating is required, and the PIC is not an appropriately qualified check pilot. The FAA proposed that this rule apply to powered-lift in § 194.245. The FAA received no comments and therefore adopts § 194.245 as proposed.

Section 91.1065 prescribes the initial and recurrent pilot testing requirements. Section 91.1065(b) specifies “multiengine aircraft;” therefore, the parts of this section that reference aircraft are applicable to powered-lift. As described in the NPRM, all powered-lift coming to market are multiengine aircraft, and the FAA does not anticipate civil single-engine powered-lift to be developed during the term of this SFAR. The FAA did not receive any comments related to § 91.1065. As such, in accordance with existing § 91.1065(b), PICs and SICs of powered-lift fractional ownership program operations must complete a competency check in each type of powered-lift in which the pilot will serve every 12 calendar months.

VI. Operational Rules for Powered-Lift

A. Introduction

As noted in the Executive Summary, the FAA received comments requesting that the FAA apply a more performance-based approach to the SFAR operational rules rather than largely apply the airplane provisions to powered-lift operations. As discussed in this section, the FAA determined that applying performance-based criteria to allow some powered-lift to use the rotorcraft/helicopter provisions for some of the operational rules is appropriate. As a result, and as discussed below in more detail, the FAA has created operational flexibility by establishing some performance-based standards for powered-lift operations.

The FAA notes there were four different regulatory tables in the proposed SFAR. The FAA addressed the parts 91 and 135 airplane provisions in the tables to §§ 194.302 and 194.307. It addressed the parts 91 and 135 helicopter and rotorcraft provisions in the tables to §§ 194.303 and 194.308. For the final rule, the FAA has combined the part 91 airplane and rotorcraft tables, now found at § 194.302, and the part 135 airplane and rotorcraft tables, now found at § 194.306.

Finally, the FAA notes that it made a technical amendment to § 194.301 to

provide further clarity. There are some existing regulatory sections that reference a specific category of aircraft such as airplanes or rotorcraft. If any of those references are not clarified in the SFAR regulatory text, then the FAA intended for them not to apply to powered-lift. Consequently, the FAA amended § 194.301 to state, “In addition, any sections or paragraphs within sections under parts 91 and 135 that refer to specific categories of aircraft and that are not referenced in the SFAR tables to § 194.302 or § 194.306, do not apply to powered-lift.”

B. Part 91 Rules for Powered-Lift

Section 91.9(a) and (b) specify the requirements for complying with the operating limitations in an approved Airplane or Rotorcraft Flight Manual, and requirements for maintaining the Airplane or Rotorcraft Flight Manual in the aircraft, as appropriate to the aircraft. The FAA proposed in § 194.302(a) to apply the requirement to comply with the operating limitations of the aircraft’s approved flight manual to powered-lift and to maintain the flight manual in the powered-lift. The FAA also proposed a permanent amendment to § 91.1(d) to change the term “airplane” to “aircraft” because these provisions apply to all aircraft. The FAA did not receive any comments related to these proposals and is therefore adopting § 194.302(a) and the amendment to § 91.1(d) as final.

The FAA received a general comment about the proposed rules for powered-lift and part 91.

AOPA argued the proposed SFAR did not sufficiently address requirements for private powered-lift operations to be conducted under part 91. AOPA indicated they expect an increase in private operations within a few years and requested clarification on private operating requirements.

The FAA disagrees with AOPA that the SFAR does not address requirements for “private” operations. The FAA asserts that operations that are not commercial operations are regulated by part 91. During this rulemaking, the FAA evaluated the part 91 regulations to determine how they apply to powered-lift. As discussed in the NPRM, the part 91 rules pertaining to “aircraft” already apply to powered-lift.³⁸⁴ The FAA then evaluated every part 91 rule pertaining to “airplanes,” “helicopters,” and “rotorcraft” and determined if and how each of those would apply to powered-lift. Those regulations are outlined in the SFAR under § 194.302. As a result,

the regulations outlined in § 194.302 address non-commercial operations (what the commenter is referring to as “private” operations).

1. Flight Rules

Section 91.103 requires a PIC to be familiar with all available information concerning that flight. Section 91.103(b)(1) states that this information must include takeoff and landing distance data as specified in an approved Airplane or Rotorcraft Flight Manual. The FAA proposed in § 194.302(b) that powered-lift with an AFM approved through the aircraft certification process in part 21 comply with the provisions in § 91.103(b)(1). The FAA did not receive any comments related to this proposal and is therefore adopting § 194.302(b) as final.

Section 91.107 prescribes rules related to the use of safety belts, shoulder harnesses, and child restraint systems. Specifically, § 91.107(a)(3)(i) through (iii) requires that each person onboard an aircraft operated under part 91 occupy an approved seat or berth with a separate safety belt and, if installed, shoulder harness properly secured about the person during movement on the surface, takeoff, and landing. The FAA proposed in § 194.302(c) to apply § 91.107(a)(3)(i) through (iii) to powered-lift. For seaplane and float-equipped rotorcraft operations during movement on the surface, § 91.107(a)(3) excepts the person pushing off the seaplane or rotorcraft from a dock and the person mooring the seaplane or rotorcraft at a dock from the preceding seating and safety belt requirements. The FAA proposed in § 194.302(c) to apply the same exception to powered-lift when the powered-lift is operating like a seaplane or float-equipped rotorcraft. The FAA did not receive any comments related to § 194.302(c) and is therefore adopting § 194.302(c) as final.

Section 91.113 prescribes the rules for converging aircraft based on category and type of operation (e.g., towing). Under § 91.113(d), when aircraft of the same category are converging at approximately the same altitude (except head-on, or nearly so), the aircraft to the other’s right has the right-of-way. When the aircraft are of different categories, § 91.113(d)(1) through (3) establishes a hierarchy giving priority to balloons, then gliders, followed by airships, and then to airplanes and rotorcraft. An aircraft that is towing or refueling other aircraft has right-of-way over all other engine-driven aircraft. The FAA emphasized aircraft maneuverability when establishing the right-of-way hierarchy for converging aircraft in

³⁸⁴ See 88 FR 38946 at 39024–39025 (June 14, 2023).

§ 91.113(d)(1) through (3). The preamble for the original right-of-way rule states “an aircraft will give way to another of a different class which is less maneuverable and is unable to take as effective action to avoid collision.” The FAA proposed in § 194.302(d) that powered-lift comply with the airplane provisions in this paragraph and yield right-of-way as prescribed in this section.

The FAA received three comments related to § 91.113 and the proposed § 194.302(d). ALPA expressed support for including powered-lift in the same right-of-way category as airplanes and rotorcraft. An anonymous commenter stated they believe it is important that all pilots have the same understanding of which aircraft have the right-of-way, and therefore recommended the FAA make a permanent change to § 91.113(d)(2) and (3) instead of publishing this change in the SFAR. An individual commenter asked the FAA to elaborate on why powered-lift is proposed to be grouped with these other aircraft types and how this categorization ensures safe and efficient traffic flow.

Right-of-way rules maintain the privilege of less maneuverable aircraft to safely proceed with priority over more maneuverable aircraft in the NAS. The proposed § 91.113(d)(2) continues to give gliders right-of-way over powered aircraft such as airplanes, powered-lift, and rotorcraft. Additionally, the proposed § 91.113(d)(3) continues to give airships right-of-way over all other powered aircraft, except for those aircraft that are towing or refueling another aircraft. Balloons will continue to have the right-of-way over any other aircraft category.

The FAA agrees with the commenter that § 91.113 should outline the powered-lift right-of-way rule instead of the SFAR so that all pilots understand how powered-lift should be treated in the NAS under the right-of-way rules. The FAA recognizes that a separate rulemaking, the *Modernization of Special Airworthiness Certification NPRM* (“MOSAIC”),³⁸⁵ has proposed language under § 91.113 that would apply to “powered aircraft.” The FAA is promulgating this powered-lift final rule before the MOSAIC final rule. As a result, any changes included in the final MOSAIC regulatory text for § 91.113 will supersede the powered-lift § 91.113 language once MOSAIC is finalized and effective. Nevertheless, the language in this rule allows powered-lift to operate under the § 91.113 right-of-way rules.

Therefore, the FAA adopts the proposal under § 194.302(d) as a permanent amendment. The FAA recognizes the importance of all pilots understanding the right-of-way rules set forth in § 91.113. Consequently, instead of placing the final language within the SFAR, it is now a permanent change within § 91.113. Under § 91.113(d)(2), a glider has the right-of-way over an airship, powered parachute, weight-shift-control aircraft, airplane, powered-lift, or rotorcraft. Under § 91.113(d)(3), an airship has the right-of-way over a powered parachute, weight-shift-control aircraft, airplane, powered-lift, or rotorcraft.

Section 91.119 prescribes the minimum safe altitude (MSA) for aircraft operations. This section establishes less restrictive minima for helicopters, which in certain circumstances as described in § 91.119(d), are allowed to operate below the minimum altitudes prescribed for airplanes in § 91.119 (b) and (c). The justification for allowing helicopters to operate below minimum altitudes was based on helicopter performance capability. Accordingly, the FAA did not propose to apply the helicopter minimum altitude requirements of § 91.119 to powered-lift. The rationale for this was based on the understanding that powered-lift will likely operate like airplanes in cruise flight, requiring more time and distance to correct their flightpath to avoid other aircraft and obstacles. The FAA proposed powered-lift operators comply with the minimum altitude requirements prescribed § 91.119 (b) and (c).

The FAA received eight comments related to § 91.119 and minimum safe altitudes. ALPA supported the proposed exclusion of powered-lift from § 91.119(d).

Eve recommended that powered-lift, based on anticipated operational performance such as speed and maneuverability, utilize the same MSA requirements as those applied to helicopters.

In a group comment, Archer, CAE, GAMA, Joby, AWPC, Lilium and NBAA suggested that the FAA consider the operational capabilities of powered-lift (e.g., vertical capabilities) when applying the minimum safe altitude requirements.

The FAA has reevaluated its proposal and has determined that certain powered-lift, similar to helicopters, have operating characteristics that enable them to land in a relatively small space, such as their ability to autorotate (or perform an equivalent maneuver) with precision during power-out

emergencies. Therefore, the FAA agrees with the group commenters that those powered-lift that have demonstrated the capability to autorotate or conduct an approved equivalent maneuver should also be allowed the same minimum safe altitudes as those afforded to helicopters in § 91.119(d). The FAA has determined there would be no adverse effect on safety to allow certain powered-lift to utilize helicopter minimum safe altitudes. As such, the FAA adopts a performance-based rule allowing powered-lift operating in the vertical-lift flight mode to use an altitude lower than that specified for airplanes in certain circumstances. This rule is being adopted as § 194.302(d). Importantly, the FAA notes that some helicopter routes may be lower than the minimum altitude published in the AFM for a given powered-lift configuration (e.g., an altitude which enables a transition from wing-borne flight to vertical-lift flight mode at an altitude sufficient to conduct a safe autorotation, or an approved equivalent maneuver, to a landing). Regardless of any clearance or helicopter route prescribed altitude, no powered-lift may operate lower than any AFM limitation (or any other limitation, e.g., MEL, etc.). The FAA reiterates that a clearance by air traffic does not grant exemption from any other rule. Section 91.9 requires compliance with all AFM-prescribed operating limitations, subject to limited exception provided in § 91.9(d).

Section 91.126(b) describes directions of turns when approaching to land at an airport without an operating control tower in Class G airspace. The FAA proposed in § 194.302(e) to apply the airplane provisions detailed in § 91.126(b)(1) when the operator of the powered-lift intends to land in wing-borne flight mode, similar to airplanes. The FAA proposed in § 194.303(b)(1) to apply the helicopter provisions detailed in § 91.126(b)(2) to powered-lift when the powered-lift intends to land in vertical-lift flight mode. The FAA did not receive any comments related to the proposed § 194.302(e) or § 194.303(b)(1). The FAA is adopting both proposed changes as final in § 194.302(e) and § 194.302(f).

Section 91.126(c) outlines the final flap settings required for turbojet-powered airplanes as outlined in the Airplane Flight Manual. Specifically, § 91.126(c) requires the PIC of a civil turbojet-powered aircraft to use, as a final flap setting, the minimum certificated landing flap setting set forth in the approved performance information in the Airplane Flight Manual for the applicable conditions. The FAA is not aware of any turbojet-

³⁸⁵ See 88 FR 47650 at 47704 (July 24, 2023).

powered powered-lift currently in the certification process, nor are any anticipated during the term of this SFAR. To ensure that powered-lift can land safely at airports in Class G airspace, the FAA did not propose to apply this paragraph to powered-lift. The FAA received no comments on this and, as proposed, will not apply § 91.126(c) to powered-lift.

Section 91.129 provides various requirements for operations in Class D airspace, which will each be discussed, in turn. Comments and FAA responses related to this rule have been consolidated at the conclusion of this section.

The provisions of §§ 91.129(a) through (d), (g)(1), and (i) refer to aircraft, and accordingly are already applicable to powered-lift. However, § 91.129(e)(1) and (e)(2) require minimum altitudes when operating at an airport in Class D airspace in large or turbine-powered airplanes. To remain consistent with this established agency policy for aircraft operations that are likely to result in similar noise due to size and powerplant, the FAA proposed in § 194.302(f) that large or turbine-powered powered-lift comply with § 91.129(e)(1) and (e)(2). The FAA anticipates that, for large and turbine-powered powered-lift, compliance with these requirements will be necessary for adequate noise abatement within Class D airspace.

Section 91.129(g)(2) requires that, unless otherwise required by the prescribed departure procedure for that airport or the applicable distance from clouds criteria, each pilot of a turbine-powered airplane and each pilot of a large airplane must climb to an altitude of 1,500 feet above the surface as rapidly as practicable. The FAA proposed in § 194.302(f) that large or turbine-powered powered-lift also need to comply with this requirement to ensure that powered-lift will be operated at an equivalent level of safety to existing large or turbine-powered airplanes.

Section 91.129(h) states that, where a formal runway use program has been established by the FAA, each pilot of a large or turbine-powered airplane assigned a noise abatement runway by ATC must use that runway. However, consistent with the final authority of the PIC concerning the safe operation of the aircraft as prescribed in § 91.3(a), ATC may assign a different runway if requested by the pilot in the interest of safety. This requirement is consistent with previously established FAA policy regarding noise abatement and operational safety, and the FAA considers this requirement to be appropriate for powered-lift operations

to ensure adequate noise abatement. The FAA proposed in § 194.302(f) that large or turbine-powered powered-lift comply with § 91.129(h).

Airbus Helicopters provided a comment related to § 91.129(e)(1), (e)(2), (g)(2), and (h). In this comment, Airbus Helicopters stated that powered-lift design will have a significantly reduced noise footprint compared to large airplanes, and therefore, the FAA should consider lower altitude minima in Class D airspace. Airbus Helicopters proposed the following regulatory amendment: “Section 91.129(e)(1) and (2), (g)(2), and (h) or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.”

The FAA finds that there is insufficient data to support Airbus Helicopters’ claim that powered-lift designs will have a significantly reduced noise footprint compared to large airplanes. Furthermore, the FAA notes that operators may seek relief from this rule by applying for a waiver in accordance with § 91.903. The FAA is adopting the requirements for applying § 91.129(e)(1) and (2), (g)(2) and (h) to powered-lift, as proposed, in § 194.302(g).

Section 91.129(e)(3) states a pilot operating an airplane approaching to land on a runway served by a visual approach slope indicator (VASI) must operate that airplane at an altitude at or above the glide path until a lower altitude is necessary for a safe landing. The requirement for all airplanes to remain at or above the glide path provides an additional measure of safety such as obstacle clearance to airplanes during their approach. The FAA proposed in § 194.302(g) that powered-lift intending to land in wing-borne flight mode must comply with this provision of paragraph (e)(3) to ensure adequate obstacle clearance is maintained during the approach. Compliance with this provision would not be required for those powered-lift intending to land in vertical flight mode as they will be flying slower than when in forward flight (wing-borne flight mode) similar to a helicopter. The FAA received no comments on the proposed § 194.302(g) and therefore, as a result of renumbering, adopts this provision in § 194.302(h) as final.

Section 91.129(f) imposes requirements for approaches in Class D airspace, except when conducting circling approaches under part 97 for airplanes and helicopters. The FAA anticipates that powered-lift will often transition from forward flight (wing-borne flight mode) to vertical flight (vertical-lift flight mode) upon entering

the traffic pattern in order to land like a helicopter. The FAA proposed in § 194.302(h) that powered-lift must comply with § 91.129(f)(1) when the operator intends to land the powered-lift in wing-borne flight mode. When the operator of the powered-lift intends to land in vertical-lift flight mode, however, the operator must comply with the helicopter provisions detailed in § 91.129(f)(2), as proposed in § 194.303(b). This application of the rule gives flexibility to the novel capabilities of powered-lift while maintaining operational safety by using the standard traffic pattern flow at airports. The requirements of §§ 91.129(f)(1) and (2) do not apply to powered-lift conducting a circling approach under part 97 because a circling approach may have specific procedures established or turns may be requested by ATC to ensure safety in the traffic pattern. The FAA did not receive any comments and therefore, as a result of renumbering, adopts these requirements in §§ 194.302(i) and 194.302(j) as final.

Section 91.131 contains rules governing operations in Class B airspace. Paragraph (a)(2) of this section requires that each person operating a large turbine-engine powered airplane to or from a primary airport for which Class B airspace area is designated must operate at or above the designated floor of the Class B airspace while within the lateral limits of that area. The FAA proposed in § 194.302(i) that § 91.131(a)(2) should apply to large powered-lift regardless of powerplant type. The FAA received no comments on § 194.302(i) and therefore, as a result of renumbering, adopts this proposal in § 194.302(k) as final.

Section 91.151 requires airplanes to carry a 30-minute fuel reserve for daytime operations and a 45-minute fuel reserve for nighttime operations. In contrast, rotorcraft only require a 20-minute fuel reserve regardless of whether the operation occurs during the day or night. For powered-lift, the FAA proposed in § 194.302(j) that powered-lift must comply with the airplane reserve requirements in § 91.151(a) due to the lack of powered-lift operational data to support use of the less restrictive rotorcraft fuel reserve.

The FAA received 21 comments related to the proposed § 194.302(j). Two commenters supported the proposed fuel reserve requirements, while 19 proposed an alternative to the FAA’s original proposal.

ALPA said these requirements would enable normalized integration of aircraft with novel power sources and are necessary to achieve equivalent levels of safety to current aircraft operational

requirements, even if they result in limiting flight times for some powered-lift. Electra.aero posited that electric energy storage technologies still have significant uncertainties that warrant a more conservative approach until sufficient operational experience is achieved. Other commenters suggested the proposed fuel requirements could be detrimental to enabling powered-lift operations. Bristow argued that the proposed requirements would limit the scope of missions that powered-lift can accomplish, which would negatively impact the economic benefits and travel efficiencies that these vehicles would otherwise provide. Bristow, Airbus Helicopters, and Joby all contended that electric powered-lift may be unable to meet the energy reserve requirements necessary to operate. BETA said that, for short-duration flights, the proposed requirements could mean requiring more than double (for VFR) or triple (for IFR) the required energy, which it said is a heavy burden compared to the impact of the same reserve on traditional aircraft. AgustaWestland Philadelphia Corporation (AWPC) stated that the proposed requirements would reduce their vehicle's range and payload by 10–15 percent.

Several commenters recommended applying current helicopter fuel minimum requirements in § 91.151(b) to powered-lift. These commenters, including CAE, the Vertical Flight Society, Bristow, GAMA, and Joby noted similarities between helicopters and powered-lift, including their maneuverability at low speeds and the flexibility to land safely at varied locations due to their vertical landing capabilities. AWPC suggested that VTOL-capable powered-lift should be allowed to use helicopter VFR fuel reserves, while powered-lift authorized to utilize copter procedures should be allowed to use helicopter IFR fuel reserves.

Archer added that many powered-lift, unlike helicopters, have no single-point-of-failure vulnerabilities. Additionally, Archer said that, because § 91.151(b) applies to the entire rotorcraft category, other aircraft that are typically incapable of vertical operations like gyrocopters are still regulated by the 20-minute fuel reserve requirement due to their ability to land in confined areas. Archer stated that electric powered-lift can land vertically in zones smaller than typically needed for gyrocopters and often require less surface area to conduct a landing than many helicopters.

Several commenters recommended the FAA consider applying performance-based reserve requirements

that consider each powered-lift's characteristics and intended operations. Bristow said there is precedent for this type of approach in §§ 121.645 and 121.646 where the FAA applies different fuel reserve criteria for domestic, flag, and ETOPS commercial airline operations. Supernal suggested revising the existing fuel reserve requirement to a performance-based standard for powered-lift to maintain an equivalent level of safety. Eve and L3Harris recommended adding language to part 194 that would allow for reduced energy requirements (subject to approval of the Administrator) based on a specific risk mitigation assessment, including energy consumption data, energy planning and in-flight energy management, and selection of alternate landing sites. GAMA and Joby added other factors to consider in an assessment, including environmental factors, performance capabilities, weather patterns, and air traffic. These commenters referenced a white paper³⁸⁶ from GAMA that they said provided more information on this issue. ANAC suggested fuel reserve requirements could be defined case-by-case based on the ConOps presented for the project.

The FAA stated in the NPRM that it did not have sufficient operational data to reduce fuel requirements. In response, AWPC said the Bell-Boeing V-22 Osprey shares performance characteristics with one of the company's powered-lift designs and has more than 20 years of flight experience with hundreds of thousands of flight hours accumulated that could provide relevant data. An individual pilot suggested the FAA seek input from the pilots currently flying powered-lift to better understand their operational experience.

The FAA has reconsidered its position regarding § 91.151. In vertical-lift flight mode, a powered-lift can operate in a manner similar to a helicopter. As such, powered-lift require less surface area for a landing, thereby increasing the number of available landing sites, both planned and unplanned. Risk is further mitigated when operations are conducted under VFR. The FAA has concluded that, provided the powered-lift is continuously capable of conducting a landing in the vertical-lift mode along the entire route of flight, there is no adverse effect on safety to allow powered-lift to utilize rotorcraft VFR

fuel requirements in accordance with § 91.151(b). However, if the powered-lift cannot be assured of a safe landing in the vertical-lift flight mode along the entire route of flight, then compliance with § 91.151(a) would be required. Indications that a powered-lift may not be assured of a safe landing in vertical-lift flight mode along the entire route of flight may include a limitation or requirement in the AFM which would preclude such a landing. Likewise, the powered-lift may not be capable of transitioning from wing-borne to vertical-lift flight mode quickly enough to comply. This provision will not prevent a powered-lift from operating in wing-borne flight mode. Rather, it will require the powered-lift to have the performance capability, as detailed in the AFM, to conduct a landing in vertical-lift flight mode along the entire route of flight in order to take advantage of the rotorcraft VFR fuel requirements. Therefore, as a result of renumbering, the FAA adopts this proposal, as amended, in § 194.302(l).

Sections 91.155 and 91.157 permit helicopters to operate under lower visibility and cloud clearance minima than airplanes. The FAA determined that powered-lift possess a wider range of characteristics, with some operating more akin to airplanes during cruise flight. The FAA proposed in § 194.302(k) that powered-lift comply with the more restrictive airplane weather minima in §§ 91.155 and 91.157.

The rationale for the proposed § 194.302(k) was that powered-lift will likely operate similar to an airplane in cruise flight, thus requiring more time and distance to correct their flightpath to avoid other aircraft and obstacles. As such, a higher visibility minimum is needed to ensure safety. The FAA received 13 comments in response to this proposal. Two commenters expressed support. Eleven commenters proposed an alternative to the FAA's original proposal.

Electra.aero and ALPA expressed support for the proposed weather minima for powered-lift. Electra.aero stated that the ability for eVTOL aircraft to hover at lower, helicopter-like speeds is often limited by the battery thermal capability that only provides a few minutes of hover time.

Archer suggested replacing category-based operational rules regarding visibility minimums with type-specific rules informed by the type certification and FSB process, similar to that proposed in the NPRM for airworthiness evaluation and eligibility for Copter Procedures.

³⁸⁶ General Aviation Manufacturers Association, *Managing Range and Endurance of Battery-Electric Aircraft* (2023), gama.aero/wp-content/uploads/Managing-Range-and-Endurance-of-Battery-Electric-Aircraft_v1-1.pdf.

GAMA stated powered-lift possess helicopter-like maneuverability, safe operation at low airspeeds and altitudes, and the capability of vertical takeoff and landing. Given these characteristics, the helicopter provisions of this rule should apply. The ability of helicopters to operate at lower speeds and with increased maneuverability while maintaining safety under less restrictive minima should be considered for powered-lift. Therefore, the exception incorporated in § 91.155 should allow powered-lift pilots to take advantage of their aircraft's capabilities while ensuring an equivalent level of safety.

Several commenters recommended applying helicopter weather minima requirements of § 91.155(b)(1) instead of the airplane requirements of § 91.155(b)(2). Commenters such as GAMA argued that, when determining appropriate weather minima requirements, powered-lift are more comparable to helicopters than airplanes in their ability to land immediately if conditions deteriorate, and fly at slow speeds with high maneuverability. Joby asserted that grouping powered-lift with helicopters would benefit all air traffic due to the two categories' similarities in performance and maneuverability. AWPC stated that restricting powered-lift from utilizing helicopter minima contradicts the FAA's intent (in §§ 91.126 and 91.129) for powered-lift in vertical-lift flight mode to adhere to helicopter directions of turn when operating in a traffic pattern. Liliun said that powered-lift are designed to operate in low-altitude environments for short routes, and therefore using helicopter VFR minimum weather requirements could improve airspace congestion by providing the ability to operate at lower enroute altitudes. Eve suggested that Multi Electric Propulsion Systems (MEPS) are capable of assuring maneuverability comparable to helicopters even when deviating from clouds, traffic, and obstacles. Some commenters contended that applying helicopter weather minima requirements to powered-lift would provide a higher level of operational safety.

CAE, Joby, and NBAA contended that many powered-lift will cruise at speeds lower than the fastest helicopters, which are subject to less restrictive minima than those proposed in the NPRM. These commenters also justified imposing less restrictive weather minima requirements for powered-lift due to similar qualities as helicopters by referencing excerpts from the NPRM.

AIR VEV disagreed with the FAA's assertion that powered-lift in cruise

operations, "perform similar to an airplane, operating at high speeds and possibly without the ability to maneuver as quickly as a helicopter." AIR VEV said this statement is not true for the powered-lift it is manufacturing.

AWPC suggested the Bell-Boeing V-22 Osprey provides a precedent for applying lower weather minima requirements to turbine-powered tiltrotor aircraft.

Commenters also highlighted certain enhanced safety features of powered-lift as justification for reducing the proposed weather minima requirements. Joby said that most powered-lift will use advanced flight control systems with advanced means of flight stabilization, flight augmentation, and envelope protection to allow for much safer flight in situations with reduced visibility by minimizing loss of control during unintentional flight into IMC.

Liliun, Joby, and AIR VEV suggested that the FAA could establish special allowances for VFR weather minima based on characteristics of each individual powered-lift and the type of operation being conducted. Liliun said this approach would be consistent with ICAO Doc. 10103.³⁸⁷

The FAA has reconsidered its position regarding § 91.155 and § 91.157. The FAA agrees with the commenters that weather minima are based on aircraft speed and maneuverability. Helicopters operate at lower speeds and are capable of greater maneuverability than other aircraft. This allows pilots to see and avoid other air traffic or obstructions in time to prevent a collision. Powered-lift have equivalent maneuvering capabilities to helicopters when operating in vertical-lift flight mode. For this reason, the FAA agrees there should be no adverse effect on safety for powered-lift operating in the vertical-lift flight mode to utilize the same VFR weather minima as helicopters.

Therefore, the FAA will incorporate a change from the visibility minimums in proposed § 91.302(k) by allowing powered-lift operating in the vertical-lift flight mode to comply with the helicopter visibility minimums prescribed in § 91.155(a) and (b)(1). In addition, the helicopter exceptions of § 91.157(b)(3), (b)(4), and (c) will also be applicable to powered-lift when operating in the vertical-lift flight mode. Powered-lift seeking to use the helicopter visibility minimums must be operated at a speed that allows the pilot

enough time to see and avoid any other air traffic or any obstructions in time to avoid a collision. A powered-lift which cannot be operated at a speed that allows the pilot enough time to see and avoid any other air traffic or any obstructions to avoid a collision, regardless of the mode of flight, must comply with the airplane visibility minimums prescribed in § 91.155(a) and (b)(2) and are not authorized to use the helicopter exceptions of § 91.157(b)(3), (b)(4), and (c). Therefore, the new SFAR provision related to § 91.155(a) is adopted at § 194.302(m), and the new SFAR provision related to § 91.155(b)(1) is adopted at § 194.302(n). The proposed § 194.302(k), pertaining to § 91.155(b)(2), is being adopted as amended at § 194.302(o). Finally, the new SFAR provision related to § 91.157(b)(3), (b)(4), and (c) is adopted at § 194.302(p).

Sections 91.167 and 91.169 prescribe certain operational requirements for IFR flight. The FAA received numerous comments related to performance-based changes proposed for both rules. Because both sections relate to IFR operations, the FAA proposes changes that are similar in nature, whereby a powered-lift may be operated using helicopter minimums, provided the powered-lift is authorized to conduct Copter Procedures, defined in part 97, and is continuously capable of conducting a landing in the vertical-lift flight mode along the entire route of flight, as outlined in the response to § 91.169(b) and (c) of this section. These changes are described in greater detail in the following paragraphs.

Section 91.167 prescribes the fuel requirements for flight in IFR conditions. Under § 91.167, helicopter operations are permitted with lower fuel minima. Section 91.167(a)(3) requires aircraft, other than helicopters, to carry a 45-minute fuel reserve and helicopters to carry a 30-minute fuel reserve. The FAA proposed that powered-lift should initially have a 45-minute fuel reserve, consistent with other aircraft requirements.

Under § 91.167, for operations in weather conditions that require an alternate airport to be identified, no person may operate in IFR flight unless the aircraft has adequate fuel to fly to the first airport of intended landing and to the alternate airport and still have a 45-minute fuel reserve. In accordance with § 91.167(b)(2)(i) for aircraft other than helicopters, when the appropriate weather reports indicate that at least 1 hour before and for 1 hour after the estimated time of arrival, the ceiling will be at least 2,000 feet above the airport elevation and the visibility will

³⁸⁷ Guidance on the Implementation of ICAO Standards and Recommended Practices for Tiltrotors (10103), International Civil Aviation Organization (2019), is available for purchase in the ICAO Store.

be at least 3 statute miles, the fuel reserve necessary to fly to the alternate airport is not required. The FAA did not propose changes to the current applicability of § 91.167(b)(2)(i), which would require powered-lift to comply with the requirements imposed on aircraft other than helicopters, to ensure an appropriate level of risk mitigation for these new-entrant aircraft. An anonymous commenter agreed with the FAA proposal to retain the IFR fuel requirements for aircraft other than helicopters, as prescribed in § 91.167(a) and (b) as proposed in the NPRM.³⁸⁸

Several commenters proposed that the FAA should revise the SFAR to allow powered-lift to comply with the helicopter fuel requirements. Joby stated the FAA should amend the part 194 requirements that specify fuel reserves for powered-lift to align with today's requirements for helicopters. Bristow believed imposing fixed wing aircraft fuel minimums is overly restrictive, offering no additional safety benefits over the helicopter fuel minimums. Bristow argued that the FAA should apply the minimum fuel reserve requirements associated with helicopters to operations by powered-lift. However, Bristow also believed that a more nuanced approach to fuel reserve minimums, based on mission-type and duration, is both possible and desirable.

In a group comment, AOPA, GAMA, HAI, NATA, NBAA, and Vertical Flight Society (VFS) collectively stated that the FAA failed to consider powered-lift characteristics and operating environment by unilaterally applying airplane fuel reserves to all powered-lift. The group comment argued that the FAA should consider the capabilities of powered-lift and apply ICAO Document 10103 to its assessment of operational rules. In the alternative, the group comment suggested that the FAA should provide a pathway for an operator or manufacturer to seek approval or authorization to adopt the alternate rule.

Ten commenters proposed that the FAA should revise § 91.167 to be a performance-based standard for powered-lift.

Archer urged the FAA to provide a path to performance-based fuel reserves and reconsider the proposal that it believes arbitrarily assigns airplane fuel reserve regulations to an aircraft capable of vertical operations. Archer also argued that the FAA should follow the safe, long-standing precedent of part 121 Performance Based Contingency Fuel (PBCF) Operations Specifications and enable a data-driven approach to

recognizing aircraft-specific capabilities and actual operational performance to assure safety and avoid unnecessary and arbitrary limitations on vehicles with restricted range.

CAE stated the FAA failed to consider powered-lift characteristics and operating environment in unilaterally applying airplane fuel reserves to all powered-lift. CAE argued that the FAA should consider the performance-based capabilities of these powered-lift when determining fuel reserves.

Eve recommended that fuel/energy reserves should be built on performance-based capabilities of the powered-lift and allow the reduction of fuel/energy reserves based on a risk assessment by considering proper and safety dispatch criteria (flight planning) and other operational aspects.

AWPC disagreed with the FAA's decision to apply airplane fuel reserves for powered-lift, arguing that the proposed VFR and IFR fuel reserve requirements are prohibitive and fail to account for specific powered-lift performance capabilities. AWPC argued that powered-lift capable of VTOL and powered-lift authorized to utilize copter procedures should be allowed to use helicopter VFR fuel reserves. AWPC argued that this recommendation aligns with ICAO Document 10103.

Lilium recommended that the FAA should adopt a flexible approach for establishing energy requirements for powered-lift. Lilium argued that adding language such as "as determined by the Administrator" would permit future operators to use performance-based reserve solutions. Alternatively, Lilium suggested that the FAA adopt a 20-minute helicopter prescriptive reserve, considering the enhanced safety features of powered-lift.

BETA recommended the FAA add an option for use of a performance-based reserve that can be determined based on the capability of the aircraft and the intended flight plan.

Supernal argued that the FAA should revise the existing fuel reserve requirement to a performance-based standard for powered-lift to maintain an equivalent level of safety.

The Vertical Flight Society/American Helicopter Society International, Inc. urged the FAA set performance-based reserves requirements for powered-lift that reflect their operational intent and capabilities, arguing that such an approach would be consistent with ICAO Document 10103.

In a group comment, NBAA, AUVSI, National Air Transportation Association, AIA, Vertical Flight Society, and Helicopter Association International collectively encouraged

the FAA to consider the language in the Advanced Aviation Act when developing the final rule for this SFAR, including performance-based requirements for energy reserves and other range- and endurance-related requirements that reflect the capabilities and intended operations of the aircraft.

L3Harris Commercial Aviation Solutions and L3Harris Commercial Training Solutions stated that there should be performance-based limitations based on a risk mitigation assessment considering energy consumption data, energy planning, alternate landing sites, and inflight energy management.

After reviewing the comments, the FAA has reconsidered its position regarding § 91.167. In the final rule, the FAA will allow powered-lift to utilize the IFR fuel requirements established for helicopters. As the commenters suggest, when a powered-lift is operating similarly to a helicopter, powered-lift should be required to only carry the fuel reserves of a helicopter. The FAA agrees that powered-lift authorized to conduct copter procedures and that have the performance capability, as provided in the AFM, for the entire flight to conduct a landing in the vertical-lift flight mode may comply with the IFR fuel requirements established for helicopters.

Furthermore, during aircraft certification, the FAA will assess the aircraft's stability, system, and equipment for IFR operations. A powered-lift that does not possess these capabilities may still be certificated for IFR but will be prohibited from performing copter procedures and have a limitation in the AFM to that effect. Powered-lift with such a limitation would not be authorized to use the IFR fuel requirements for helicopters and would be required to use the IFR alternate airport minimums specified for airplanes.

This provision will not prevent a powered-lift from operating in wing-borne flight mode but will require the powered-lift to have the performance capability, as detailed in the AFM, to conduct a landing in vertical-lift flight mode along the entire route of flight. Therefore, the FAA agrees with the commenters that, provided the powered-lift is continuously capable of conducting a landing in the vertical-lift flight mode along the entire route of flight, there is no adverse effect on safety to allow powered-lift to utilize helicopter IFR fuel requirements in accordance with § 91.167(a)(3) and (b)(2)(ii).

Therefore, a person operating a powered-lift will have the option to use

³⁸⁸ See 88 FR 38946 at 39029–39030 (June 14, 2023).

the helicopter fuel requirements under § 91.167(a)(3) and (b)(2)(ii) when the aircraft is authorized to conduct copter procedures and has the performance capability, as provided in the AFM, to always conduct a landing in the vertical-lift flight mode along the entire flight. When taking into consideration the performance capability, a person operating a powered-lift must consider the energy required to successfully complete a descent from the altitude they plan to use, any required instrument or visual procedure, and any landing performance data contained in the AFM that enables a landing in the vertical-lift flight mode. There may be performance requirements or limitations contained in the AFM, or in any approved Minimum Equipment List (MEL), that would prevent a powered-lift from conducting a landing in the vertical-lift flight mode, such as a landing weight limitation or a deferred maintenance item, thereby requiring a person to use the 45 minutes of reserve fuel. This requirement is adopted as § 194.302(q).

Section 91.169 prescribes the information required for filing an IFR flight plan. Under § 91.169, helicopter operations are permitted to use lower weather minima before an alternate must be filed because helicopters operate at lower altitudes and slower airspeeds. The FAA reasoned that, while powered-lift have a range of performance characteristics, the majority of powered-lift flight time will be during cruise operations and therefore proposed that powered-lift comply with the provisions of § 91.169(b)(2)(i) and (c)(1)(i) as written for aircraft other than helicopters.

Four operators provided comments related to § 91.169. Archer asserted that the FAA should evaluate the operational capabilities of each powered-lift through the type certification process before deciding which operational rules are appropriate. Archer pointed out that powered-lift that share the key operating capabilities that enable helicopters to safely operate at lower altitudes and reduced weather minima should be subject to the same operating rules. Archer recommended the FAA replace category-based operational rules regarding visibility minimums in favor of type-specific rules informed by the type certification and FSB process, similar to that proposed in the NPRM for airworthiness evaluation and eligibility for Copter Procedures.

AWPC argued that certain powered-lift, such as their AW609 Tiltrotor, are capable of VTOL, like helicopters, during takeoff and landing. AWPC contended that IFR weather reporting

requirements/IFR alternate airport weather minima should be performance-based due to the VTOL capability.

Lilium asserted that the safe use of helicopter flight rules for powered-lift can be evaluated during aircraft certification and/or the type rating evaluation process and urged the FAA to adopt a similar comprehensive and risk-based approach as suggested for altitude requirements to evaluate the capabilities and performance of each individual powered-lift to safely operate under helicopter IFR. Lilium also asserted that the FAA's proposal is inconsistent with the way other countries regulate powered-lift.

GAMA generally stated that the FAA should adopt performance-based regulations for powered-lift that take into consideration the diverse capabilities of such aircraft. GAMA also suggested that the FAA follow the approach recommended in ICAO Document 10103.

After reviewing the comments, the FAA has reconsidered its position regarding the proposal to apply § 91.169(b)(2)(i) and (c)(1)(i) to powered-lift. Similar to § 91.167, the FAA will now allow powered-lift that are authorized to conduct copter procedures and that have the performance capability to land in the vertical-lift flight mode, as provided in the AFM, to use the helicopter provisions specified in § 91.169(b)(2)(ii) and (c)(1)(ii) for helicopters. This provision can be found in § 194.302(r).

The FAA agrees with Archer, Lilium, and GAMA that some degree of a performance-based rule is appropriate. As discussed above in the § 91.167 section, during aircraft certification, the FAA will assess the aircraft's capabilities and characteristics for IFR operations. A powered-lift that does not possess the appropriate characteristics may still be certificated for IFR but will be prohibited from performing copter procedures and have a limitation inserted into the AFM to that effect.

As recommended by AWPC, and as discussed in the § 91.167 section, when taking into consideration the performance capability, a person operating a powered-lift must consider any landing performance data contained in the AFM that enables a landing in the vertical-lift flight mode. Requirements or limitations outlined in the AFM may require a person to use the IFR alternate airport minimums specified for airplanes. For the foregoing reasons, the FAA is adopting a performance-based rule for § 91.169, as outlined in § 194.302(r).

Section 91.175 governs takeoff and landing under IFR. Sections

91.175(f)(2)(i) and (ii) apply to powered-lift as-written because those paragraphs are applicable to all aircraft. Therefore, these provisions are not included in § 194.302, as they already apply to powered-lift.

Section 91.175(f)(2)(iii) governs takeoff and landing under IFR for helicopters. In the NPRM, the FAA did not address § 91.175(f)(2)(iii) because it is helicopter specific, and the FAA asserted § 91.175(f)(2)(i) and (ii) were sufficient because they apply to aircraft, including powered-lift. However, in response to comments received and discussed below, the FAA will permit some powered-lift to use the ½ statute mile visibility stipulated for helicopters in § 91.175(f)(2)(iii).

Section 91.175(f)(4)(i) requires airplanes operating under parts 121 or 135 to comply with the takeoff obstacle clearance or avoidance procedures contained in subpart I of part 121 or subpart I of part 135, as applicable, for IFR takeoffs. Accordingly, the FAA proposed in § 194.302(l) that any powered-lift that would be required to comply with the provisions of subpart I of part 135 (Airplane Performance Operating Limitations) must also comply with § 91.175(f)(4)(i). The takeoff limitations of subpart I of part 135, and therefore the provisions of § 91.175(f)(4)(i), are only applicable to certain powered-lift that are required to comply with subpart I. As discussed in section VI.D.6. of this preamble, subpart I of part 135 will only apply to those powered-lift that are designated as "large or transport category" during type certification. The FAA did not receive any comments specific to § 91.175(f)(4), which was proposed as § 194.302(l). However, the FAA received three comments specific to the takeoff visibility requirements of § 91.175(f)(2).

AWPC did not agree with the FAA's proposal in the SFAR to apply blanket airplane requirements to powered-lift without any performance-based relief. AWPC urged the FAA to take a tailored approach for this rule utilizing performance-based requirements instead of applying airplane rules to all powered-lift.

Lilium noted that the safe use of helicopter flight rules for powered-lift can be evaluated during aircraft certification and/or the type rating evaluation process. Lilium urged the FAA to adopt a similar comprehensive and risk-based approach as suggested for altitude requirements, to evaluate the capabilities and performance of each individual powered-lift to safely operate under helicopter IFR.

GAMA recommended the FAA follow ICAO Document 10103 and apply the

helicopter requirements for this rule to powered-lift.

AWPC expressed their understanding that the lower takeoff visibility minimums for helicopters are based on lower speeds, maneuvering characteristics, and the ability to comply with copter procedures under part 97.

In response to the comments received, the FAA evaluated the feasibility of allowing a powered-lift to use the helicopter visibility takeoff minimums stipulated in § 91.175(f)(2)(iii). When § 91.175(f) was drafted in 1985, the rationale used for a lower takeoff minimum for helicopters was that they are highly maneuverable and capable of sustaining flight at lower airspeeds. The NPRM also mentioned that, due to the unique flight capabilities of helicopters, they can safely maneuver in lower takeoff visibility conditions.³⁸⁹

The FAA agrees with AWPC's statement that powered-lift benefit from being highly maneuverable and capable of sustaining flight at lower airspeeds and will make a change in the final rule for those powered-lift conducting a vertical take-off. However, the FAA does not believe providing all powered-lift broad authorization to use helicopter take-off minimums would be in the best interest of aviation safety. Therefore, the FAA will prohibit those powered-lift having two engines or less that do not have the capability to use copter procedures from conducting an IFR takeoff using the ½ mile visibility minimum. The capability to use copter procedures will be identified in the limitations section of the AFM.

In response to the comments received from AWPC and GAMA, the FAA is adopting a change in the final rule for IFR takeoff minimums for powered-lift. In this final rule, the FAA will allow powered-lift that have two engines or less to use the helicopter minimums of ½ mile providing the powered-lift conducts their takeoff vertically and are authorized to use copter procedures. This provision is adopted in § 194.302(s). In addition, the FAA is adopting § 194.302(l) as proposed, though due to renumbering, it is now § 194.302(t).

2. Equipment, Instrument, and Certificate Requirements

Section 91.205 states that no person may operate a powered civil aircraft with a standard category U.S. airworthiness certificate in VFR day or night, IFR, at or above 24,000 feet, in Category II or III operations, or in night

vision goggle operations, unless the aircraft contains instruments and equipment in § 91.205 or FAA-approved equivalents. For powered-lift that meet the definition of small aircraft in § 1.1, the FAA proposed in § 194.302(m) that the position and anti-collision lights meet the requirement set forth in § 23.2530(b). The FAA proposed that this requirement should apply to small powered-lift to provide an equivalent level of safety to that of small airplanes and to ensure that those powered-lift have an adequate anticollision lighting system that provides sufficient time for another aircraft to avoid a collision.

The FAA also proposed in § 194.302(m) that small powered-lift should meet the § 91.205(b)(14) requirement for installing an approved shoulder harness or restraint system for all seats to provide an equivalent level of safety to small airplanes.

The FAA did not receive any comments on the proposals for small powered-lift in § 194.302(m). The FAA is therefore adopting § 194.302(m) as proposed, though due to renumbering, it is being adopted as § 194.302(u).

Section 91.205(d) prescribes instruments and equipment requirements for IFR flight. Under § 91.205(d)(3), an aircraft must have a gyroscopic rate-of-turn indicator installed, unless the aircraft is equipped with a third attitude instrument system installed as provided in § 121.305(j). For airplanes, the third attitude instrument system installed must be usable through flight attitudes of 360 degrees of pitch and roll. For rotorcraft, the third attitude instrument system installed must be usable through flight attitudes of +/- 80 degrees of pitch and +/- 120 degrees of roll. The FAA anticipates that some powered-lift may be capable of exceeding 80 degrees of pitch and/or 120 degrees of roll. Therefore, the FAA proposed in § 194.302(m) that all powered-lift approved for IFR during type certification would be required to comply with the airplane provisions in § 91.205(d)(3)(i) for IFR flight, which requires the installation of either a gyroscopic rate-of-turn indicator or a third attitude instrument system usable through flight attitudes of 360 degrees of pitch and roll. The FAA received three comments on § 194.302(n).

Airbus, GAMA, and Joby requested that the FAA provide relief to the requirement that powered-lift have either a gyroscopic rate-of-turn indicator or a third attitude instrument system usable through flight attitudes of 360 degrees of pitch and roll installed in accordance with § 91.205(d)(3)(i). The commenters asserted that this regulation may not be compatible with aircraft

designed with advanced flight control systems.

The FAA considered the comments from Airbus, GAMA, and Joby and their requests for relief from the proposed requirement. Section 91.205 already includes flexibility for operators, as it allows for FAA-approved equivalents to the instruments and equipment specified in § 91.205. Section 91.205(a) contains the phrase "or FAA-approved equivalents." This phrase provides the flexibility necessary to consider other types of aircraft systems not specifically included in § 91.205 paragraphs (b) through (f); therefore, the FAA determined no additional regulatory revisions are required. The FAA is therefore adopting § 194.302(n) as proposed, though due to renumbering, it is being adopted as § 194.302(v).

Section 91.207 requires an emergency locator transmitter (ELT) for airplane operations to facilitate search and rescue efforts in locating downed aircraft. The FAA proposed applying § 91.207 to powered-lift in § 194.302(o). The FAA received two comments related to the proposed § 194.302(o).

ALPA expressed support of § 194.302(o), which requires all powered-lift to comply with § 91.207 and be equipped with an ELT.

Joby, however, argued that mandating ELTs would increase cost and decrease payload capacity without providing an increase in operational safety. Joby suggested there are suitable alternatives to ELTs such as ADS-B, personal locator beacons, personal satellite trackers, and mobile phones.

The ability to locate powered-lift in the event of a crash is essential for reaching survivors as quickly as possible and potentially saving lives. The FAA considers this to be a necessary requirement for powered-lift, particularly as a new entrant aircraft with little civil operational history. The FAA noted in the ADS-B final rule that the ADS-B system cannot replace the ELT function since the ADS-B system is not required to be crashworthy nor is the ADS-B system integrated with the satellite-based search and rescue system (SARSAT) and, thus, may not be operable or able to transmit following an aircraft accident. Similarly, the FAA does not consider personal locator beacons, personal satellite trackers, and mobile phones as a suitable replacement for an ELT as these devices do not meet the requirements for new installation specified in § 91.207, nor the minimum operational performance standards (MOPS) for ELTs. Accordingly, the FAA is adopting § 194.302(o) as proposed, though due to renumbering it is being adopted as § 194.302(w).

³⁸⁹ Rotorcraft Regulatory Review Program Notice No. 5, NPRM, 50 FR 10144, 10157 (Mar. 13, 1985).

Section 91.213 provides limitations on operations with inoperative instruments and equipment, as well as relief for operations with inoperative instruments and equipment for aircraft with and without an approved Minimum Equipment List (MEL). Section 91.213(a) requires that no person may takeoff an aircraft with inoperative instruments or equipment installed. This applies to powered-lift. Section 91.213(d) provides specific relief for an aircraft without an approved MEL; however, powered-lift is not included in the aircraft eligible for the exception in § 91.213(d)(1). The FAA did not propose to include powered-lift in the exceptions set forth in § 91.213(d). The FAA did not receive any comments on this and will therefore not apply § 91.213(d) to powered-lift.

Section 91.215(b) states that no person may operate an aircraft in the airspace described in § 91.215(b)(1) through (5) unless that aircraft is equipped with an operable coded radar beacon transponder. The FAA anticipates that, while all new entrant powered-lift will have a substantial electrical system, some powered-lift may be powered by batteries, rather than an engine. Sections 91.215(b)(3) and (5) allow aircraft to operate without a transponder if the aircraft was certificated without an engine-driven electrical system. The FAA proposed in § 194.305 that the exceptions outlined in § 91.215(b)(3) and (5) for “aircraft” not apply to powered-lift. The effect of the proposal is that all powered-lift must be equipped with an operable coded radar beacon transponder as required in § 91.215(b)(1), (2), and (4). The FAA did not receive any comments related to the proposed § 194.305. The FAA determined that adding “Notwithstanding § 194.301,” to the beginning of § 194.304 helps to clarify that the aircraft provisions under § 91.215(b)(3) and (5) do not apply to powered-lift even though, generally, any aircraft provisions in part 91 already apply to powered-lift. As such, as a result of renumbering, the FAA adopts § 194.304 as proposed.

Section 91.219 prohibits the operation of a turbojet-powered U.S.-registered civil airplane unless that airplane is equipped with an approved altitude alerting system or device. The FAA proposed in § 194.302(p) that all powered-lift comply with the altitude alerting requirements under § 91.219. The FAA received one comment on the proposed § 194.302(p) from EASA, requesting more details as to how the FAA decided that all new powered-lift entrants would be considered “high performant.”

Within the operational rules of this SFAR, the FAA generally does not impose requirements based on the powerplant of the powered-lift. For example, where a regulation refers to an aircraft powered by turbines, the FAA takes the approach that such regulations should apply to all powered-lift, rather than just those powered-lift that are powered by turbines. The FAA anticipates that certain powerplants, such as electric motors, may have equal or better performance in comparison to internal combustion engines, which could lead to higher performance capabilities. As such, the FAA is generally taking the more conservative approach and requiring that certain operating regulations apply to all powered-lift, regardless of powerplant. There are, however, some instances where the FAA proposed to apply certain regulations based on the type of powerplant. Such regulations are tailored based on the type of powerplant because those regulations contain factors other than performance to trigger the applicability of that particular regulation (*e.g.*, the regulation is powerplant specific to maintain the intent for noise abatement in certain classes of airspace). In those instances, the FAA explains in this preamble why it decided to retain the powerplant reference.

EASA requested more details as to how the FAA decided that all new powered-lift entrants would be considered “high performant.” In formulating the discussion surrounding use of altitude alerting equipment, the FAA identified that some powered-lift may have high performance capabilities which warrant the use of such equipment. Because powered-lift capabilities are not yet fully known, the most conservative approach is to require this equipment. The FAA received no negative comments and will adopt the proposed § 194.302(p) as final, though due to renumbering it is being adopted as § 194.302(x).

Section 91.223 prohibits the operation of a turbine-powered U.S.-registered airplane configured with six or more passenger seats, excluding any pilot seat, unless that airplane is equipped with an approved terrain awareness and warning system (TAWS). The FAA proposed in § 194.302(q) that all powered-lift, regardless of powerplant type, with 6 or more seats must be equipped with an HTAWS system that meets the Technical Standard Order (TSO) C194 or an FAA-approved TAWS A/HTAWS hybrid system. In addition, the FAA proposed in § 194.302(q) that powered-lift must comply with § 91.223(c), which imposes a

requirement for a manual containing appropriate procedures on the use of terrain awareness equipment and the proper flightcrew reactions in response to a TAWS activation.

The FAA received one comment from ALPA related to the proposed § 194.302(q). ALPA stated that all powered-lift (regardless of seating capacity) must be equipped with TAWS or HTAWS as applicable, an Aircraft Collision Avoidance System (ACAS), and a CVR and FDR. ALPA recommended that when HTAWS is required for traditional helicopter operations, it should also be required for similar powered-lift operations regardless of seat capacity, to ensure the highest level of safety in this novel aircraft type and its operations.

The FAA has considered ALPA’s recommendation for TAWS/HTAWS to be required for all powered-lift regardless of seating capacity. The FAA is adopting the rule as proposed in the NPRM. The FAA has previously determined that a TAWS requirement is appropriate for only those turbine-powered airplanes with 6 or more passenger seats, excluding any pilot seat. For consistency with previous rulemaking, the FAA is requiring all powered-lift, regardless of powerplant, with six or more passenger seats, excluding any pilot seat, to meet a similar terrain awareness equipment requirement. Because powered-lift are capable of flight in vertical mode and have been granted some of the same operating privileges as rotorcraft, the terrain awareness equipment must meet either HTAWS or hybrid A/HTAWS specifications, to comply with § 91.223(a). The costs imposed on operators and individuals required to comply with this rule would be no more burdensome than the costs incurred by entities and individuals complying with corresponding airplane and rotorcraft regulations that are already in effect. Moreover, the FAA has determined that requiring this equipment for all powered-lift regardless of the seating capacity is not warranted at this time because the FAA does not have the data to support requiring TAWS/HTAWS to be installed on powered-lift with less than six passenger seats. As such, requiring powered-lift to comply with TAWS/HTAWS regardless of seating capacity is not consistent with current regulations. The FAA is therefore adopting § 194.302(q) as proposed, though due to renumbering it is being adopted as § 194.302(y).

3. Incorporation by Reference

Incorporation by reference (IBR) is a mechanism that allows Federal agencies

to comply with the requirements of the Administrative Procedure Act to publish rules in the **Federal Register** and the CFR by referring to material published elsewhere.³⁹⁰ Material that is incorporated by reference has the same legal status as if it were published in full in the **Federal Register** and the CFR. The standards referenced in this rule include technical information and specifications for equipment and capabilities required to meet terrain awareness and warning systems and helicopter terrain awareness and warning systems.

The standards referenced in §§ 194.109, 194.302, and 194.306 of this rule are incorporated by reference with the approval of the Director of the Office of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. In accordance with 5 U.S.C. 552(a) and 1 CFR part 51,³⁹¹ all approved materials are available for inspection at the FAA's Office of Rulemaking, 800 Independence Avenue SW, Washington, DC 20591 (telephone (202) 267-9677). This material is also available from the sources indicated in paragraphs (a) and (b) of § 194.109 and as follows:

1. Copies of Technical Standard Order (TSO)-C194, Helicopter Terrain Awareness and Warning System (Dec. 17, 2008) may be obtained from the U.S. Department of Transportation, Subsequent Distribution Office, DOT Warehouse M30, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785; telephone (301) 322-5377. It is also available on the FAA's website at www.faa.gov/aircraft/air_cert/design_approvals/tso/. Select the link "Search Technical Standard Orders." This TSO contains the minimum performance standards the helicopter terrain awareness and warning system must meet for approval and identification with the TSO marking.

2. Copies of section 2, Equipment Performance Requirements and Test Procedures, of RTCA DO-309, Minimum Operational Performance Standards (MOPS) for Helicopter Terrain Awareness and Warning System (HTAWS) Airborne Equipment (Mar. 13, 2008) may be obtained from RTCA, Inc., 1150 18th St NW, Suite 910, Washington, DC 20036; telephone (202) 833-9339; website: www.rtca.org/

³⁹⁰ 5 U.S.C. 552(a).

³⁹¹ 5 U.S.C. 552(a) requires that matter incorporated by reference be "reasonably available" as a condition of its eligibility. Further, 1 CFR 51.5(b)(2) requires that agencies seeking to incorporate material by reference discuss in the preamble of the final rule the ways that the material it is incorporating by reference is reasonably available to interested parties and how interested parties can obtain the material.

products. Section 2 of RTCA DO-309 contains the equipment performance requirements and test procedures for Helicopter Terrain Awareness and Warning Systems.

4. Special Flight Operations

Section 91.313 prescribes operating limitations for restricted category civil aircraft. Section 91.313(a) through (e) apply to all restricted category aircraft, including powered-lift. Section 91.313(f) relates to operations under part 133, which powered-lift are not currently authorized to conduct. Section 91.313(g) requires small, restricted-category airplanes to be equipped with a shoulder harness or restraint system for each front seat. For the same reasons as discussed regarding applicability of § 91.205(b)(14), the FAA proposed in § 194.302(r) that restricted category small powered-lift must have an approved shoulder harness or restraint system for all seats installed to provide an adequate level of safety for powered-lift operations. The FAA did not receive any comments on this proposal and therefore adopts § 194.302(r) as proposed, though due to renumbering it is being adopted as § 194.302(z).

5. Maintenance, Preventive Maintenance, and Alterations

Section 91.409 prescribes inspection programs to ensure that the aircraft is airworthy. Sections 91.409(a) and (b) require annual and 100-hour inspections, or optionally a progressive inspection program under paragraph (d) for aircraft that do not fall under the exceptions provided in paragraph (c).³⁹² Section 91.409(e) through (h) set forth inspection program options and requirements for larger aircraft and aircraft with more complex aircraft systems which are more stringent than those provided under § 91.409(a), (b), and (d). Because paragraphs (e) through (h) apply to more complex aircraft, the FAA proposed in § 194.302(s) that these paragraphs should apply to technically advanced powered-lift (TAPL), which is a powered-lift that is equipped with an electronically advanced system in which the pilot interfaces with a multi-computer system with increasing levels of automation in order to aviate, navigate, or communicate. The FAA proposed requiring certain minimum display elements for both a PFD and MFD, clarifying what will be considered a PFD or MFD. Powered-lift that are not considered technically advanced under

³⁹² Section 91.409 does not apply to an aircraft that is maintained under a Continuous Airworthiness Maintenance Program (CAMP), such as under § 135.411(a)(2).

the definition used for compliance with § 91.409 within this SFAR and are not maintained under a CAMP under § 135.411(a)(2) must continue to comply with § 91.409(a), (b), and (d) because those provisions apply to "aircraft."

The FAA received four comments related to § 91.409 and proposed § 194.302(s).

AUVSI expressed concern with the FAA's approach to TAPL. AUVSI also argued that the proposal is inconsistent with the flightcrew interface requirements that have been proposed as airworthiness standards/criteria for both the Joby JAS4-1 and the Archer Model M001 powered-lift. AUVSI noted that § 194.302(s) imposes a design requirement and that such requirements should not be implemented through operational rules.

CAE recommended the determination of TAPL be delegated to the Aircraft Certification Offices (ACO), Aircraft Evaluation Division (AED), or Flight Standardization Board (FSB) assigned to a specific aircraft certification project, rather than to individual FSDOs. CAE emphasized that the TAPL determination should be made based on the aircraft and equipment combination, not individual operator policies or procedures.

In a group comment, AOPA, GAMA, HAI, NATA, NBAA, and VFS collectively stated that the determination of TAPL should be delegated to the ACO, AED, or FSB assigned to a specific aircraft certification project, not to individual FSDOs.

An individual commented that the FAA should provide more guidance on maintenance and inspection requirements in the final rule, including specific maintenance standards or procedures and the frequency of inspections for powered-lift. This individual commenter asked for clarification on how maintenance, inspection, and minimum equipment requirements would differ from existing requirements for airplanes and helicopters.

The FAA agrees with the commenters who recommended that the determination of a TAPL should not rest with individual field offices. The rule determines whether a powered-lift constitutes a TAPL because it outlines the required criteria.

However, the FAA disagrees with AUVSI about the proposed § 194.302(s). The definition of TAPL is intended to allow the FAA to distinguish between complex and less complex powered-lift and thereby determine which inspection program applies. The TAPL definition is

not an indirect imposition of design requirements via operational rules.

Finally, in response to the commenter who requested more details on maintenance and inspection requirements, the FAA notes that, unless otherwise specified by part 194, powered-lift must continue to comply with rules applicable to all aircraft in part 43 of this chapter as well as any applicable maintenance and inspection requirements under parts 91 and 135 of this chapter.

The FAA adopts § 194.302(s) as proposed, though due to renumbering, it is being adopted as § 194.302(aa).

Section 91.411 prescribes the requirements for altimeter system and altitude reporting equipment tests and inspections. The FAA proposed in § 194.302(t) to apply § 91.411 to powered-lift, as it currently applies to both airplanes and helicopters, without differentiation. The FAA did not receive any comments on the proposed § 194.302(t) and therefore adopts the proposed § 194.302(t) as final, though due to renumbering, it is being adopted as § 194.302(bb).

6. Large and Turbine-Powered Multiengine Airplanes and Fractional Ownership Program Aircraft

Section 91.501 prescribes operating rules governing the operation of large airplanes of U.S. registry, turbojet-powered multiengine civil airplanes of U.S. registry, and fractional ownership program aircraft of U.S. registry that are operating under subpart K of part 91 in operations not involving common carriage.

The FAA anticipates that U.S.-registered large powered-lift will operate like large airplanes with respect to altitude, speed, passenger carrying capacity, passenger safety, composition of flightcrew, operating environment (e.g., over water), and required safety and rescue equipment. The FAA proposed in § 194.302(u) to capture large powered-lift in the applicability section of § 91.501, regardless of powerplant type, system of aircraft ownership, or ownership interest. The FAA received no comments on the proposed § 194.302(u). Though the proposal will not substantively change, the FAA determined that further clarification is necessary in the subpart F applicability section under § 194.302(cc). First, the FAA is clarifying under § 194.302(cc) that part 91, subpart F applies to powered-lift operating under subpart K of part 91 (“Fractional Ownership

Operations”).³⁹³ The current § 91.501 already states that subpart F applies to fractional ownership program aircraft, but the FAA determined that expressly stating this in the SFAR regulatory text will help clarify the applicability of subpart F. Second, the FAA has clarified that any sections or paragraphs within sections that refer to a specific category of aircraft, such as airplanes or helicopters, and that are not outlined in the SFAR tables to § 194.302 or § 194.306, do not apply to powered-lift. Any regulatory reference to a category of aircraft that is intended to apply to powered-lift will be included in the SFAR tables. As such, the FAA adopts § 194.302(u) as final, though due to renumbering, it is being adopted as § 194.302(cc).

Section 91.503 describes required flying equipment and operating information for airplanes under subpart F of part 91. The FAA proposed in § 194.302(v) that this section apply to large powered-lift because the FAA anticipates that powered-lift will be used in passenger-carrying operations highly similar to airplanes. The FAA received no comments on the proposed § 194.302(v) and therefore adopts § 194.302(v) as final, though due to renumbering, it is being adopted as § 194.302(dd).

Section 91.505 imposes requirements to be familiar with the emergency equipment installed on the airplane to which a crewmember is assigned and with the procedures to be followed for the use of that equipment in an emergency. The crewmember must also be familiar with the Airplane Flight Manual for that airplane, if one is required, and with any placards, listings, instrument markings, or any combination thereof, containing each operating limitation prescribed for that airplane by the Administrator, including those specified in § 91.9(b). The FAA proposed in § 194.302(w) that § 91.505 apply to large powered-lift because, as stated previously, the FAA expects powered-lift to be used in passenger-carrying operations similar to airplanes. The FAA received no comments and therefore adopts § 194.302(w) as proposed, though due to renumbering it is being adopted as § 194.302(ee).

³⁹³ As discussed in the NPRM, subpart K of part 91 allows for fractional owners and their respective management company to share operational control of an aircraft. This subpart details certain operational considerations pertaining to fractional ownership programs to include safety standards for pilot training and qualifications. In the NPRM, the FAA discussed how the current regulatory framework as well as proposed amendments would be applicable to fractional ownership programs utilizing powered-lift. See 88 FR 39020, 39038.

Section 91.507 states that no person may operate an airplane over-the-top or at night under VFR unless that airplane is equipped with the instruments and equipment required for IFR operations under § 91.205(d) and one electric landing light for night operations. The FAA proposed in § 194.302(x) that large powered-lift must comply with the equipment requirements in this section. The FAA received no comments on the proposed § 194.302(x) and therefore adopts it as final, though due to renumbering, it is being adopted as § 194.302(ff).

Section 91.509(a) requires a life preserver or an approved flotation means for each occupant of an airplane. The FAA proposed in § 194.302(y) that powered-lift meet the requirements of § 91.509(a). The FAA received no comments on this proposal.

Section 91.509(b) states that no person may take off an airplane for flight over water more than 30 minutes flying time or 100 nautical miles from the nearest shore, whichever is less, unless it has onboard specified survival equipment. The FAA determined that the vertical landing capability of powered-lift should be considered in evaluating the applicability of this rule. Therefore, the FAA proposed in § 194.302(y)(1) to also apply the definition of extended over-water operations for helicopters to powered-lift. The FAA received no comments to this proposal.

Section 91.509(b)(5) specifically requires a lifeline to be stowed in accordance with § 25.1411(g). The FAA anticipates that powered-lift may be developed in the future that are capable and certified for ditching and with a wing or comparable structure suitable for evacuation. Accordingly, the FAA proposed in § 194.302(y)(2) that powered-lift subject to the requirements of subpart F will be required to comply with § 25.1411(g) or other airworthiness requirements established in accordance with § 21.17(b) that provide an equivalent level of safety for powered-lift, as reflected in the proposed regulatory text. The FAA received no comments to § 194.302(y)(2). As a result of the foregoing, the FAA adopts § 194.302(y) as final, but as a result of renumbering, it is now § 194.302(gg).

Section 91.511 describes requirements for communication and navigation equipment for overwater operations. Paragraph (a) states that no person may take off an airplane for a flight over water more than 30 minutes flying time or 100 nautical miles from the nearest shore unless it has at least the operable radio communication and electronic navigation equipment described in

§ 91.511. The FAA proposed in § 194.302(z) to require large powered-lift to comply with § 91.511 for overwater operations that are more than 30 minutes or 100 nautical miles from the nearest shore or off-shore heliport structure, whichever is less. The FAA received no comments on proposed § 194.302(z) and therefore adopts § 194.302(z) as final, though due to renumbering it is being adopted as § 194.302(hh).

Section 91.513 describes requirements for emergency equipment for airplanes, such as fire extinguishers, first aid kits, and megaphones. The FAA proposed in § 194.302(aa) to apply the safety standards required in this section to large powered-lift. The FAA received no comments on the proposed § 194.302(aa) and therefore adopts § 194.302(aa) as final, though due to renumbering it is being adopted as § 194.302(ii).

Section 91.515 prescribes flight altitudes for airplanes operating under VFR. The flight altitudes are designed to ensure adequate terrain clearance from any mountain, hill, or other obstruction to flight for day and night operations. The FAA proposed in § 194.302(bb) to apply the minimum flight altitudes in § 91.515 to large powered-lift. The FAA received no comments on the proposed § 194.302(bb). Therefore, the FAA adopts the proposed § 194.302(bb) as final, though due to renumbering it is being adopted as § 194.302(jj).

Section 91.517 describes passenger information and signage displaying the use of seatbelts and non-smoking requirements. The FAA proposed in § 194.302(cc) that large powered-lift comply with the information and signage display requirements in § 91.517. The FAA received no comments and is adopting § 194.302(cc) as final, though due to renumbering it is being adopted as § 194.302(kk).

Section 91.519 describes passenger briefings for the use of seatbelts and non-smoking requirements. The FAA proposed in § 194.302(dd) that § 91.519 should also apply to large powered-lift because passenger briefings for seatbelt use and smoking are equally important for airplane and powered-lift passenger-carrying operations. The FAA received no comments on § 194.302(dd) and therefore adopts the proposed § 194.302(dd) as final, though due to renumbering it is being adopted as § 194.302(ll).

Section 91.521 prescribes the requirements for equipping transport category airplanes with shoulder harnesses and safety belts. The FAA proposed in § 194.302(ee) that large powered-lift comply with the safety

equipment requirements for airplanes in this section. The FAA did not receive any comments on the proposed § 194.302(ee). As such, the FAA adopts § 194.302(ee) as final, though due to renumbering, it is being adopted as § 194.302(mm).

Section 91.523 imposes requirements regarding how carry-on baggage is stored on airplanes with a seating capacity of more than 19 passengers. The FAA proposed in § 194.302(ff) that, should powered-lift with more than 19 seats be developed, they would be required to comply with § 91.523, including the safety equipment requirements specified in § 25.561(b)(3) or airworthiness criteria that the FAA may find provide an equivalent level of safety in accordance with § 21.17(b). The FAA did not receive any comments on the proposed § 194.302(ff) and therefore adopts § 194.302(ff) as final, though due to renumbering, it is being adopted as § 194.302(nn).

Section 91.525 describes the requirements for the carriage of cargo. The FAA proposed in § 194.302(gg) that this section should apply to powered-lift. The FAA received no comments on the proposed § 194.302(gg) and therefore adopts § 194.302(gg) as final, though due to renumbering, it is being adopted as § 194.302(oo).

Section 91.527 describes the requirements for operations in icing conditions. To ensure safe operation of powered-lift, all the items listed in § 91.527(a), as well as other critical surfaces as determined by the manufacturer, must be clear from any contamination adhering to their surfaces, including the vertical-lift flight mode lifting devices. The FAA proposed in § 194.302(hh) that the requirements of § 91.527(a) should apply to all large powered-lift, including the vertical-lift flight mode lifting devices. The FAA received no comments on the proposed § 194.302(hh) and therefore adopts § 194.302(hh) as final, though due to renumbering, it is being adopted as § 194.302(pp).

Section 91.527(b) prescribes rules for IFR flight into known or forecast light or moderate icing conditions, or under VFR into known light or moderate icing conditions unless certain conditions are met as described below. The FAA proposed in § 194.302(ii) that no pilot may fly a powered-lift under IFR into known or forecast light or moderate icing conditions or under VFR into known light or moderate icing conditions unless it has been type certificated and appropriately equipped for operations in icing conditions, as set forth in § 194.308(i). Section 194.308(i), pertaining to § 135.227(d), requires

powered-lift seeking certification to operate in known or forecast light or moderate icing conditions to have procedures for the use of the ice protection equipment set forth in the AFM. The FAA received no comments on either the proposed § 194.302(ii) or § 194.308(i). As such, the FAA adopts both §§ 194.302(ii) and 194.308(i) as final. However, due to renumbering, § 194.302(ii) is being adopted as § 194.302(qq) and § 194.308(i) is being adopted as § 194.306(xx).

Section 91.527(c) prohibits airplane operations into known or forecast severe icing conditions, except for an airplane that has ice protection provisions that meet the requirements in section 34 of Special Federal Aviation Regulation No. 23, or those for transport category airplane type certification. The FAA did not propose to apply this regulation to powered-lift operations, explaining that powered-lift would be prohibited from operating into known or forecast severe icing conditions. However, upon further review, the FAA determined the SFAR regulatory text should explicitly address this prohibition. As a result, the FAA is adding paragraph (rr) within § 194.302, applying paragraph (c) of § 91.527 to powered-lift that are subject to the requirements of subpart F of part 91. Section 194.302(rr) states that no pilot may fly a powered-lift into known or forecast severe icing conditions. The exceptions outlined in § 91.527(c) (*i.e.*, for airplanes and transport category airplanes with ice protection provisions) do not apply to powered-lift. The FAA therefore adopts § 194.302(rr) as amended, which prohibits powered-lift from flying into known or forecast icing conditions.

Section 91.529 addresses flight engineer requirements for airplane operations. The FAA did not propose application of this section to powered-lift because modern aircraft are not designed to require a flight engineer.

Section 91.531 describes second-in-command SIC requirements for airplanes in subpart F. Section 91.531(a) provides that, subject to an exception in § 91.531(b), no person may operate any airplane that is type certificated for more than one required pilot, any large airplane, or any commuter category airplane without a pilot designated as SIC. The FAA proposed in § 194.302(jj) that paragraphs (a)(1) and (2) apply to powered-lift. However, the FAA proposed not to apply paragraph (a)(3) to powered-lift because there are currently no commuter category powered-lift, and no new aircraft can be certificated for that category as there are no longer any certification standards for commuter category aircraft in the

Federal Aviation Regulations. Section 91.531(b)(1) states that an airplane certificated for operation with one pilot may be operated without a pilot designated as SIC. Section 91.531(b)(2) states that a person may operate a large or turbojet-powered multiengine airplane, holding a special airworthiness certificate, without an SIC if (1) the airplane was originally designed with only one pilot station, or (2) the airplane was originally designed with more than one pilot station, but single pilot operations were permitted by the AFM or were otherwise permitted by the U.S. Armed Forces or the armed forces of a Chicago Convention contracting State. The FAA proposed in § 194.302(jj) that § 91.531(b)(1) apply to a powered-lift certificated for operation with one pilot and that (b)(2) apply to all large powered-lift that hold a special airworthiness certificate and meet the requirements of § 91.531(b)(2)(i) and (ii), regardless of powerplant type. The FAA determined that further clarification is necessary for § 91.531(b)(2) because the current regulation applies to large and turbojet-powered multiengine airplanes. Though the FAA explains in the NPRM it will not reference “multiengine” or “turbojet-powered” for powered-lift in the operational rules,³⁹⁴ the SFAR regulatory text should clarify that § 91.531(b)(2) applies to “large” powered-lift. As a result, the FAA is clarifying under § 194.302(ss) that § 91.531(b)(2) applies to large powered-lift that meet the additional requirements outlined in § 91.531(b)(2), which includes subparagraphs (i) and (ii).

Section 91.531(c) states no person may designate a pilot to serve as SIC, nor may any pilot serve as SIC, of an airplane required under this section to have two pilots unless that pilot meets the qualifications for SIC prescribed in § 61.55. The FAA proposed in § 194.302(jj) that paragraph (c) apply to large powered-lift. The FAA received no comments on the proposed § 194.302(jj) and therefore adopts § 194.302(jj) as final, though due to renumbering, it is being adopted as § 194.302(ss).

Section 91.533 describes flight attendant requirements for airplanes with more than 19 passengers. The FAA proposed in § 194.302(kk) that this section apply to powered-lift with more than 19 passengers onboard if the powered-lift are certificated for civil operations during the duration of the SFAR. The FAA received no comments on the proposed § 194.302(kk) and therefore adopts § 194.302(kk) as final,

though due to renumbering, it is being adopted as § 194.302(tt).

7. Additional Equipment and Operating Requirements for Large and Transport Category Aircraft

Section 91.603 requires that a transport category airplane be equipped with an aural speed warning device that complies with § 25.1303(c)(1). The FAA proposed in § 194.302(ll) that this regulation apply to large powered-lift. As noted in the NPRM, the FAA also proposed that instead of § 25.1303, the FAA may apply other airworthiness criteria it finds provide an equivalent level of safety in accordance with § 21.17(b). The FAA did not receive any comments on the proposed § 194.302(ll) and therefore adopts § 194.302(ll) as final, though due to renumbering, it is being adopted as § 194.302(uu).

Section 91.605 prescribes transport category civil airplane weight limitations. Section 91.605(a) prescribes takeoff requirements for transport category airplanes (other than a turbine-engine-powered airplane certificated after September 30, 1958). This regulation applies only to non-turbine powered airplanes that were type certificated without an Airplane Flight Manual. All new entrant powered-lift type certificated under § 21.17(b) will be required to have an AFM; accordingly, the FAA did not propose to apply § 91.605(a) to powered-lift for this SFAR.

Section 91.605(b) contains references to an Airplane Flight Manual and prohibits operations contrary to the flight manual. Section 91.605(b)(1) states that no person operating a turbine-engine-powered transport category airplane may takeoff that airplane at a weight greater than that listed in the Airplane Flight Manual. The FAA proposed in § 194.302(mm) to apply § 91.605(b)(1) to large powered-lift—regardless of whether they will takeoff vertically or using wing-borne lift similar to an airplane—and that have the takeoff performance information in the AFM.

Section 91.605(b)(2) stipulates no person operating a turbine-engine-powered transport category airplane may takeoff at a weight (allowing for normal consumption of fuel and oil in flight to the destination or alternate airport) if the weight of the airplane on arrival would exceed the landing weight as contained in the Airplane Flight Manual taking in consideration the elevation of the destination or alternate airport and the ambient temperature anticipated at the time of landing. The FAA proposed in § 194.302(nn) that paragraph (b)(2) apply to large powered-

lift—regardless of whether they will land vertically or using wing-borne lift similar to an airplane—that have the landing performance information in the AFM.

Section 91.605(b)(3) and (b)(4)(ii) also contain additional takeoff criteria for turbine-engine-powered transport category airplanes, such as wet runway and clearway distances. The FAA proposed in § 194.302(oo) to apply these requirements to certain large powered-lift. Section 91.605(c) sets specific requirements for takeoff distances and runway lengths for turbine-engine-powered transport category airplanes certificated after August 29, 1959. The FAA proposed in § 194.302(oo) that this paragraph apply to large powered-lift executing takeoff operations that utilize wing-borne lift and have takeoff performance information in the AFM.

The FAA did not receive any comments on proposed § 194.302(mm), (nn), or (oo). The FAA therefore adopts § 194.302(mm), (nn), and (oo) as final, though due to renumbering, these sections are being adopted as § 194.302(vv), (ww), and (xx).

Section 91.609 prescribes the requirements for flight data recorders (FDR) and cockpit voice recorders (CVR) in large and transport-category U.S.-registered civil aircraft.³⁹⁵ The requirements are based, in part, on the passenger-seating configuration of each aircraft. The FAA proposed in § 194.302(pp) that a powered-lift, based on seating configuration but regardless of the type of powerplant, must comply with the certification provisions listed in § 91.609(c)(3), (e)(1), and (i), or with such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b). Furthermore, the FAA proposed that operators of powered-lift must comply with §§ 194.312 or 194.313 in lieu of the appendices referenced in § 91.609(c)(1).

The FAA received four comments on the proposed §§ 194.302(pp), 194.312, and 194.313.

ALPA argued that FDR and CVR should be required for powered-lift, regardless of seating capacity. ALPA further recommended that, in addition to requiring CVR and FDR recorders for all powered-lift, powered-lift operators should be required to install Flight Data Monitoring Systems (FDMS) to identify adverse trends and prevent accidents.

The FAA has previously determined that the FDR requirement is appropriate

³⁹⁵ The FAA notes that it published a Notice of Proposed Rulemaking pertaining to CVRs, but the proposal does not impact this final rule. See *25-hour Cockpit Voice Recorder (CVR) Requirement, New Aircraft Production*, NPRM, 88 FR 84090 (Dec. 4, 2023).

³⁹⁴ See 88 FR 39025 (June 14, 2023).

for only those multiengine, turbine-powered airplanes or rotorcraft that have a passenger seating configuration, excluding any pilot seats, of 10 or more. Due to the capability of powered-lift to operate in wing-borne flight mode and vertical-lift flight mode, the FAA will also require multiengine, turbine-powered powered-lift to comply with § 91.609(c)(1).

In addition, the FAA has previously determined that the cockpit voice recorder (CVR) requirement is appropriate for only those multiengine, turbine-powered airplanes or rotorcraft that have a passenger seating configuration of six passengers or more and for which two pilots are required by type certification. Due to the capability of powered-lift to operate in the wing-borne flight mode and vertical-lift flight mode, the FAA will also require multiengine, turbine-powered powered-lift to comply with § 91.609(e).

Lastly, as stated in the NPRM, the costs imposed on operators and individuals complying with this rule would be no more burdensome than the costs incurred by entities and individuals complying with corresponding airplane and rotorcraft regulations that are already in effect. Requiring powered-lift to comply with FDR and CVR regardless of seating capacity is not consistent with current regulations. Moreover, the FAA determined that requiring equipment such as CVRs and FDRs for all powered-lift regardless of the seating capacity is not warranted at this time because the FAA does not have the data to support requiring that equipment to be installed on powered-lift with less than six passenger seats.

An individual commenter stated that, although the NPRM mentions that powered-lift can operate using features of both helicopters or airplanes, the proposed rule only addresses two flight modes: wing-borne and vertical-lift flight. The commenter argued that the most critical operating modes, as evidenced by historical accident, incident, and anomalous event data for the V-22 Osprey tilt-rotor, are during transition (VTOL-airplane) and conversion (airplane-VTOL), when the lift is being shared by engine-driven lift devices/engine thrust and the wing. The commenter argued that the rule should address powered-lift transition and conversion modes of flight.

Although there is no table specific to “transition” and “conversion” modes, the existing parameters listed in the published FDR tables include these flight modes (e.g., § 194.310 contains a section that specifies “Pilot inputted—Primary controls (*i.e.*, Ascent, descent,

acceleration and deceleration, heading and directional control for all axes”). The FAA proposed requiring the FDR to record all data during the manipulation of all primary flight controls for all axes, which includes recording the full range during any transitions in and out of the vertical-lift flight mode.³⁹⁶ These parameters were included in Table 1 to § 194.312 and Table 1 to § 194.314 in the proposed SFAR. Therefore, the transition and conversion modes are incorporated into the SFAR FDR tables.

ANAC asked the FAA to consider adopting the following requirement: “No person may operate a U.S. civil registered multiengine aircraft having a passenger seating configuration of six passengers or more unless it is equipped with an approved cockpit voice recorder.” Lastly, ANAC suggested exploring the integration of lightweight flight recorders for voice and data recording.

ANAC suggested that the required amount of recorded information be reduced from 25 hours to 10 hours due to the perceived limited endurance of powered-lift. However, the FAA notes that subpart G of part 91 applies to the operation of large and transport category U.S.-registered civil aircraft. The FAA expects large and transport-category powered-lift to have endurances similar to transport-category airplanes and helicopters. Therefore, the FAA has determined that existing FDR requirements are appropriate for large and transport category U.S.-registered civil powered-lift and will provide a level of safety equivalent to airplanes and rotorcraft. The FAA has previously determined that the CVR requirement is appropriate only for those U.S. civil registered multiengine, turbine-powered airplane or rotorcraft having a passenger seating configuration of six passengers or more and for which two pilots are required by type certification or operating rule. The FAA does not intend to expand this requirement to include aircraft for which only one pilot is required. Furthermore, as stated in the NPRM the costs imposed on operators and individuals complying with this rule would be no more burdensome than the costs incurred by entities and individuals complying with corresponding airplane and rotorcraft regulations that are already in effect. As such, requiring powered-lift to comply with the CVR requirements for aircraft requiring only one pilot is not consistent with current regulations and

would create a financial burden on the operator.

An anonymous commenter stated they are concerned that the proposed flight recorder parameters do not adequately address the unique design and operation of vertical lift vehicles. Furthermore, battery propulsion systems are not included in the proposed parameter list in this NPRM. The commenter asserted that, considering that the intent of battery technology is to replace legacy turbine-powered systems, powered-lift should be mandated to carry flight recording technology regardless of weight or passenger capacity. The FAA disagrees. The parameters specified in the proposed tables of § 194.312 through § 194.315 in the SFAR adequately encompass current powered-lift designs. The FAA proposed the requirement of the FDR to record all the pilots’ inputs of the primary controls (*i.e.*, ascent, descent, acceleration, and deceleration, heading and directional control for all axes). Thus, regardless of propulsion system or weight, the FDR would record the primary controls inputs.

In summary, the FAA notes that subpart G of part 91 applies to the operation of large and transport-category U.S.-registered civil aircraft. The FAA expects large and transport-category powered-lift to have endurances similar to transport-category airplanes and helicopters. Therefore, the FAA has determined that existing CVR and FDR requirements are appropriate to large and transport category U.S. registered civil powered-lift and will provide a level of safety equivalent to airplanes and rotorcraft. The FAA does not intend to expand the current rule to include all powered-lift, regardless of powerplant, seating capacity, or number of pilots required. Requiring equipment such as CVRs and FDRs for all powered-lift is not warranted at this time because the FAA does not have the data to support requiring this equipment to be installed all powered-lift regardless of seating capacity. Furthermore, as stated in the NPRM, the costs imposed on operators and individuals complying with this rule would be no more burdensome than the costs incurred by entities and individuals complying with corresponding airplane and rotorcraft regulations that are already in effect. As a result of the foregoing, the FAA adopts § 194.302(pp)(1) and (2) as final, though due to renumbering, those provisions are adopted as § 194.302(yy)(1) and (2).

Section 91.609(d) requires that, whenever a flight recorder required by § 91.609 is installed, it must be operated continuously from the instant the airplane begins the takeoff roll or the

³⁹⁶ See Section XIII (“Definitions”) for more information on how the FAA defines these flight modes in the final rule.

rotorcraft begins lift-off to when the airplane has completed the landing roll or the rotorcraft has landed at its destination. The FAA proposed in § 194.302(pp)(3) to require powered-lift to comply with this section by requiring that the flight recorder be operated continuously from the earlier point at which the powered-lift begins the takeoff roll or begins lift-off until the latter point when the powered-lift has completed the landing roll or has landed at its destination. The FAA did not receive any comments on this proposal and therefore adopts § 194.302(pp)(3) as final, though due to renumbering, it is being adopted as § 194.302(yy)(3).

Section 91.609(i) describes the CVR requirements for airplanes or rotorcraft manufactured on or after April 7, 2010. Section 91.609(j) describes the requirements for recording datalink messages in airplanes or rotorcraft when the datalink communication equipment was installed on or after April 6, 2012. The FAA considers CVRs and FDRs to be necessary safety equipment on airplanes and rotorcraft and proposed in § 194.302(pp) that these requirements also be applicable to powered-lift. The FAA did not receive any comments related to § 91.609(i) and (j). The FAA therefore adopts § 194.302(pp) as final, though due to renumbering, it is being adopted as § 194.302(yy).

Section 91.611 authorizes ferry flights with one engine inoperative for airplanes with three or four engines. The rule was written specifically for airplanes and is based on airplane performance characteristics. The FAA acknowledged that some powered-lift may operate as an airplane during takeoff but determined this section should not be applicable to large powered-lift under the SFAR due to the lack of data to support safe powered-lift operations with an inoperative engine.

The FAA received one comment related to § 91.611 from BETA, who recommended that the FAA make § 91.611 applicable to all powered-lift for which the AFM contains procedures for normal flight operations without all engines operating. BETA stated the FAA's decision to exclude § 91.611 from the SFAR unnecessarily restricts operations of powered-lift that during the type certification process establish that the aircraft can safely perform normal flight operations without all engines operating.

The FAA notes that § 91.611 was written specifically for airplanes and is based on airplane performance characteristics. The FAA acknowledges that some powered-lift may operate as an airplane during takeoff but

determined this section should not be applicable to large powered-lift under the SFAR due to the lack of data to support safe powered-lift operations with an inoperative engine. The FAA expects to obtain more data during the term of this SFAR to determine if powered-lift can safely operate with an inoperative engine. The FAA further notes that the applicability section subpart G of part 91 applies to the operation of large and transport category U.S.-registered civil aircraft. The A250, a powered-lift mentioned in BETA's comment, is not a large nor a transport category U.S.-registered civil aircraft and therefore is not subject to the requirements of subpart G of part 91.

Section 91.613 requires airplane compartment interiors to meet the flame propagation requirements set forth in §§ 25.853 or 25.856. For large powered-lift, the FAA proposed in § 194.302(qq) that the thermal/acoustic installation materials required by § 91.613(b)(2) meet the requirements of § 25.856 or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b). Section 91.613(a) does not apply to powered-lift because SFAR 41 terminated in September 1983 and is limited to type design changes for airplanes issued prior to October 1979. The FAA did not receive any comments related to § 194.302(qq) and therefore adopts § 194.302(qq) as final, though due to renumbering, it is being adopted as § 194.302(zz).

8. Waivers

Section 91.903 permits the Administrator to issue a certificate of waiver authorizing the operation of aircraft in deviation from any rule listed under § 91.905 if the Administrator finds that the proposed operation can be safely conducted under the terms of that certificate of waiver. In the NPRM, the FAA proposed a permanent change to § 91.903 that would allow the FAA to issue certificates of waiver for any of the part 91 operating rules as modified by part 194. In other words, each corresponding part 194 operating rule addressing a waivable part 91 rule will also be waivable. For example, § 91.107 is a waivable regulation under § 91.905. Similarly, § 194.302(c), which applies § 91.107 to powered-lift, will also be waivable under the § 91.903 amended language. For any rules that are not waivable, a powered-lift operator may still petition for an exemption. The FAA did not receive comments regarding proposed § 91.903(a) and finalizes the amendment as proposed.

9. Fractional Ownership Operations

Section 91.1037 addresses the requirements for operating large transport category airplanes at destination and alternate airports. The FAA perceives that large powered-lift will operate similar to large transport-category airplanes when considering altitude, distance, speed, passenger carrying capacity, passenger safety, composition of flight crew, operating environment (e.g., over water), and required safety and rescue equipment. Therefore, the FAA proposed that large transport category powered-lift comply with § 91.1037 as set forth in § 194.302(rr). Furthermore, the FAA proposed that if a specific powered-lift meets the requirements of § 91.1037, then all of the requirements of § 91.1025(o), including § 91.1025(o)(7) which currently only applies to airplanes, will be applicable, as set forth in § 194.302(rr)(i). The FAA did not receive any comments related to § 194.302(rr) and therefore adopts § 194.302(rr) as final, though due to renumbering, it is being adopted as § 194.302(aaa).

Section 91.1041 addresses aircraft proving and validation tests. Section 91.1041 sets out the parameters and the requirements for when proving and validation tests must be accomplished by a fractional ownership program.

Section 91.1041(b) requires a fractional ownership program manager to conduct proving tests in a turbojet airplane if they have not previously proved a turbojet airplane. The FAA proposed in § 194.302(ss) that a fractional ownership program manager that has not previously proven a powered-lift in operations under subpart K, be required to conduct at least 25 hours of proving tests acceptable to the Administrator as detailed in § 91.1041(b)(1) through (3).

Under § 91.1041(d), the FAA requires validation testing for certain authorizations, for operations outside U.S. airspace, and for the addition of certain aircraft that were previously proved or validated but are not of the same make or model, or of similar design. These tests are required for aircraft that require two pilots for flight in VFR conditions, or turbojet airplanes. Under § 194.302(ss), the FAA proposed applying § 91.1041(d) to powered-lift that are subject to the requirements of subpart K of part 91. The FAA did not receive comments regarding § 91.1041(d).

The FAA received one comment from Lilium regarding the 25-hour proving test requirement under § 91.1041(b). Lilium urged the FAA to consider

adopting a tailored approach to this requirement. Specifically, Liliium stated the FAA could require program managers to conduct a series of proving tests, each focusing on a specific aspect of the aircraft's operation, and that the proving test period should be tailored to the expected geographical routes and flight times of the program.

Powered-lift, regardless of the powerplant, have additional complexity due to their design and operation. These features have not been available and experienced by the civilian market to date. Although Liliium proposed a specific strategy for tailoring the proving test requirements, § 91.1041(g) already allows the Administrator to authorize deviations from the proving and validation testing requirements if the Administrator finds that special circumstances make full compliance with this section unnecessary. As a result of this deviation authority, no additional regulatory revisions are required. The FAA accepts § 194.302(ss) as final, though due to renumbering, it is being adopted as § 194.302(bbb).

Section 91.1045 contains additional safety equipment requirements for program aircraft. The FAA proposed that this rule apply to certain powered-lift in proposed § 194.302(tt) and (uu).

For powered-lift with more than 30 seats or a payload capacity of more than 7,500 pounds, the FAA proposed that § 91.1045(a) applies; and for powered-lift with 30 seats or fewer and a payload capacity of 7,500 pounds or less, § 91.1045(b) applies. Furthermore, the FAA proposed that § 91.1045(a)(3) and (b)(3) apply to powered-lift, and that instead of TAWS, a powered-lift must be equipped with an HTAWS that meets the requirements of TSO-C194 and Section 2 of RTCA DO-309 or a FAA-approved TAWS A/HTAWS hybrid system.

Section 91.1045(b)(5) refers to airborne thunderstorm detection equipment required by § 135.173 and airborne weather radar required by § 135.175. This section is applicable to airplanes having a passenger-seat configuration of 30 seats or fewer, excluding each crewmember, and a payload capacity of 7,500 pounds or less, and any rotorcraft (as applicable). The FAA proposed in § 194.302(uu) that § 91.1045(b)(5) apply to powered-lift. As an additional note, the requirements of §§ 135.173 and 135.175 apply as-written to powered-lift because they apply to aircraft and the FAA is not proposing to apply the helicopter provisions of those sections to powered-lift.

EASA asked if the FAA expects to issue a waiver from the requirement for powered-lift to be equipped with

thunderstorm detection equipment. Although not explicitly stated, it appears EASA is referencing § 91.1045. The FAA does not issue waivers to this rule. However, an individual or entity may seek relief from this rule, in the form of an exemption, by following the criteria set forth in 14 CFR part 11. The FAA will consider any exemption request that is submitted in accordance with 14 CFR part 11.

The FAA is adopting § 194.302(tt) and (uu) as proposed, though due to renumbering, these sections are being adopted as § 194.302(ccc) and (ddd).

The FAA notes applicability of pilot qualifications and training requirements in Subpart K of part 91 are discussed in section V.L. of this preamble.

With the exception of § 91.1109(b)(4), § 91.1109 applies to powered-lift because it is generally applicable to aircraft. Section 91.1109(b) requires each person desiring to establish or change an approved inspection program under this section to submit the inspection program for approval to the Flight Standards office that issued the program manager's management specifications. Under § 91.1109(b)(4), the inspection program may be derived from an airplane inspection program approved under § 125.247 and currently in use under part 125. The FAA recently proposed to amend the applicability of part 119 and allow powered-lift operations in part 125 in the Update to Air Carrier Definitions NPRM. However, the FAA did not include part 125 in this SFAR. Although § 91.1109(b)(4) is not applicable to powered-lift, the remaining provisions in § 91.1109 apply to powered-lift because they apply to all aircraft.

Additionally, the FAA notes that § 91.1115(b)(1) uses the word "airplane" and the rest of paragraph (b) uses the word aircraft. The FAA proposed a technical amendment to § 91.1115(b)(1) to change the word "airplane" to "aircraft." Changing this reference will not adversely affect any other category of aircraft. As changed, this section would then apply to powered-lift. The Continuous Airworthiness Maintenance Program (CAMP) program manager is primarily responsible for maintaining the airworthiness of the program aircraft, including airframes, aircraft engines, propellers, rotors, appliances, and parts, including for powered-lift. The CAMP manager is also responsible for maintaining the operations manual and maintaining the records required by § 91.1427 for the specified amount of time. The FAA did not receive any comments on the proposed § 91.1115(b)(1) and therefore adopts it as final.

C. Part 97 Rules for Powered-Lift

Title 14 CFR part 97 prescribes standard instrument approach procedures, obstacle departure procedures, and weather minimums that apply to IFR takeoffs and landings at civil airports in the United States. It further defines copter procedures as helicopter procedures, with applicable minimums as prescribed in § 97.35. The definition is limited to helicopters because when part 97 was promulgated, the FAA did not envision that aircraft would have hybrid airplane and helicopter characteristics. Consequently, powered-lift are currently excluded from using copter procedures, even if they can perform the operations safely. The purpose of this section of the SFAR is to propose a regulatory pathway that allows powered-lift to use the copter procedures defined in § 97.3.

In the NPRM, the FAA proposed § 194.305 to ensure that powered-lift seeking to use copter procedures can be certified under § 21.17(b), be approved for IFR operations, and meet equivalent system design and stability as helicopters currently type certificated for instrument flight under part 27 and appendix B to part 29. If the powered-lift does not meet that equivalency, the aircraft's flight manual will contain a limitation prohibiting use of copter procedures. As explained in the NPRM, the specific airworthiness standards will be established during the type certification process. The criteria the FAA considers necessary for powered-lift to conduct copter procedures under part 97 are provided in greater detail in the NPRM.³⁹⁷

The FAA received five public comments that were in support of the proposed language. Joby and Bristow generally supported the language. Both commenters (from CAE and National Business Aviation Association (NBAA)) considered the draft language to be a practical application of IFR procedures to powered-lift and expressed their support. GAMA expressed very strong support of the draft language allowing certified powered-lift to use helicopter procedures stating it is "welcomed by industry stakeholders."

³⁹⁷ See 88 FR 39040–39041 (June 14, 2023). Specifically, the NPRM further explains the TERPs Manuals and Copter instrument procedures (IP) process, as well as the airworthiness evaluation process for copter procedures. 88 FR 39040 (June 14, 2023). The NPRM also explains that the minimums prescribed for copter procedures are not published in the Code of Federal Regulations; rather, the Standard for Terminal Instrument Procedures (TERPs) are documented on FAA Forms 8260–3, 8260–4, 8260–5, and 8260–15A, and depicted on aeronautical charts published by the FAA. They are incorporated by referenced pursuant to 5 U.S.C. 552(a) and 1 CFR part 51.

Therefore, the FAA adopts § 194.305 as proposed.

D. Part 135 Rules for Powered-Lift

The FAA conducted a review of the part 135 regulations to identify which rules specified aircraft, airplane, helicopter, rotorcraft, or powered-lift in the text of the rule. All part 135 regulatory requirements imposed on “aircraft” apply to powered-lift, so any portions of part 135 which are silent to aircraft category are applicable to all part 135 operations conducted with powered-lift. The FAA considered the safety aspects of the rule and whether powered-lift have similar operating and performance characteristics to airplanes or helicopters, and determined which should be applicable to powered-lift. This final rule uses existing requirements for airplane, helicopter, or rotorcraft and includes some new requirements specifically for powered-lift. This final rule will apply to all powered-lift when used in part 135 operations.

In response to comments received, the FAA drafted some new performance-based requirements. These new requirements allow the use of some helicopter rules as long as the operator complies with the appropriate risk mitigations that are detailed in the final rule, as an alternative to the airplane rules. Therefore, there is no longer a distinct dividing line between airplane or helicopter rules being applicable to powered-lift, so the final rules below are listed in numerical order.

1. Subpart A: General

Subpart A prescribes requirements regarding the applicability, manual requirements, aircraft requirements, and crewmember certificate requirements for part 135.

Section 135.1 outlines the applicability of part 135. In particular, § 135.1(a)(9) lists helicopter air ambulance (HAA) operations, as defined in § 135.601(b)(1), as being governed by part 135. Regulations for HAA operations are found in subpart L of part 135. As discussed in section VI.D.8. of this preamble, the FAA is applying subpart L of part 135 to powered-lift that conduct air ambulance operations. Therefore, it is necessary for § 135.1(a)(9) to be applicable to powered-lift that conduct air ambulance operations. The application of § 135.1(a)(9) to powered-lift conducting air ambulance operations was proposed in § 194.308(a).

The FAA received one comment from GAMA on proposed § 194.308(a). GAMA requested that powered-lift be treated as helicopters for the purposes of

§ 135.1(a)(9). As the FAA proposed that § 135.1(a)(9) be applicable to powered-lift conducting air ambulance operations, GAMA’s comment was already addressed in the NPRM.

Therefore, the FAA adopts § 194.308(a) as final, but as a result of renumbering it is now § 194.306(a).

Section 135.23 specifies the required content for those operators required to have a manual under § 135.21. Section 135.23(r) specifies the manual content requirements of a Destination Airport Analysis. However, the Destination Airport Analysis manual content requirements are only required if a Destination Airport Analysis is required by § 135.385 (“Large transport category airplanes: Turbine engine powered: Landing limitations: Destination Airports”). As specified in section VI.D.6. of this preamble, § 135.385 applies to large powered-lift per § 194.306(hhh) and (iii).

In the NPRM, the FAA proposed in § 194.307(a) that, if a large powered-lift is required by § 194.307(qq) and (rr) to comply with § 135.385, then the requirements of § 135.23(r)(7) would be applicable to powered-lift.

The FAA received no comments on proposed § 194.307(a); however, the FAA determined that clarification on § 135.23(r) is necessary. Although subparagraph (r)(7) contains the only specific reference to “airplane” under § 135.23, the FAA is revising the proposed regulatory text under § 194.307(a) to reference “Section 135.23(r)” instead of “(r)(7)” because the introductory text to paragraph (r) of § 135.23 cross-references an airplane-specific section of part 135 (§ 135.385). As a result, to minimize any confusion of whether all of § 135.23(r) applies to powered-lift, the FAA is revising § 194.307(a) to state “Section 135.23(r)”. The FAA therefore adopts § 194.307(a) as revised, but as a result of renumbering, it is now § 194.306(b).

2. Subpart B: Flight Operations

Subpart B prescribes requirements for flight operations under part 135.

Section 135.93 details minimum altitudes for use of an autopilot. The altitude requirements of this section are in place to provide pilots with sufficient altitude for obstacle clearance, taking into consideration the reaction time needed to disengage the autopilot and apply a corrective action should an autopilot malfunction occur.

In the NPRM, the FAA stated that the autopilot requirements in § 135.93(a)–(f) would apply to powered-lift because the section is generally applicable to aircraft. While § 135.93 is applicable to aircraft in general, § 135.93(g) excludes

rotorcraft from having to comply with the minimum altitudes for use of an autopilot. However, the FAA chose in the NPRM to not apply the exception in § 135.93(g) to powered-lift.

In § 194.307(b), the FAA proposed to apply the requirements referencing the “airplane” flight manual to powered-lift, as reflected in a powered-lift’s AFM. The FAA anticipated that powered-lift will conduct most of their autopilot-controlled flight operations much like an airplane (in wing-borne flight mode), with the lift being primarily produced by the wings thereby enabling a powered-lift to travel at a greater forward velocity than a helicopter.

The FAA received three comments on proposed § 194.307(b). The commenters argue that the requirement to use airplane regulations for this rule is prohibitive, short sighted, and is not in the public’s interest. Commenters recommended using ICAO direction, which utilizes the helicopter rules.

AWPC asserted that restricting the use of an autopilot in their aircraft below 500 feet AGL is prohibitive. The commenter suggested this is against public interest since their aircraft is capable of sustained hovering maneuvers and is expected to be used for Search and Rescue (SAR) operations at minimum use heights 30 feet above the surface. AWPC indicated that their aircraft will have specific autopilot modes—such as radar altimeter hold, transition down to a hover, barometric altimeter hold, and winchman trim mode—and contends the use of an autopilot should be based on aircraft capabilities. Therefore, AWPC argued that their aircraft should be allowed to engage the autopilot at a certified minimum use heights under the same regulations as permitted for helicopters in § 135.93(g).

AUVSI asserted the FAA’s proposal falls short in regard to supporting autonomy, including advanced autopilots, by applying the airplane altitude requirements of § 135.93. The commenter also asserted the FAA is short sighted and safety-limiting by not considering a fully autonomous auto flight system. AUVSI contended the FAA is prohibiting a safety-enhancing system from being able to be used during some of the phases of flight most susceptible to pilot error accidents when autonomous takeoff and landing are being routinely demonstrated by eVTOL (and other) aircraft today.

GAMA submitted a comment indicating it represents consensus recommendations from the following powered-lift member companies: AIR, Joby, Vertical Aerospace Group, Airbus Helicopters, AWPC, Volocopter, Archer,

Lilium, Wisk, BETA, Overair, Zipline, EVE Air Mobility, and Supernal. In this comment, they conducted a gap analysis with those regulations they identified and the ICAO guidance to determine whether helicopter or airplane rules should apply. In general, GAMA recommended that the FAA use the ICAO Document 10103 and apply rules for helicopters to powered-lift most of the time. They stated these recommendations were crafted by broad powered-lift industry consensus and supports their entry into service by 2024. GAMA's group comment requested that powered-lift be included in the rotorcraft exception of § 135.93(g), which means there would be no minimum altitudes for the use of an autopilot installed on powered-lift.

The FAA has evaluated the comments and the information that AWPC provided in their comment regarding the capabilities that are built into their autopilot system and the type of operations where the autopilot use would be desirable. This prompted the FAA to reconsider the proposal from the NPRM to unilaterally apply the autopilot enroute requirements of § 135.93(c) to all powered-lift. Due to the hybrid nature of powered-lift and the varying performance capabilities of these aircraft designs, the FAA determined unilaterally applying the rotorcraft exception of § 135.93(g) would not necessarily provide the safety parameters for enroute operations currently set forth in § 135.93(c) to all powered-lift designs.

In response to the comments received, for those powered-lift manufacturers that have requested the FAA to evaluate the autopilot system and to subsequently have a published minimum engagement altitude for enroute operations in the AFM, the FAA is providing a performance-based alternative for those aircraft. This performance-based alternative would permit a powered-lift to conduct enroute operations with the autopilot engaged below 500 feet. For an autopilot system to have a minimum engagement altitude for enroute operations specified in the AFM, it must be shown during type certification that the powered-lift can be safely operated at the minimum engagement altitude. However, if no minimum engagement altitude is specified in the AFM, then a powered-lift could not use the autopilot in enroute operations below 500 feet or at an altitude that is no lower than twice the altitude loss specified in the AFM for an autopilot malfunction in cruise conditions, whichever is greater.

The addition of the performance-based alternative will maintain the level

of safety provided by the current rule since the autopilot system will be evaluated during the aircraft certification process. During the type certification of the powered-lift the authorizations and limitations of the aircraft autopilot system can be documented in the AFM. For those powered-lift that do not have a minimum engagement altitude specified in the AFM, safety will be maintained because the autopilot in the powered-lift may not be used enroute either below 500 feet, or at an altitude that is twice the altitude loss specified in the AFM for an autopilot malfunction, whichever is higher, and this is consistent with the current requirements of § 135.93(c).

GAMA recommended to follow the ICAO requirements, which would use the helicopter rule. The FAA disagrees with GAMA's recommendation and believes that due to the hybrid nature of powered-lift and the varying performance capabilities of these aircraft designs, unilaterally applying the rotorcraft exception of § 135.93(g) would not necessarily provide the safety parameters currently set forth in § 135.93(a)–(f) to all powered-lift designs, and they should be required to adhere to the autopilot limitations provided in their AFM.

Therefore, the FAA has amended § 194.307(b), which as a result of renumbering is now § 194.306(c), to provide powered-lift a performance-based alternative for enroute use of autopilots. The FAA is also retaining the provision in § 135.93(c)(3) which permits enroute use of the autopilot at an altitude specified by the Administrator.

Section 135.100 details flightcrew member duties and activities in relation to critical phases of flight. Section 135.100 defines "critical phases of flight" as including "all ground operations involving taxi, takeoff and landing, and all other flight operations conducted below 10,000 feet, except cruise flight." A note appended to § 135.100 states that "taxi" is defined as "movement of an airplane under its own power on the surface of an airport." The FAA adopted the § 135.100 note in 1981 (Elimination of Duties final rule, 46 FR 5500). As illustrated by the § 135.100 note's focus on airplanes, people often only associate the ground movement of airplanes with taxiing. However, there are comparable movements of aircraft under their own power, such as ground taxiing by wheeled helicopters. The narrowed focus of the § 135.100 note limits the restrictions in § 135.100 just to airplanes, even though helicopters and powered-lift may have the ability to move under their own power in a

similar manner. To maintain an equivalent level of safety for all aircraft conducting operations at an airport, regardless of the category of aircraft and the kind of taxiing they do, all movement of any aircraft under its own power at an airport must be done free from distraction of non-safety related duties and activities. As such, the FAA proposed in the NPRM to amend the note as a permanent change in § 135.100 by broadening the term to "aircraft" from "airplane," and by applying references to "taxi" in § 135.100 to all categories of aircraft. This change would satisfy the intent of the rule by requiring a sterile cockpit environment for all aircraft during critical phases of flight, which improves safety by reducing distractions for all aircraft operations, including powered-lift.

The FAA received one comment on § 135.100 from an individual, who indicated that the proposed definition of "taxi" under § 135.100 does not fully encompass the capabilities or current operating procedures for powered-lift. Specifically, the commenter noted that some powered-lift have the design capability to hover taxi, which the commenter noted was defined in the Pilot-Controller Glossary as "movement conducted above the surface and in ground effect at airspeeds less than approximately 20 knots." The commenter recommended amending the note in § 135.100 to incorporate the Pilot-Controller Glossary definition of hover taxi to accommodate these types of powered-lift.

The FAA agrees with the commenter that the note in § 135.100 does not fully encompass the capabilities or current operating procedures for powered-lift. To ensure the sterile cockpit requirements are being applied during all critical phases of flight, including various forms of taxiing, the FAA is adding both hover taxi and air taxi from the Pilot Controller Glossary to the existing note in § 135.100. This will ensure that flight crewmembers are not distracted when taxiing their aircraft, whether such taxiing is traditional ground taxiing, hover taxiing, or air taxiing. Therefore, the FAA is amending § 135.100 as a permanent change to add paragraph (d), which includes both hover and air taxi under the definition of "taxi."

Section 135.117(a) requires each PIC of an aircraft carrying passengers to ensure that passengers have been orally briefed on certain specific items. In particular, § 135.117(a)(6) requires that, for flights involving extended overwater operations, passengers must be orally briefed on ditching procedures and the use of required flotation equipment.

With respect to helicopters, an extended overwater operation is defined in § 1.1 as an operation over water at a horizontal distance of more than 50 nautical miles from the nearest shoreline and more than 50 nautical miles from an off-shore heliport structure. Section 135.117(a)(6) applies to all aircraft, including powered-lift conducting extended overwater operations as defined in § 194.103.

In addition, § 135.117(a)(9) requires that, before each takeoff, the PIC of a rotorcraft that involves flight beyond the autorotational distance from the shoreline must ensure that all passengers have been orally briefed on the use of life preservers, ditching procedures, and emergency exit from the rotorcraft in the event of a ditching. This briefing must include the location and use of life rafts and other life preserver devices as applicable.³⁹⁸ In the NPRM, the FAA proposed applying § 135.117(a)(9) to powered-lift in § 194.308(b).

The FAA received one comment from GAMA, cosigned by other industry stakeholders on proposed § 194.308(b). Regarding § 135.117, GAMA recommended the FAA apply the ICAO guidance and use the paragraphs stipulated for airplanes for powered-lift, rather than the regulations for rotorcraft.

The FAA disagrees with GAMA's recommendation to only apply the airplane provisions of § 135.117 to powered-lift operations. Powered-lift may have the ability to glide, autorotate, or both. Not all powered-lift designs may be able to perform a glide and ditch similar to an airplane in an emergency. For those powered-lift that are unable to glide and can only conduct an autorotation in an emergency, it is critical to ensure that passengers receive the briefing required by § 135.117(a)(9). Failing to require the § 135.117(a)(9) briefing would expose passengers to unnecessary risk in the event of a water landing.

Additionally, the FAA does not have the historical data on powered-lift designs to assert that the positive buoyancy characteristics and the potential to float for a longer period of time—characteristics of airplane designs—will exist in powered-lift. Therefore, the FAA will address powered-lift as helicopters for the purpose of overwater operations.

In response to the comment received, the FAA did not make any changes to the proposed regulatory text. Therefore,

³⁹⁸ “As applicable” means if the aircraft is carrying rafts or other life preserver devices onboard, passengers must be briefed on the location and use of these items.

the FAA adopts § 194.308(b) as final, but as a result of renumbering, it is now § 194.306(d).

Section 135.128 regulates the use of safety belts and child restraint systems, requiring that each person onboard an aircraft operated under part 135 occupy an approved seat or berth with a separate safety belt properly secured about him or her during movement on the surface, takeoff, and landing. For seaplane and float equipped rotorcraft operations during movement on the surface, § 135.128(a) makes clear that the person pushing off the seaplane or rotorcraft from the dock and the person mooring the seaplane or rotorcraft at the dock are excepted from the seating and safety belt requirements. This is because a pilot would be unable to moor or launch a seaplane or a float equipped rotorcraft unless a pilot or passenger has their safety belt or shoulder harness unfastened so that they can vacate their seat for the purpose of launching or mooring the seaplane or float equipped rotorcraft.

In the NPRM, the FAA proposed in § 194.307(c) to apply the exception delineated in § 135.128(a) to powered-lift pilots or passengers when the powered-lift is operating like a seaplane or a float equipped rotorcraft. The FAA received no comments on proposed § 194.307(c). Therefore, the FAA adopts § 194.307(c) as final, but as a result of renumbering, it is now § 194.306(e).

3. Subpart C: Aircraft and Equipment

Subpart C prescribes requirements for aircraft and associated equipment for operations under part 135.

Section 135.145 sets out the parameters and the requirements for the Proving and Validation Tests that must be accomplished by a certificate holder.³⁹⁹ In the NPRM, the FAA proposed in § 194.307(d) that, if a certificate holder has not previously proven a powered-lift in operations under part 135, they would be required to conduct at least 25 hours of proving tests as detailed in § 135.145(b)(1) through (3).

Section 135.145(d)(1) requires validation tests for the addition of an aircraft that requires two pilots for flight in VFR conditions, or turbojet airplanes. In the NPRM, the FAA proposed in § 194.307(e) that validation testing required by § 135.145(d)(1) would apply to all powered-lift. Under the proposed § 194.307(e), validation testing would be required when an operator requests

³⁹⁹ Proving tests are necessary to evaluate each certificate holder's ability to conduct operations safely and in accordance with the applicable regulations.

authorization to use a powered-lift, unless a powered-lift of the same make or similar design has been previously proved or validated by that operator in operations under part 135.

EASA supported the FAA's intent “to ensure powered-lift operate to the highest level of safety in part 135,” as noted in the FAA's rationale for proposed § 194.307 in Notice 23–8. EASA asked if the FAA intends to have increased safety requirements similar to part 121 operations.

In the SFAR, the FAA intends for powered-lift to comply with the level of safety provided in part 135. To require powered-lift to comply with a higher regulatory requirement than already stipulated in part 135 would place an undue burden on powered-lift operators with no basis to support higher regulatory requirements, such as those found in part 121.

In response to the comments received, the FAA did not make any changes to the proposed regulatory text. Therefore, the FAA adopts § 194.307(d) and (e) as final, but as a result of renumbering, they are now § 194.306(f) and (g), respectively.

Section 135.150 requires a public address and crewmember interphone systems for aircraft that have a passenger seating configuration of more than 19, excluding any pilot seat. Section 135.150 works in conjunction with § 25.1423, which requires any public address (PA) system that is required for use in air carrier service to be powered by a source that remains powered when the aircraft is in flight or stopped on the ground, after the shutdown or failure of all engines and auxiliary power units, or the disconnection or failure of all power sources dependent on their continued operation.

The FAA proposed in § 194.307(f) that, for large powered-lift, the public address system required by § 135.150(a)(7) must comply with § 25.1423 or such airworthiness criteria as the FAA may find provides an equivalent level of safety in accordance with § 21.17(b). Additionally, the FAA proposed in § 194.307(g) that for large powered-lift that have more than 19 passenger seats, regardless of the type of powerplant, the crewmember interphone system must comply with the requirements of § 135.150(b)(7) or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b).

The FAA received no comments on proposed § 194.307(f) and (g). Therefore, the FAA adopts § 194.307(f) and (g) as final, but as a result of renumbering,

they are now § 194.306(h) and (i), respectively.

Section 135.151 requires cockpit voice recorders (CVRs) on certain turbine-powered airplanes and rotorcraft. CVRs enhance safety and are required in turbine-powered airplanes and rotorcraft carrying a certain passenger count as a necessary hazard analysis tool used during an accident investigation. In the NPRM, the FAA proposed in § 194.307(h) through (m) to require CVRs for powered-lift with the same seating configurations and pilot requirements that are in § 135.151. In § 194.307(h), the FAA proposed that powered-lift which have a passenger seating configuration of six or more and for which two pilots are required by certification or operating rules, or that have a passenger seating configuration of 20 or more seats will be required to comply with § 135.151(a) or (b), regardless of the type of powerplant. In § 194.307(k), the FAA proposed applying § 135.151(g)(1) to powered-lift with a passenger seating configuration of six or more seats, for which two pilots are required by certification or operating rules, and that are required by § 135.152 to have a flight data recorder. In § 194.307(l), the FAA proposed applying § 135.151(g)(2) to powered-lift with a passenger seating configuration of twenty or more seats and which are required by § 135.152 to have a flight data recorder. The FAA also proposed in § 194.307(j) and (m) that, although § 135.151(d) and (h) reference airplanes or rotorcraft, these paragraphs will also apply to powered-lift to ensure that uninterrupted audio signals are recorded and that all datalink messages are recorded when required. The FAA will include CVR airworthiness requirements during type certification based on an applicant's proposed operational needs. Operators must ensure that the CVR for each powered-lift be installed and equipped in accordance with the certification provisions listed in the applicable paragraph of § 135.151 or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b).

The FAA received two comments on when a powered-lift would be required to be equipped with a CVR. ALPA provided a comment arguing that limiting the requirement to equip powered-lift with CVRs, FDRs, or TAWS (see section VI.B.7. of this final rule) based on seating configuration would exclude the first generation of powered-lift from the safety benefits of this equipment. ALPA disagreed with the FAA's rationale, arguing that the FAA has based its rationale on traditional

aircraft and flight operations. They asserted these emerging novel entrants into the NAS pose a new challenge to the safety matrix of commercial aviation, and therefore the existing practices of aircraft weight, size, and seating capacity for required safety equipment is unjustified. ALPA recommended all powered-lift (regardless of seating capacity) should be equipped with a CVR. EASA commented about the requirement to equip powered-lift with CVRs and FDRs. EASA argued that it is crucial to consider the important role this equipment provides in incident and accident investigations, emphasizing its importance for those eVTOLs with lower passenger capacity who are engaging in commercial passenger transportation in congested areas. EASA asked the FAA to take into consideration that the majority of the current designs of eVTOL will not be required to equip their aircraft with a CVR due to seating capacity. They requested that the FAA clarify if alternatives are going to be considered to compensate for the lack of such recording capability in the AAM group.

The FAA agrees that CVRs provide valuable information during accident investigations. However, the FAA does not agree that it is necessary for all powered-lift, regardless of seating capacity, be equipped with a CVR. The FAA reduced the minimum seat requirement in § 135.151(a) and (g)(1) from 10 passenger seats to 6 passenger seats in 1987 because of the large number of small airplanes that operate with seating configurations of six to nine passenger seats and that are required by certification or part 135 operating rules to have two pilots. In 1988, the FAA required rotorcraft with the same passenger seat configurations and operational requirements as airplanes to be equipped with a CVR. For the same reasons that the FAA imposed the CVR requirements for airplanes and rotorcraft with certain seating capacities, the FAA will require CVRs for powered-lift with those same seating configurations and pilot requirements, regardless of the types of powerplant. The FAA has determined that requiring equipment such as CVR for all powered-lift regardless of the seating capacity is not warranted at this time because the FAA does not have the data to support requiring CVRs to be installed on powered-lift with less than six passenger seats. Additionally, requiring a CVR on powered-lift with less than six passenger seats increases the associated costs and requires a higher standard than what is currently

in place for other aircraft of similar passenger seating capacity.

Therefore, the FAA adopts § 194.307 (h), (i), (j), (k), (l) and (m) as final, but as a result of renumbering, they are now § 194.306(j), (k), (l), (m), (n) and (o).

Section 135.152 specifies when a flight data recorder (FDR) is required to be installed on an aircraft, parameters to be recorded, and installation requirements. The FAA proposed in § 194.307(n) to apply § 135.152(c), (d), (f), and (j) to powered-lift with a passenger seating configuration, excluding crewmember seats, of 10 to 30. The FAA proposed in § 194.307(o) to apply § 135.152(a) to powered-lift with a passenger seating configuration of 10 to 19 seats. Additionally, the FAA proposed in § 194.307(p) that § 135.152(b) and (b)(3) apply to powered-lift with a passenger seating configuration of 20 to 30 seats, regardless of the type of powerplant.

The FAA received three comments on when a powered-lift would be required to be equipped with a FDR, and one comment on the FDR recording parameters.

ALPA expressed general support for the FAA's analysis of part 135 regulations and identification of helicopter rules that are appropriate for powered-lift. However, ALPA pointed out several proposed rules under § 194.307 that would only apply to powered-lift with certain minimum seating capacities. ALPA said that, because powered-lift generally have less than six seats, many powered-lift would be excluded from the safety benefits provided by these rules. ALPA therefore recommended that these rules apply to all powered-lift, regardless of seating capacity, for enhanced safety.

Similarly, EASA stated in their comment that most current eVTOL do not meet the minimum passenger seating configurations and therefore would not be affected by the proposals requiring either a CVR or FDR under § 194.307. Without these CVR and FDR provisions, EASA noted that there will be a lack of data. EASA advocated for applying § 194.307 to all powered-lift, regardless of seating capacity.

Additionally, GAMA noted that the ICAO Document 10103 framework would result in powered-lift of certain weight to be required to install FDRs, rather than basing it on seating capacity. GAMA stated that this would enable operators to collect and share data about the suitability of rotorcraft rules. GAMA further recommends that the FAA apply ICAO guidance and replace the term "helicopter" or "rotorcraft" with "powered-lift," as written in ICAO Annex 6, Part 3, Section 2, Chapter 4,

4.3.1.1. This would add a weight requirement of 4,960 pounds to trigger the installation of an FDR, instead of a 10-passenger seat capacity trigger.

The FAA considered the comments requesting the FAA to require all powered-lift to be equipped with an FDR, regardless of the passenger seating capacity, as well as an aircraft weight in lieu of a passenger seat capacity threshold. When the FDR rule was first promulgated in 1988, it was based on NTSB safety recommendations. In response to a number of significant events and the substantial growth in commuter air transportation, the FAA required FDRs for all multiengine turbine-powered airplanes and rotorcraft operated under part 135 having a passenger seating configuration of 10–19 seats. In the FDR final rule, the FAA acknowledged that the FDR requirements for larger aircraft operating under part 135 are more stringent than those for smaller aircraft because the small aircraft are required to be equipped with cockpit voice recorders.⁴⁰⁰ The FAA determined the cost of installing cockpit voice recorders is substantially less than that of flight data recorders and therefore would not be a significant burden on small operators.⁴⁰¹ The FAA acknowledges that FDR data is beneficial for accident investigations. However, the FAA continues to believe that the benefits of requiring an FDR would not be justified in aircraft with less than 10 passenger seats because the FAA does not yet have the data to support requiring FDRs to be installed on powered-lift with less than ten passenger seats. Without the data to support requiring an FDR on powered-lift with less than ten passenger seats, the associated costs and mandating a higher standard than what is currently in place for other categories of aircraft of similar passenger seating capacity is not justified. As such, the FAA will not adopt ALPA and EASA's recommendation to require FDRs for all powered-lift, regardless of seating capacity.

Additionally, the FAA will not adopt GAMA's suggestions to base the FDR requirement on aircraft weight rather than seating capacity. Basing the FDR requirement on seating capacity for powered-lift is consistent with how the FAA has historically determined whether FDR is required. Therefore, the FAA will continue basing the determination of whether FDR is

required on seating capacity, not aircraft weight.

An individual commenter said the proposed FDR tables for part 135 only address vertical-lift and wing-borne flight modes. The commenter said the rule should address powered-lift transition (VTOL-airplane), and conversion (airplane-VTOL) modes of flight under all applicable and relevant sections.

In response to the individual commenter regarding the proposed FDR Tables, the FAA responds that not all powered-lift designs will have transition and conversion modes like a tilt-rotor as referenced by the commenter. The NPRM discussed the two flight modes that the operational rules refer to, these are wing-borne and vertical-lift flight modes.⁴⁰² Wing-borne flight mode is when a powered-lift is operating more like a traditional airplane, which uses a wing to generate lift and depends exclusively or partially on nonrotating airfoil(s) for lift during takeoff, landing, or horizontal flight. Vertical-lift flight mode refers to a powered-lift that is operating like traditional rotorcraft, which is in a configuration that allows vertical takeoff, vertical landing, and low speed flight; and depends principally on engine-driven lift devices or engine thrust for lift. The FAA recognizes powered-lift will have the ability to transition in and out of the vertical-lift flight mode. In the NPRM, the FAA proposed requiring the FDR to record all data during the manipulation of all primary flight controls for all axes, which includes recording the full range during any transitions in and out of the vertical-lift flight mode. These parameters were included in Table 1 to § 194.312 and Table 1 to § 194.314 in the proposed SFAR. Therefore, the FDR would record all parameters, including when a powered-lift is transitioning in and out of the vertical-lift flight mode.

In response to the comments received, the FAA did not make any changes to the proposed regulatory text, and adopts as final § 194.307(n), (o), and (p), which as a result of renumbering is now § 194.306(p), (q), and (r), as well as Table 1 to § 194.314 and Table 1 to § 194.315, which as a result of renumbering are now Table 1 to § 194.312 and Table 1 to § 194.313, respectively.

While considering the FDR requirements of § 135.152, the FAA became aware of the need for a technical correction in § 135.152(j), which cross-references the operational parameters

that must be recorded for turbine-engine powered airplanes with a seating configuration of 10 to 30 passenger seats. The FAA proposed to correct the cross-reference in § 135.152(j) to refer to § 135.152(h)(1) through (h)(8).

The technical correction for paragraph (j) will be adopted as final to § 135.152.

Section 135.154 requires turbine-powered airplanes to be equipped with TAWS. To ensure that powered-lift engaged in air carrier operations will be operated at the highest possible degree of safety, as required by 49 U.S.C. 44701(d)(1)(A), the FAA proposed in § 194.307(q) that powered-lift having a passenger seating configuration, excluding any pilot seat, of 6 or more be equipped with a HTAWS that meets the requirements in Technical Standard Order (TSO) C194 and Section 2 of RTCA DO-309, as prescribed for helicopters and contained in § 135.605, unless equipped with a FAA approved TAWS A/HTAWS hybrid system.

In addition, the FAA proposed in § 194.307(q) that § 135.154(c) apply to powered-lift as they will be required to have an AFM that contains the appropriate procedures on the use of this equipment and the proper flight crew reactions in response to the activation of a terrain awareness system. This ensures powered-lift equipped with HTAWS or an FAA-approved TAWS A/HTAWS hybrid system are operated at a level of safety that a terrain awareness system currently provides for airplanes.

The FAA received two comments, one from ALPA and one from EASA, on when a powered-lift would be required to be equipped with a TAWS or HTAWS.

ALPA recommended that TAWS or HTAWS as applicable should be required for all powered-lift regardless of seating capacity. ALPA stated that, if HTAWS is required for helicopter operations, it should also be required for similar powered-lift operations regardless of the seating capacity. ALPA argued that this would ensure the highest level of safety in this novel aircraft type, and operations.

The FAA has determined that without a TAWS A/HTAWS hybrid system, and until a TAWS specification is developed specifically for powered-lift, the current HTAWS specification, which requires a terrain display unit, would provide the best level of safety without an undue number of nuisance alerts. To ensure that powered-lift engaged in air carrier operations will be operated at the highest possible degree of safety, as required by 49 U.S.C. 44701(d)(1)(A), the FAA will require any powered-lift having a passenger seating

⁴⁰⁰ See *Cockpit Voice Recorders (CVR) and Flight Recorders*, final rule, 53 FR 26134, 26137 (Jul. 11, 1988).

⁴⁰¹ *Id.*

⁴⁰² See Section XIII ("Definitions") for more information on how the FAA defines these flight modes in the final rule.

configuration, excluding any pilot seat, of 6 or more be equipped with a HTAWS that meets the requirements in Technical Standard Order (TSO) C194 and Section 2 of RTCA DO-309, as prescribed for helicopters and contained in § 135.605, unless equipped with a FAA approved TAWS A/HTAWS hybrid system.

The FAA does not believe there is any justification to require a terrain awareness system for all powered-lift and will retain the threshold of a passenger seating capacity of 6 or more for those powered-lift conducting operations other than air ambulance operations. Powered-lift conducting air ambulance operations, regardless of passenger seat configuration, will be required to be equipped with an HTAWS or a FAA-approved TAWS-A/HTAWS hybrid system. This will align the powered-lift requirements with those currently required for helicopters and airplanes. Therefore, the FAA has determined requiring any terrain warning system for all powered-lift, regardless of the seating capacity, is not warranted at this time. Additionally, the FAA has no data to support ALPA's request to require terrain warning systems on all powered-lift. The FAA has determined the justification of complexity, size, speed, and flight performance characteristics mentioned in the final rule of March 29, 2000, including passenger seating capacity, is still valid today and will be applied uniformly to powered-lift.⁴⁰³

In their comment, EASA asked whether the FAA considered standards for the implementation of congested area databases for the HTAWS requirements.

In response to EASA's comment regarding the implementation of congested area databases for the HTAWS requirements, the obstacle and terrain databases include data for congested areas, and this subject is covered in TSO-C194 and Section 2 of RTCA DO-309, which are incorporated by reference under § 194.306(s) and (ooo).

In response to the comments received, the FAA did not make any changes to the proposed regulatory text and adopts § 194.307(q) as final, but as a result of renumbering it is now § 194.306(s).

Section 135.158 requires transport category airplanes equipped with a flight instrument pitot heating system to also be equipped with an operable pitot heat indication system that complies

with § 25.1326.⁴⁰⁴ The FAA anticipates that powered-lift will incorporate technological advances in aircraft display, will require highly augmented advanced flight control systems, and will be capable of operations in conditions conducive to icing. Accordingly, in the NPRM, the FAA proposed in § 194.307(r) that § 135.158 apply to all powered-lift that have a required pitot heating system installed. Section 194.307(r) cites the § 135.158 rule and invokes § 25.1326, which mandates a prescriptive means ("amber light") to indicate pitot heat failures.

The FAA received one comment on the proposed § 194.307(r) from BETA. BETA agreed that it is necessary for highly augmented, advanced flight control systems to include indication of pitot heat failures. BETA also agreed that the safety intent of the rule makes sense to apply to powered-lift. However, BETA argued that it does not make sense to apply the prescriptive means of indication used by part 25 transport category aircraft to powered-lift. BETA stated that many modern aircraft present pilot alerts through means other than colored flight deck lights, such as Crew Alerting System (CAS) alerts. BETA noted that, in March 2022, the FAA accepted ASTM F3120/F3120M-20 as an accepted means of compliance for § 23.2605, which covers crew alerting. Section 8.2.1 of ASTM F3120/F3120M-20 provides that the alert must conform to a "Caution" alert that is in clear view of a flightcrew member. This means of compliance allows the applicant to maintain a consistent flight deck indication philosophy, which is preferable from a safety and human factors perspective. BETA understood the FAA's safety intent is to require a crew alert that conforms to a prioritization hierarchy based on the urgency of flightcrew awareness and response if the pitot heat fails. BETA asserted this can be accomplished without the prescriptive aspects of § 25.1326(a), which may be inconsistent with the crew alerting philosophy or flight deck design of a specific powered-lift.

BETA recommended the FAA revise the SFAR to adopt § 135.158 with modifications to change "amber light" in the referenced § 25.1326(a) to "Caution alert" to allow for the pitot heat indication as appropriate for powered-lift.

The FAA agrees with BETA that the alert should not only be limited to an amber light and that there should be

another FAA-approved method of crew notification, such as a caution alert. Technological advances in aircraft crew alerting systems, including electronic cockpit displays, can provide equal or better notification to the flightcrew of improper operation or failure of systems. These highly automated systems will provide an equal or better indication to the flightcrew as would be provided by an amber light. The FAA is therefore amending the proposed regulatory text for § 194.307(r) to allow for the indication in powered-lift to be something other than an amber light when a pitot system is not operating. Therefore, the FAA has amended the SFAR to allow compliance with the criteria established under § 23.2605, § 25.1326, or equivalent airworthiness criteria established during certification under § 21.17(b). The requirement will be that the alert is in clear view of a flightcrew member. The FAA adopts the amended regulatory text in § 194.307(r) as final, but as a result of renumbering it is now § 194.306(t).

Section 135.159 stipulates the equipment requirements for when an aircraft is carrying passengers under VFR at night or under VFR over-the-top conditions.

When powered-lift are operated in wing-borne flight mode, they operate much like a traditional airplane in cruise flight. As such, the FAA proposed in § 194.307(s) that the exception in § 135.159(a)(1), which allows for an aircraft to be equipped with a third attitude indicator in lieu of a gyroscopic rate-of-turn indicator, should apply to powered-lift with a third attitude indicator. Section 135.159(a)(1) provides a separate standard for the third attitude indicator for airplanes as compared to helicopters. Under § 194.307(s), operators seeking to use the exception in § 135.159(a)(1) must ensure that the powered-lift is equipped with an attitude indicator capable of displaying the pitch and roll specifications of flight attitudes of 360 degrees of pitch-and-roll.

The FAA received two comments on proposed § 194.307(s), one from Joby and one from GAMA.

Joby indicated the FAA's proposal is overly prescriptive and inappropriate for powered-lift. Joby argued that their own systems inherently understand attitude and rates. Joby further stated that, if their attitude control system were to improperly estimate this data, the pilot cannot take control of the aircraft, even if the pilot correctly understands the attitude, because all pilot commands would be interpreted via a malfunctioning flight computer. Joby argued that such fly by wire

⁴⁰³ See *Terrain Awareness and Warning System*, final rule, 65 FR 16736 (Mar. 29, 2000).

⁴⁰⁴ Transport Category Airplanes—Pitot Heat Indication Systems, final rule, 46 FR 43804 (Aug. 31, 1981).

systems will be designed to the appropriate development assurance level (DAL) to control the aircraft under all conditions and will generally include redundant sensing with voting and exclusion of failed or misleading sensors.

Joby asserted that, in these full-time fly-by-wire aircraft, there is no safety benefit from independent sensing of attitude or other primary flight indications. Joby stated that it is sufficient for their system to display the output of its own attitude estimation since their system will be designed with the availability and redundancy needed to control the aircraft in all conditions. Joby also stated that, given the level of flight augmentation in their fly-by-wire system, the pilot will not perform attitude management or other stability tasks, instead being primarily focused on navigating the aircraft. Joby stated this is the case even in IMC conditions. Joby also argued that requiring a specific number of sensors, displays, or type of sensing is inappropriate and should instead be performance-based. Joby stated that each proposed design should be evaluated against the criticality of attitude information to the pilot and the hazard presented by loss of information, as well as the integrity of the source of information. Joby further asserted that, for powered-lift, there may not be a need to have multiple attitude sources displayed to the pilot simultaneously. Joby stated that, in their aircraft, the pilot does not have the task of comparing multiple data sets and deciding which are not correct, and thus there should not be a prescriptive requirement to show multiple displays of attitude or turn rate to the pilot.

Joby also asserted that the highly augmented systems installed on powered-lift are often envelope-limited and will therefore prevent the aircraft from exiting a narrow set of pitch and roll angles. As such, Joby argued that no pilot input can cause an exceedance, which is inherently a loss of control event, as it represents a failure of the fundamental control laws. With indirect controls, the pilot would not be able to recover an aircraft beyond programmed pitch or roll limits, as the flight control system itself is already outside of approved functionality.

According to Joby, requiring sensing that works through 360 degrees is also inappropriate. They asserted that this would require implementation and demonstration of a device which cannot be exercised by a properly functioning flight control system and may require applicants to design attitude sensing beyond aircraft performance only to meet this rule.

In their comment, GAMA provided the recommendation to use the ICAO guidance provided for helicopters for this rule.

The FAA disagrees with both of the commenters. According to § 91.3, the pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft. This cannot be delegated away from the pilot in command, regardless of the flight control or avionics package installed in the aircraft. Section 135.159 requires the aircraft to be equipped with certain instrumentation when carrying passengers under VFR at night or under VFR over-the-top conditions. Pilots engaging in VFR night operations may often unexpectedly encounter unpredicted adverse weather conditions which necessitate the use of instruments to safely pilot the aircraft out of the area. Additionally, during flights on dark nights over areas in which few, if any, ground reference lights are available, control of the aircraft is, to a great extent, dependent upon reference to instruments. Instrument flight may also become necessary in over-the-top operations due to such things as mechanical emergencies and weather conditions. The rate-of-turn indicator and the pitch and bank indicator ensures a single point of failure will not leave a pilot with no bank indication, enabling a pilot in command to maintain the safety of the flight and fulfill his responsibility for that flight.

The FAA asserts the equipment requirements of § 135.159 are essential, and since powered-lift in wing-borne flight mode operate similar to an airplane, the powered-lift needs to be equipped with a gyroscopic rate-of-turn indicator, except a third attitude indicator capable of displaying the pitch and roll specifications for airplanes may be used in place of the required gyroscopic rate-of-turn indicator.

Additionally, there is no requirement to use the exception provided in § 135.159(a)(1). Operators could choose to comply with § 135.159(a) and install a gyroscopic rate of turn indicator. Section 194.307(s) simply gives powered-lift operators the option to use a third attitude instrument system instead of a gyroscopic rate of turn indicator, as allowed for airplanes in § 135.159(a)(1).

Therefore, the FAA adopts § 194.307(s) as final, but as a result of renumbering it is now § 194.306(u).

Section 135.160 requires radio altimeters for all rotorcraft operations conducted under part 135. The FAA proposed in § 194.308(c) to require persons operating powered-lift to comply with the radio altimeter

requirements of § 135.160(a).⁴⁰⁵ Consistent with rotorcraft that must comply with § 135.160(a), the FAA also proposed to allow persons operating powered-lift with a maximum takeoff weight no greater than 2,950 pounds to have the ability to apply for a deviation from the radio altimeter requirements in accordance with § 135.160(b).

The FAA received two comments with one being partially in favor of the FAA's proposal.

Joby indicated that the FAA's proposed rationale for requiring a radio altimeter is overly broad and does not address specifics for electric powered-lift or their intended types of operations, namely urban air taxi, air tours, or short, regional flight operations. Joby argued that a radio altimeter may not be necessary or even beneficial to safety for those types of operations. Joby asserted that powered-lift with advanced flight control systems do not exhibit the same safety concerns from inadvertent IMC encounters as traditional part 135 helicopters. Joby further stated that the use of radio altimeters in urban settings does not provide the same assumed benefits and may decrease operational safety.

Joby urged the FAA to consider revising the radio altimeter requirements for powered-lift to address the types of operations where radio altimeters would be most beneficial, and to carefully consider specific aircraft design characteristics, equipage, or functionality when determining "unless otherwise authorized in the certificate holder's approved minimum equipment list" under § 135.160(a). They also suggested revising § 135.160(b) to allow deviations based on the type of operations and specific aircraft design characteristics, equipage, and functionality.

According to Joby, electric powered-lift are not intended to be operated in the type of missions or environments that lead to the type of accidents that motivated the adoption of § 135.160. Joby stated that helicopters flying under part 135 are traditionally used for a wide variety of missions, while electric powered-lift are intended to be operated in a very narrow range of missions with ranges typically under 100 NM. Joby argued that the value of a radio altimeter for additional situational awareness and safety margin due to unknowns from off-airport operations and unimproved landing zones will inherently be much lower for electric powered-lift than for traditional helicopters.

⁴⁰⁵ A-02-35 NTSB recommendation to incorporate radio altimeters for passenger carrying operations.

Joby asserted that the risk of losing visual acuity due to flat light, whiteout, or brownout is much more likely to occur during off airport operations or flight over rural or mountainous terrain. Joby stated the environments for urban air taxi, urban air tour, and short regional flights in metropolitan areas are different. These operations will be conducted in well developed areas where there are more buildings, roads, lights, surrounding structures, and prepared surfaces which provide good visual cues and allow pilots to maintain good depth of field and contrast in their vision. Therefore, according to Joby, the risk of exposure to flat light, whiteout, and brownout conditions will be significantly diminished. Joby also mentioned that some electric powered-lift being developed may be prohibited from operating in falling or blowing snow and takeoff and landing from snow covered surfaces.

Joby stated that “many powered-lift currently in development are using advanced flight control systems with advanced means of flight stabilization, flight augmentation, and envelope protection—such as flight path hold, altitude hold, airspeed hold, hover hold, level flight mode, ROC/ROD protection, and similar functionality.” According to Joby, these aircraft exhibit much lower pilot workload for aviating and navigating tasks than traditional helicopters and allow for much safer flight in situations with reduced visibility. Joby stated that these aircraft use modern flight deck avionics systems that have significantly improved situational awareness compared to traditional rotorcraft. Therefore, Joby argued that the pilots of these powered-lift will have a much higher level of situational awareness in general than pilots of traditional VFR helicopters. Joby asserted that this situational awareness is more effective than radio altimeters in most phases of flight because radio altimeters cannot look forward of the aircraft, while technologies such as HTAWS can.

Joby stated that, during a loss of visual reference due to flat light, whiteout, brownout, or any other inadvertent IMC encounter, powered-lift will behave significantly differently from traditional rotorcraft that depend on the pilot to maintain stability and control and ascertain the flight path relative to the ground or obstacles. According to Joby, powered-lift flight control systems are intentionally designed to revert to safe and stable flight when the pilot lets go of the controls. Therefore, Joby stated the assumed safety benefit of a radio altimeter for loss of visual reference due

to flat light, whiteout, brownout, or other, inadvertent IMC encounter is significantly reduced and may be negligible.

Joby argued that the proposed requirement is problematic due to the current radio altimeter TSO performance requirements. Joby suggested allowing for alternative, lower power, lower performance radio altimeters or for performance-based functionality, which may be non-TSO equipment or functionality approved under the Type Design. Joby argues that increased flexibility, to meet the “FAA-Approved radio altimeter” requirement would allow the industry to develop solutions better suited to improve safety in urban environments. For these reasons, Joby contended that a universal requirement for all powered-lift to be equipped with a radio altimeter for part 135 operations is misplaced and would negatively impact electric powered-lift conducting air taxi flight operations.

The FAA disagrees with Joby and has determined that radio altimeters are an important safety device designed to inform the pilot of the aircraft’s actual height above the surface. The FAA also believes that radio altimeter requirements should not be limited to only IMC flights, as radio altimeters provide additional situational awareness during inadvertent encounters with IMC as well as additional situational awareness after encounters with brownout, whiteout, or other situations where vision is suddenly limited and pilots lose their reference to the horizon and the ground. Powered-lift, like rotorcraft, can conduct vertical-lift flight mode take-offs and landings, so they could be susceptible to these same hazards that are applicable to rotorcraft.

Furthermore, the regulation takes into consideration the various designs of powered-lift and the different types of operations/missions that may be conducted with those aircraft, not just a segment of the operations that could be conducted with a powered-lift as requested by the commenter. Additionally, the FAA believes that electric powered-lift transporting passengers, including those operations conducted in concentrated urban environments, could encounter some of the hazards cited above and would benefit from the information that a radio altimeter provides to the pilot. As such, the FAA intends to apply the radio altimeter rule broadly, so that the safety enhancements provided by the radio altimeter will be available to all powered-lift regardless of the types of operations they perform.

The FAA disagrees with Joby’s recommendation to expand the deviation authority contained in § 135.160(b). When the FAA published the final rule requiring radio altimeters, it recognized there was a limited number of older helicopters used in part 135 operations that may not have adequate room on the flightdeck to install a radio altimeter.⁴⁰⁶ Therefore, the FAA included the ability for a certificate holder to obtain a deviation from this rule for circumstances when a radio altimeter cannot physically be located on the flightdeck. The FAA also noted that an HTAWS or other device such as a multi-function display that incorporates a radio altimeter would be permitted under this rule and that deviation authority may not be warranted for helicopters in which a radio altimeter can be incorporated into the flightdeck’s existing configuration. The FAA believes there is no justification to expand the deviation for powered-lift beyond the original limit of no greater than 2,950 pounds. This would ensure that powered-lift and helicopters will use the same criteria for authorization of a deviation as explained in the *Helicopter Air Ambulance, Commercial Helicopter, and Part 91 Helicopter Operations* final rule of 2014.

In response to Joby’s request for a discussion about the relief provided for radio altimeters in a certificate holder’s MEL, the FAA notes that powered-Lift MMELs will be treated no differently than any other aircraft with regard to MMELs. Proposed MMEL relief is normally submitted to the FAA by manufacturers or operators. The entity that requests the relief is responsible for submitting an evaluation plan that considers all phases of flight operation and that demonstrates that flight operations with the inoperative item will have an equivalent level of safety compared to flight operations with the same item operative. In response to Joby’s comment requesting the FAA revise part 194 rules to allow for alternative, lower power, lower performance radio altimeters or performance-based functionality, which may be non-TSO equipment or functionality approved under the Type Design, the FAA notes that § 135.160 requires a radio altimeter be “FAA-approved.” Radio altimeters installed as part of the initial type design or a type design change would be FAA-approved. However, if the equipment was to be installed after initial aircraft certification, then the radio altimeter

⁴⁰⁶ 79 FR 9932, 9939 (Feb. 21, 2014).

would need to meet a TSO standard and be a FAA-approved device.

GAMA recommended that the FAA use ICAO Document No. 10103 and apply the rule for helicopters in § 135.160 to powered-lift. The FAA reviewed ICAO Document No. 10103 and notes that the document indicates that radio altimeters should only be required in powered-lift that must perform a forced landing when experiencing a critical power-unit failure at any stage in the flight profile while operating in Instrument Meteorological Conditions (IMC).

The FAA agrees with GAMA in that § 135.160 should be applicable to powered-lift as it is applicable to rotorcraft. However, the FAA disagrees that the radio altimeter should only be required when a powered-lift must perform a forced landing when experiencing a critical power unit failure at any stage in the flight profile while operating in IMC. As stated in the NPRM, radio altimeters are valuable safety tools that can provide additional situational awareness during an inadvertent encounter with IMC, as well as additional situational after encounters with brownout, whiteout, or other situations where vision is suddenly limited and pilots lose their reference to the horizon and the ground. Additionally, radio altimeters can greatly improve a pilot's awareness of height above the ground during hover, landing in unimproved landing zones, and landings in confined areas where a more vertical approach may be required. The situations where a radio altimeter can provide valuable situational information are not limited to only operations conducted in IMC conditions but can also occur during VFR or flights conducted in VMC conditions where a pilot encounters conditions that they initially did not anticipate.

In response to the comments received, the FAA did not make any changes to the proposed regulatory text and adopts § 194.308(c) as final, but as a result of renumbering it is now § 194.306(v).

Section 135.163 outlines the equipment requirements for all aircraft carrying passengers under IFR. Section 135.163(g) contains an exception for multi-engine helicopters that states the two required generators may be mounted on the main rotor drive train and a loss of one powerplant will not affect both generators since they are on a common drive train. Section 135.163 currently applies to powered-lift as written. The FAA proposed in § 194.308(d) to allow powered-lift to utilize the exception for helicopters contained in § 135.163(g) when that powered-lift is equipped with a

drivetrain system that is driven by two separate powerplants and able to run the two required generators because, just as for rotorcraft, the loss of one powerplant would not affect both generators.

The FAA received no comments on proposed § 194.308(d) and therefore adopts § 194.308(d) as final, but as a result of renumbering it is now § 194.306(w).

Section 135.165 details communication and navigation equipment for extended over-water or IFR operations. This section is general to aircraft except for § 135.165(d) and (g)(1), which are specific to airplanes. The FAA determined that paragraph (d) should also apply to powered-lift with a passenger seating configuration, excluding any pilot seat, of 10 seats or more, or a powered-lift used in commuter operations, regardless of the type of powerplant, as proposed in § 194.307(t).

Paragraph (g) provides for extended over-water exceptions that allow the use of a single long-range navigation and single long-range communication system in certain geographic areas as authorized by the FAA. A list of operational factors the FAA may consider is listed in paragraph (g)(1)–(3) of § 135.165. Although (g)(1) uses the term airplane, the FAA proposed in § 194.307(u) to extend the ability to request that exception to powered-lift that are able to conduct extended over-water operations. The FAA proposed that paragraphs (d) and (g)(1) apply to powered-lift, as this will ensure powered-lift will be able to communicate as required during IFR and extended over-water flights.

The FAA received no comments on proposed § 194.307(t) and (u), and therefore, adopts § 194.307(t) and (u) as final, but as a result of renumbering they are now § 194.306(x) and (y).

While developing this final rule, the FAA noted that § 135.165(d) inadvertently continued to reference part 119 for the definition of “commuter operation.” The definition of “commuter operation” was moved to § 110.2 in the Operations Specifications final rule (76 FR 7482, Feb. 10, 2011). The FAA is adopting a permanent amendment to § 135.165(d) to reflect the current location of the “commuter operation” definition.

Section 135.168 contains requirements for emergency equipment for rotorcraft overwater operations. In the NPRM, the FAA proposed to apply § 135.168 to powered-lift under § 194.308(e). Under the proposed § 194.308(e), if the powered-lift is operating overwater beyond the gliding

or autorotational distance of the shoreline, then life preservers must be provided and worn by each occupant.

In the NPRM, the FAA indicated that powered-lift operated overwater will have a survivability sequence (sequence of events which occur upon impact with the water) more similar to rotorcraft than airplanes, and that the donning of life preservers would provide for the greatest likelihood of surviving in the water versus requiring the carriage of a life raft whenever powered-lift are conducting overwater operations beyond gliding and/or autorotational distance from the shoreline.

The FAA received three comments on proposed § 194.308(e).

According to GAMA, certain powered-lift demonstrate the capability to glide in a manner similar to airplanes when carrying passengers over water. GAMA asserted that, in such cases, it is imperative that the FAA apply the relevant airplane version of the rule to ensure appropriate and effective oversight. GAMA argued that, by recognizing the glide capabilities of these powered-lift, the FAA can optimize safety measures and streamline regulations accordingly. GAMA further argued that it is crucial to take full advantage of the similarities to airplane operations in these specific scenarios to maintain an equivalent level of safety for passengers and to facilitate smooth and efficient operations.

AWPC stated that their aircraft, the AW609, is a tiltrotor and is designed to operate like a pressurized turboprop airplane when in horizontal flight mode. AWPC argued that the AW609 has the equipment and related characteristics of a helicopter to conduct ditching procedures. This design approach, according to AWPC, addressed the concerns the FAA stated in the proposed SFAR such as buoyancy and the duration to remain afloat after ditching in water. AWPC further stated that the AW609 Tiltrotor has design features such as a door above the waterline, wing fuel tanks, and a pressurized cabin with closeable outflow valves, as well as being equipped with an overhead escape hatch and flotation system. Therefore, AWPC contended that the application of helicopter rules is inappropriate for the AW609 Tiltrotor and requests the FAA apply a performance and equipage-based approach to applying regulations for overwater operations to the AW609 Tiltrotor.

Joby recommended the FAA follow the ICAO guidance for powered-lift, which Joby stated applies airplane rules to powered-lift for overwater operations. Joby also recommended that the FAA

reverse course on many of the proposed powered-lift rules and instead use helicopter-based rules to align with ICAO Document 10103. Joby stated that, for situations like overwater operations where helicopter rules would not be advisable, limitations can be placed in the AFM or, in very limited situations, addressed through placards. According to Joby, this approach would result in a more logical transition from existing aircraft types to powered-lift.

The FAA has reviewed the comments received and as part of the review, the FAA considered § 136.9, which addresses commercial air tours operating over water beyond the shoreline. Sections 136.9 and 135.168 are similar because they stipulate when a life preserver is required to be worn. The FAA determined that the performance-based criteria of § 136.9(b)(3) could provide flexibility to the life preserver requirements of § 135.168(b)(1) without any degradation to safety. Therefore, under § 194.306(z), which addresses § 135.168, the FAA will introduce the provision only requiring the life preservers to be readily available instead of requiring them to be worn when the powered-lift is able to meet certain performance requirements. In order to use this provision under § 194.306(z)(1), the multi-engine powered-lift must be operated at a weight that will allow it to climb with the critical engine inoperative or when experiencing a critical change of thrust, of at least 50 feet a minute, at an altitude of 1,000 feet above the surface.

The term “critical change of thrust” is a new term the FAA has introduced since the publication of the NPRM, and it can be used for those powered-lift that do not necessarily have a critical engine. A critical change of thrust means a failure that would most adversely affect the performance or handling qualities of an aircraft. This new term ensures powered-lift that do not have a critical engine but do experience an adverse effect on performance or handling qualities resulting from failures of the flight control or propulsive system, either singular or in combination, must meet the same performance requirements specified for aircraft that have a critical engine. Adding the term “critical change of thrust” ensures that those novel aircraft that may not have a critical engine will be required to demonstrate the same performance requirements as those stipulated for aircraft with a critical engine, thereby ensuring the same level of safety is maintained.

The FAA took into consideration the ability of the powered-lift to remain at

least 1,000 feet above the surface after the critical engine becomes inoperative or the powered-lift experiences a critical change of thrust. This will ensure a powered-lift will have the ability to remain out of the water, providing ample time for each occupant to don their life preservers. For those powered-lift that do not have this performance capability, the occupants must wear life preservers during the flight.

The FAA also took into consideration that some powered-lift would be operated at higher altitudes overwater similar to airplanes, rather than the lower altitudes at which helicopters normally operate, and the requirement for each occupant to wear a life preserver when over water is therefore unnecessary for some powered-lift.

As a result of the foregoing, the FAA amends the proposed rule for multi-engine powered-lift that are operated at a weight that will allow it to climb, with the critical engine inoperative or while experiencing a critical change of thrust, at least 50 feet a minute, at an altitude of 1,000 feet above the surface. For those powered-lift, life preservers are not required to be worn but must be readily available and easily accessible to each occupant. Proposed § 194.308(e) is adopted as amended, but due to renumbering, it is now § 194.306(z).

Section 135.169 provides additional airworthiness requirements for large airplanes, as well as small airplanes with a passenger-seating configuration of 10 or more seats. These airplanes are held to a higher airworthiness safety standard either through aircraft certification basis or certain other regulatory standards or requirements. Section 135.169 also includes rules about the material used as a liner for cargo or baggage compartments.

Section 135.169(a) applies to large airplanes and requires them to meet the additional airworthiness requirements of §§ 121.213 through 121.283, and 121.307. The FAA proposed in § 194.307(v) to require a large powered-lift to comply with appropriate certification provisions listed in § 135.169(a) or such airworthiness criteria as the FAA determines will provide an equivalent level of safety in accordance with § 21.17(b). Powered-lift will spend their cruise portion of flight similar to airplanes. When a powered-lift is configured with 10 or more passenger seats or is large, the persons riding on the powered-lift should be afforded the same level of safety afforded to passengers on an airplane.

Section 135.169(b), which applies to operators of small airplanes that have a passenger seating configuration, excluding pilot seats, of 10 seats or

more, requires certain type certifications for such small aircraft. Since powered-lift are currently in development, the FAA has determined that § 135.169(b)(2) through (b)(7) should not be applicable to them. As discussed in the NPRM, the FAA has determined that § 135.169(b)(1) and (b)(8) should be applicable to powered-lift. Section 135.169(b)(1) requires that such airplanes be certificated in the transport category, while (b)(8) requires certification in the normal category as a multi-engine certification level 4 airplane, as defined in part 23. The FAA proposed in § 194.307(w) that small powered-lift with a passenger seating configuration of 10 seats or more operating under part 135 must comply with the applicable part 23 provisions identified in § 135.169(b)(8) or such airworthiness criteria as the FAA may find provides an equivalent level of safety in accordance with § 21.17(b). Section 194.307(w) will ensure that a small powered-lift utilized in part 135 operations and carrying more than 10 passengers will achieve a certification standard at least equivalent to the standard set forth in § 135.169(b)(8). The FAA notes that, although it proposed in the NPRM preamble to apply § 135.169(b)(1) to powered-lift, paragraph (b)(1) was inadvertently excluded from the proposed SFAR regulatory text at § 194.307(w). As a result, the FAA has added § 135.169(b)(1) to the SFAR at § 194.306(bb).

Section 135.169(d) addresses cargo or baggage compartments of 200 cubic feet or greater volume in transport category airplanes by requiring more flame-resistant materials. The intent of § 135.169(d) is to reduce the risk of fire burning through the compartment liner and becoming uncontained.⁴⁰⁷ Accordingly, the FAA proposed in § 194.307(x) that large powered-lift that have a cargo or baggage compartment of 200 cubic feet or greater will be required to meet the certification requirements of appendix F to part 25, part III or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b).

The FAA received one comment on proposed § 194.307(v), (w), and (x) from an individual commenter.

Specifically, the individual commenter sought guidance on the definitions of small and large powered-lift as used for this rule. The commenter mentions that part of the NPRM suggests that small powered-lift are those with 10

⁴⁰⁷ See Fire Protection Requirements for Cargo or Baggage Compartments, final rule, 54 FR 7384 (Feb. 17, 1989).

or more passengers. The commenter notes that other parts of the NPRM suggest that a large powered-lift would be one capable of 10 or more passengers. The commenter requests that the FAA provide guidance as to the specific definitions of small and large powered-lift and as to whether the definition of passenger capacity and cargo compartment type from § 135.169 applies to powered-lift.

Per § 1.1, passenger seating configuration does not define small or large aircraft. Instead, whether an aircraft is small or large is determined by weight alone. Specifically, the definition of large aircraft contained in § 1.1 is based upon maximum certificated takeoff weight, not on passenger seating configuration. As such, a large powered-lift may be configured with less than 10 passenger seats, while a small powered-lift may be configured with more than 10 passenger seats.

The FAA evaluated the weight parameters for both transport category airplanes and transport category rotorcraft and determined that the weight limit for large aircraft (over 12,500 pounds, § 1.1) would be an appropriate weight at which to apply airplane transport category standards to powered-lift. Accordingly, small powered-lift would include powered-lift weighing 12,500 pounds or less. To determine whether a powered-lift qualifies as small or large, the FAA will use the existing § 1.1 weight criteria definitions and not the commenter's suggested seat number because weight thresholds are already used in the regulations.

The commenter also inquired if the current § 135.169 applies, specifically in the context of the aircraft's number of passenger seats and cargo/baggage compartment size.

As stated in the NPRM, § 194.306(aa) through (cc) will require certain § 135.169 subparagraphs to apply based on the powered-lift's seating and cargo/baggage compartment size. The additional § 135.169 airworthiness requirements would be required for powered-lift based on the same criteria specified for airplanes, large airplanes (as defined in § 1.1), or small airplanes with a passenger-seating configuration, excluding pilot seats, of 10 or more. Therefore, large powered-lift, or small powered-lift with a passenger-seating configuration, excluding pilot seats, of 10 or more, would have to comply with the additional airworthiness requirements in § 135.169.

Moreover, large powered-lift that have a cargo or baggage compartment of 200 cubic feet or greater in volume would be

required to meet the certification requirements of appendix F to part 25, part III, or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b).

In response to the comments received, the FAA did not make any changes to the proposed regulatory text. Therefore, the FAA adopts § 194.307(v), (w), and (x) as final, but as a result of renumbering they are now § 194.306(aa), (bb), and (cc).

Section 135.170 lists the requirements for materials used in the compartment interiors of specific airplanes. Some powered-lift may be able to transition to a landing quickly; however, others may have descent, landing, and evacuation times similar to airplanes so to provide an equivalent of safety for passengers the FAA determined this rule should be applicable to large powered-lift. The FAA proposed in § 194.307(y) and (z) that large powered-lift must comply with the applicable paragraphs of § 135.170(b)(1) and (b)(2). Powered-lift must comply with appropriate certification provisions listed in § 135.170(b)(1) and (2) or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b).

Section 135.170(c) details the requirements for thermal/acoustic materials on transport category airplanes. The FAA asserted that the flame propagation requirements applicable to transport category airplanes should also be applicable to large powered-lift in order to ensure that persons or property carried on large powered-lift are afforded the same safety provided to persons or property carried in transport category airplanes. Accordingly, large powered-lift would be required to comply with the provisions of § 135.170(c). As proposed in § 194.307(aa), this section requires that large powered-lift comply with § 25.856 (Thermal/Acoustic insulation materials) or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b).

The FAA received no comments on proposed § 194.307(y), (z), and (aa), and therefore adopts § 194.307(y), (z), and (aa) as final, but as a result of renumbering they are now § 194.306(dd), (ee), and (ff).

Section 135.173(a) requires aircraft, excluding helicopters operating under day VFR conditions, that have a passenger seating configuration, excluding any pilot seat, of 10 seats or more in passenger-carrying operations to be equipped with either approved thunderstorm detection equipment or

approved airborne weather radar equipment.

Section 135.173(b) is specific for helicopters and only requires this equipment under night VFR when current weather reports indicate that thunderstorms or other potentially hazardous weather conditions that can be detected with airborne thunderstorm detection equipment may reasonably be expected along the route to be flown.

The FAA determined that the helicopter exception contained in this regulation should not apply to powered-lift because these new entrant aircraft are expected to operate similar to an airplane during the en route phases of flight. The FAA does not yet have enough information about the operations of powered-lift to state definitively whether such aircraft will have the agility and maneuverability of a helicopter during the cruise portion of flight. The FAA anticipates that powered-lift will likely require more time and space to recognize and successfully maneuver out of the dangers associated with hazardous thunderstorm activity.

The FAA received one comment from EASA questioning the logic of requiring large eVTOL to have thunderstorm detection equipment. EASA pointed out that many powered-lift operations are expected to be quite local. EASA also raised the question of waivers for this requirement.

This SFAR is not limited to only eVTOL by the FAA but applies to all powered-lift that may operate in the NAS, some of which will not be limited to local area flying. The use of airborne thunderstorm detection equipment or airborne weather radar contributes to greater safety in operations, even in local area flying areas, because it enables the pilot to detect and locate severe adverse weather areas early. The equipment also enables the pilot to avoid those thunderstorm areas and take other actions necessary for safety of the flight. Furthermore, the FAA has concluded that this equipment is an additional safety benefit for aircraft with 10 or more passenger seats. Throughout the FAA's regulations, 10 or more passenger seats is a threshold at which many additional regulatory requirements are imposed in order to mitigate the risk of carrying the additional people.

In response to the comments received, the FAA will not make any changes to the final rule, and powered-lift must adhere to the provisions provided in § 135.173(a) as written for all aircraft that have a passenger seating configuration, excluding any pilot seat,

of 10 seats or more in passenger-carrying operations.

Section 135.178 details additional emergency equipment applicable to airplanes with a passenger seating configuration of more than 19 seats. This section was implemented largely due to several studies conducted by the Civil Aerospace Medical Institute (CAMI) on exit row configurations and equipment necessary for the most efficient emergency exit of the airplane in the case of emergency.⁴⁰⁸

The FAA anticipates that, due to advances in technology, powered-lift developed in the future could surpass the 19-passenger seating configuration threshold requirement in § 135.178. Those powered-lift should have the requisite procedures and equipment to evacuate passengers in the event of an emergency such as is currently required for airplanes. As such, in the NPRM, the FAA proposed in § 194.307(bb) to apply § 135.178 to powered-lift with a passenger seating configuration of 19 seats or more.

The FAA received no comments on proposed § 194.307(bb); therefore, the FAA adopts § 194.307(bb) final, but as a result of renumbering it is now § 194.306(gg).

Section 135.179 contains the conditions required to take off an aircraft with inoperable instruments or equipment, lists the MEL requirements, and enumerates which instruments and equipment may not be contained within the MEL. In 1991, the FAA published a final rule expanding the availability of a MEL to any civil aircraft that can be operated under part 135, including single-engine aircraft. The notice of proposed rulemaking⁴⁰⁹ that is directly related to the 1991 final rule states that the MEL provisions would apply to “aircraft” and that “[t]he FAA also proposes to amend the language of §§ 135.179 and 125.201 to make them essentially the same as § 121.628.”⁴¹⁰ The FAA notes that the mention of airplane in § 135.179(b)(1) appears to be an oversight in transcription and should actually reference aircraft, as do the rest of the references in § 135.179. This is in contrast to § 121.628, where all references are to airplane. Review of the historical information for this rule revealed that the FAA’s original intent was for § 135.179 to apply to “any civil aircraft,” which includes powered-lift. As a result, the FAA proposed to make a technical amendment to

§ 135.179(b)(1) to reflect that intent by replacing the word airplane with aircraft.

The FAA received no comments on the proposed amendment to § 135.179(b)(1). Therefore, the FAA adopts the amendment to § 135.179(b)(1) as final.

Section 135.180 was implemented to require traffic alert and collision avoidance systems (TCAS) for turbine-powered airplanes that have a passenger seat configuration, excluding any pilot seat, of 10 to 30 seats. TCAS uses transponder signals from nearby aircraft to alert pilots to the danger of mid-air collisions. The FAA anticipates that certain powered-lift will have the same relative speed, size, and passenger-carrying capacity as the airplanes that must be equipped with TCAS under § 135.180. Additionally, the FAA anticipates that some powered-lift will have the ability to operate in the same airspace as other larger, high-performance aircraft, including airplanes operating under part 121. To afford the same level of safety through the mitigation of potential mid-air collisions and their devastating effects on persons and property onboard or in the same airspace as powered-lift, the FAA proposed in § 194.307(cc) this section apply to powered-lift that have a passenger seat configuration, excluding any pilot seat, of 10 to 30 seats.

Powered-lift that are required to have TCAS will also be required to have the content specified in § 135.180(b) in the powered-lift’s AFM. This will ensure that the persons operating a powered-lift will have access to the appropriate procedures for the use of the TCAS equipment, proper flightcrew action with respect to the TCAS equipment, and an outline of all the input sources that must be operating for proper TCAS operation.

The FAA received one comment on proposed § 194.307(cc) from ALPA. ALPA recommended all powered-lift (regardless of seating capacity) should be equipped with a Terrain Awareness and Warning System (TAWS) or a Helicopter Terrain Awareness and Warning System (HTAWS) as applicable, and an Aircraft Collision Avoidance System (ACAS), as well as CVR and FDR. They asserted that these sources of information aid in the avoidance of Controlled Flight into Terrain (CFIT) and Mid-Air Collisions (MAC), and they all directly enhance flight safety. ALPA recommended that, when a TCAS system is required for traditional airplanes or helicopter operations, under the SFAR it should also be required for powered-lift

regardless of seat capacity, to ensure the highest level of safety in this new and novel aircraft type and operations.

The FAA agrees with ALPA that a TCAS provides valuable collision avoidance information to flightcrew during flight. However, the FAA disagrees that all powered-lift, regardless of the passenger seat configuration, should be required to install a TCAS. When the FAA promulgated the TCAS final rule of 1989, the categories of commercial aircraft for which TCAS I or II will be required were based on the provisions of Pub. L 100–223 and on the relative speed of the aircraft, the size of the aircraft, and the number of passengers per aircraft who would benefit from TCAS installation. The FAA anticipates some powered-lift will have the same relative speed, size, and passenger-carrying capacity as the airplanes required to be equipped with TCAS. As such, those powered-lift of similar size will be required to equip their aircraft with TCAS.

The FAA believes the criteria established for TCAS installations in aircraft with 10 to 30 passenger seats is still valid today. Aircraft below the 10-passenger seat threshold are smaller and therefore don’t have the same need for TCAS. Additionally, the FAA believes the associated costs for requiring a higher standard than what is currently in place for other aircraft will place this new emerging industry at an unfair disadvantage. The SFAR enables the FAA to collect data to inform the FAA on future rulemaking for powered-lift operations, and once powered-lift operations become more commonplace and the FAA has a better understanding of the operational complexities for these aircraft, the FAA could consider making a future adjustment to the TCAS requirements. However, at this time, the FAA will require TCAS be installed on powered-lift that have a passenger seat configuration of 10 or more passenger seats.

In response to the ALPA comment, the FAA did not make any changes to the proposed regulatory text. Therefore, the FAA adopts § 194.307(cc) as final, but as a result of renumbering it is now § 194.306(hh).

Section 135.181 details performance requirements for all aircraft operated over-the-top⁴¹¹ or in IFR conditions. The FAA proposed in § 194.308(f) to apply § 135.181(b) to all powered-lift. A powered-lift that is able to meet the performance requirements of § 135.181(b) would provide the same

⁴¹¹ Over-the-top means above the layer of clouds or other obscuring phenomena forming the ceiling.

⁴⁰⁸ See Improved Access to Type III Exits, 57 FR 19220 at 19245 (May 4, 1992).

⁴⁰⁹ Minimum Equipment List Requirements, 54 FR 3320 (Jan. 23, 1989).

⁴¹⁰ Minimum Equipment List Requirements, 56 FR 12311 (Mar. 22, 1991).

level of safety established for helicopters. This exception would provide the same economic relief to powered-lift operators as that experienced by helicopter operators. In the NPRM the FAA did not propose any changes relating to § 135.181(a)(2) because this paragraph applies to all multi-engine aircraft.

The FAA received two comments on proposed § 194.308(f), one from GAMA and one from Joby.

GAMA recommended that the FAA apply the rotorcraft or helicopter rules in § 135.181 to powered-lift. GAMA agrees with the FAA that it was appropriate to allow powered-lift to use the performance requirements of § 135.181(b) when conducting offshore passenger-carrying operations.

The FAA received a comment from Joby not directly specifying § 135.181 but relating to § 135.183(c), which is a performance requirement for a multi-engine aircraft to maintain a certain altitude above the surface when a critical engine is inoperative. Joby's comment regarding § 135.183 advocated that the FAA use another term to capture aircraft that do not have a "critical engine" but may have other powerplants that could experience a loss of thrust impacting the aircraft's ability to stay aloft. As this comment raised the concern about powered-lift without a "critical engine," the FAA is including Joby's comment here.

The term "critical change of thrust" will be added to the SFAR alongside the current term "critical engine" in order to ensure that the performance requirements currently stipulated in § 135.181(a)(2) and (b) will apply to those powered-lift that do not have a critical engine but can experience a critical change of thrust.⁴¹² Using the term "critical change of thrust" ensures that those novel aircraft that may not have a critical engine will be required to demonstrate the same performance requirements as those stipulated for aircraft with a critical engine, thereby ensuring the same level of safety is maintained.

As a result, the FAA will add the term "critical change of thrust" with respect to powered-lift under § 135.181(a)(2) and (b). The FAA adopts § 194.306(ii), which addresses § 135.181(a)(2), as final. The FAA also adopts the proposed § 194.308(f) and the new verbiage of "critical change of thrust" as final. Due to renumbering, the proposed § 194.308(f) is being adopted as § 194.306(jj).

⁴¹² For a more detailed discussion on "critical change of thrust" see Section V.C.3 regarding § 135.168.

Section 135.183 provides the performance requirements for land aircraft to operate over water. Section 135.183(a) requires that any aircraft operate at an altitude that allows it to reach land in the event of an engine failure. Section 135.183(b) allows overwater operations strictly limited to only takeoff and landing operations. Section 135.183(c) requires a multiengine aircraft to be able to climb with its critical engine inoperative at least 50 feet a minute at 1000 feet above the surface. Section 135.183(d) allows helicopters the option of installing floats if they are unable to meet the requirements of paragraph (a) or (c). Section 135.183(a)–(c) are applicable to powered-lift because those paragraphs reference aircraft.

The FAA anticipates that powered-lift may be utilized in the same fashion as helicopters carrying passengers over water. Some powered-lift may not be equipped with floats. Powered-lift that are equipped with a flotation device will provide the same level of safety that is currently extended to helicopters since that flotation device will have gone through the FAA certification process. The FAA expects that a powered-lift equipped with floats would land similarly to a float-equipped helicopter. Accordingly, the FAA proposed in § 194.308(g) to allow powered-lift to utilize the exception contained in paragraph (d) if the powered-lift is unable to meet the requirements of paragraphs (a) or (c).

The FAA received four comments on proposed § 194.308(g), relating to § 135.183.

In their comment, Joby agreed with the FAA's proposal to include powered-lift with all references to helicopter floats.

Joby stated that most electric powered-lift being developed now use distributed electric propulsion (DEP) systems that include multiple electric engines/electric power units (EPUs). They also mention that some of these designs may not have a single engine that could fail and be critical for performance or handling qualities. According to Joby, with some of these DEP propulsion designs there may be likely failures that don't result in total loss of a single engine, result in partial loss of thrust on multiple engines, result in total loss of thrust on multiple engines/stations simultaneously, or other non-intuitive engine failure scenarios. For these reasons, airworthiness criteria and design standards have adopted the concept of "critical loss of thrust" for showing compliance for performance and handling qualities. Joby asserted the

term "critical loss of thrust" is specific to the aircraft and the electric propulsion system designs being used. Therefore, Joby recommended revising § 135.183(c) to better accommodate multi-engine aircraft with distributed electric propulsion systems by adding "or critical loss of thrust for distributed electric propulsion systems." Additionally, Joby stated, aircraft that can be shown to climb after a critical loss of thrust should be provided appropriate credit.

In their comment, EASA inquired what the FAA expects the buoyancy and demonstrated sea states to be, since the FAA is offering the option to install floats for powered-lift unable to meet the requirements of § 135.183(a) or (c).

AWPC stated that their aircraft, the AW609 a tiltrotor, is designed to operate like a pressurized turboprop airplane when in horizontal flight mode and has the equipment and related characteristics of a helicopter to conduct ditching procedures. This design approach, according to AWPC, addresses the concerns the FAA stated in the NPRM, such as buoyancy and the duration to remain afloat after ditching in water. The AW609 tiltrotor has design features such as a door above the waterline, wing fuel tanks, and a pressurized cabin with closeable outflow valves. It is also equipped with an overhead escape hatch and flotation system. Therefore, AWPC contended that the application of helicopter rules is inappropriate for the AW609 tiltrotor and requests the FAA apply a performance and equipage-based approach to applying regulations for overwater operations to the AW609 Tiltrotor.

GAMA argued that certain powered-lift demonstrate the capability to glide in a manner similar to airplanes when carrying passengers over water. GAMA asserted that, in such cases, it is imperative that the FAA apply the relevant airplane version of the rule to ensure appropriate and effective oversight. By recognizing the glide capabilities of these powered-lift, GAMA argued that the FAA can optimize safety measures and streamline regulations accordingly. GAMA stated that it is crucial to take full advantage of the similarities to airplane operations in these specific scenarios to maintain an equivalent level of safety for passengers and facilitate smooth and efficient operations.

The FAA agrees with Joby that another term to capture aircraft that does not have a "critical engine" but may have other powerplants that could experience a loss of thrust impacting the aircraft's ability to stay aloft needs to be

addressed. The FAA did not include the term “distributed electric propulsion” as recommended by Joby because the FAA determined this change should apply to all future propulsion systems that could experience a critical change of thrust, and not just those that are electrically driven. Therefore, the FAA will add “or while experiencing a critical change of thrust” under § 194.306(kk)(1) in the final rule thereby ensuring the safety mitigations for land aircraft operated over water under § 135.183(c) will also apply to powered-lift that may not have a critical engine.⁴¹³ This provision is adopted at § 194.306(kk).

In response to GAMA’s comment, the FAA states the requirements found in § 135.183 provides risk mitigations for all land aircraft when operated over water. This rule as written would apply to powered-lift except for paragraph (d), which as written for helicopters. To operate a powered-lift over water carrying passengers under part 135, the powered-lift must be operated at an altitude that allows it to reach land in the case of an engine failure. All aircraft are allowed to operate over water when it is necessary for takeoff or landing. Any aircraft that is multiengine and has the performance capability to climb, with the critical engine inoperative, at least 50 feet a minute, at an altitude of 1,000 feet above the surface will also be allowed to operate over water. Per § 194.308(g), powered-lift that cannot climb, with the critical engine inoperative or experiencing a critical change of thrust, at least 50 feet a minute, at an altitude of 1,000 feet above the surface must equip their aircraft with flotation devices in order to operate over water. The FAA anticipates that most powered-lift will be multi-engine and could have the performance capability to stay out of the water, but if they don’t and the powered-lift lacks that performance capability, the operator must install flotation devices or stay high enough to be able to either glide or autorotate to reach land in the case of engine failure.

The FAA believes the requirements that are currently in § 135.183 for all aircraft are in line with the comments received from both GAMA and AWPC aimed at following the airplane requirements. The only difference is the flotation requirement the FAA will place on powered-lift should they not have the performance capability to stay out of the water. As addressed in the overwater requirements of §§ 135.168,

136.9, and 136.11, the FAA does not know whether or not a powered-lift will take on water like a helicopter or float for a longer period of time like an airplane after ditching. AWPC requested the FAA apply a performance-based approach to applying overwater regulations. That performance-based approach is already found in § 194.306(kk), addressing § 135.183(c).

In response to EASA’s request on the expected buoyancy and demonstrated sea states, the FAA notes that buoyancy and sea states are defined within aircraft certification (combination of regulation and guidance material) if a ditching approval is sought. If a powered-lift applicant requests this approval, then the FAA would apply the appropriate airworthiness criteria from the existing airworthiness standards to meet the equivalent level of safety as required under § 21.17(b).

In response to the comments received, the FAA made one change to the regulatory text at § 194.306(kk) by using the term “or while experiencing a critical change of thrust.” The FAA is not making any changes regarding the provision to require powered-lift to be equipped with floats when unable to otherwise meet the requirements of § 135.183(a) and (c). The FAA is therefore adopting the proposed § 194.308(g), though due to renumbering, it is being adopted as § 194.306(ll).

4. Subpart D: VFR/IFR Operating Limitations and Weather Requirements

Subpart D prescribes operating limitations for VFR/IFR flight operations and associated weather requirements for operations under part 135.

Section 135.203 provides the VFR minimum altitude requirements for airplanes and helicopters. Different minimum altitudes for airplanes and helicopters exist because the special flight characteristics of a helicopter enable it to accomplish an emergency landing in a small space relative to an airplane. Additionally, the maneuverability of a helicopter permits it to make corrective actions in less distance than most airplanes. This enables a helicopter to be operated over congested areas at 300 feet above the surface without compromising the safety of persons or property on the surface.

In the NPRM, the FAA proposed in § 194.307(dd) to apply the airplane minimum altitude requirements of § 135.203(a) to powered-lift. The FAA anticipates that many powered-lift operators will prefer to utilize lift provided by the wing for as long as practicable in order to gain efficiencies

in speed and range. The FAA expects that the transition from forward flight to vertical flight will require additional time, distance, and altitude for powered-lift. Although some powered-lift may be capable of performing an emergency autorotation into a more confined space, the FAA anticipates that additional altitude would increase the chances of a successful outcome without undue hazard to persons or property on the surface.

The FAA received seven comments in response to the proposed § 194.307(dd). Several commenters disagreed with proposed § 194.307(dd) and recommended applying the helicopter requirements of § 135.203(b) instead. CAE and NBAA argued that the rationale provided by FAA for allowing powered-lift to use copter procedures should justify applying helicopter MSA requirements to powered-lift. CAE stated that powered-lift are capable of vertical takeoff and landing in small spaces and have helicopter-like maneuverability. Furthermore, CAE noted that the FAA is allowing powered-lift to use part 97 copter instrument procedures, recognizing the vertical capabilities of these aircraft, but then does not apply the same premise to minimum safe altitudes.

Lilium said that, although autorotation is a key feature for helicopters, it should not be the primary factor that allows powered-lift to operate using helicopter minimums. Lilium suggested determining on a case-by-case basis whether a powered-lift should be allowed to use the helicopter requirements of § 135.203(b), taking into consideration the aircraft’s redundant propulsion systems, equipment, operational environment, and design.

Archer recommended replacing category-based operational rules regarding minimum safe altitude with type-specific rules informed by the type certification and FSB process, similar to that proposed in the NPRM for the airworthiness evaluation and eligibility for copter procedures. Archer believed using this method to establish the operational rules would allow the FAA to evaluate the operational capabilities of each powered-lift before deciding which operational rules are appropriate. Archer argued that such evaluations would achieve the goal of an equivalent level of safety through performance-based rulemaking. Archer further stated that powered-lift which share the key operating capabilities that enable helicopters to safely operate at lower altitudes and reduced weather minima should be subject to the same operating rules.

⁴¹³ For a more detailed discussion on “critical change of thrust” see Section V.C.3 regarding § 135.168.

Eve asserted that the FAA has assigned powered-lift with the minimum safe altitude specified for airplanes based on two assumptions: that most powered-lift flights while in cruising phase are performed in wing-borne flight mode, and that, even if considering the possibility of transitioning from wing-borne to vertical flight mode in case of an emergency, that requires a safe landing in some place in the city, which would result in a loss of altitude. Even though the first assumption is valid for most powered-lift, Eve alleged that the second assumption deserves further consideration. Eve argued that the time, distance, and speed necessary to transition from wing-borne flight mode to vertical-lift flight mode should be considered when applicable to powered-lift operating in an urban environment. Without knowing those parameters, Eve argued that it is not reasonable to assume that powered-lift will perform as an airplane and not as a helicopter when time, speed, and speed necessary to transition are taken into consideration. Eve stated that, for most powered-lift, those time, distance, and speed responses will have a suitable certified performance because of the use of MEPS (Multi-Electric Propulsion System), which Eve alleged will provide increased thrust, efficiency, and redundancy to minimize any possible loss of altitude. Therefore, Eve recommended that the FAA apply the helicopter provisions of § 91.119(b)(1) and § 135.203(b) to powered-lift.

AWPC stated that the FAA's proposal to limit powered-lift to airplane MSAs will inhibit their AW609 Tiltrotor powered-lift from conducting low-altitude missions such as Search and Rescue (SAR) and Air Ambulance. AWPC stated that, while operating in horizontal flight mode, the AW609 crews can reach the distressed person or patient faster than helicopters. However, AWPC argued that, without the ability to operate at helicopter MSAs, even in vertical flight mode, the AW609 Tiltrotor would not be authorized to operate on the helicopter routes or even land at a hospital helipad. AWPC asserted that the minimum altitudes for powered-lift should be based on aircraft performance and capabilities. AWPC agreed that powered-lift operating in horizontal flight mode should operate in accordance with airplane MSA. However, AWPC argued that powered-lift capable of demonstrating category A performance or an ability to autorotate comparable to helicopters, such as the AW609 Tiltrotor, should be allowed to

operate at helicopter MSA when in vertical flight mode.

GAMA stated that powered-lift possess helicopter-like maneuverability, safe operation at low airspeeds and altitudes, and the capability of vertical takeoff and landing. Given these characteristics, GAMA felt that the helicopter provisions of this rule should apply.

Joby argued that, depending on the powered-lift's characteristics, the MSA rules for helicopters should be applied. Joby pointed to the ability of powered-lift to take off and land vertically in relatively small spaces, similar to a helicopter. Joby also states that many electric powered-lift currently in development have distributed electric propulsion systems, which Joby alleged provide a high level of redundancy in producing thrust and lift. Joby argued that requiring a higher minimum safe altitude for these powered-lift flight operations is not necessary to maintain an equivalent level of safety. For those aircraft which incorporate multiple electric engines or electric propulsion units, Joby alleged that the loss of a single electric engine/electric propulsion unit (EPU) or even a critical loss of thrust would not directly endanger the crew or passengers or create an undue hazard to persons or property on the ground. According to Joby, following an engine failure, these aircraft will be able to continue safe flight. Joby suggested powered-lift provide a higher level of safety than single engine airplanes or helicopters.

Joby specifically pointed to powered-lift flying air tour and air taxi operations, arguing that the ability to fly at lower minimum safe altitudes increases their ability to navigate under and around congested airspace, deconflict with other aircraft, fly missions more efficiently, and better meet market and community objectives in a manner consistent with safety. Joby believed that establishing higher minimum safe altitudes will inadvertently reduce safety while also negatively affecting marketability and community service. Joby also believed that, by allowing flight below airspace shelves or below approach paths, which is common for helicopters, operational safety will be improved while allowing for more inherent traffic deconfliction. Joby argued that this is especially important for electric powered-lift that have relatively shorter range and endurance capabilities than traditional aircraft.

In a group comment, AOPA, GAMA, HAI, NATA, NBAA, and VFS argued that, considering the FAA is allowing powered-lift to use part 97 copter

instrument procedures, thereby recognizing the vertical capabilities of these aircraft, the FAA should apply the same premise to minimum safe altitudes.

The FAA evaluated the information from the commenters and therefore will create a performance-based rule allowing powered-lift to use an altitude lower than specified for airplanes. The FAA considered the special flight characteristics of a helicopter, which can accomplish an emergency landing within a relatively small space as noted in the *Part 60—Air Traffic Rules* final rule.⁴¹⁴ The FAA has concluded that powered-lift that are able to autorotate or conduct an approved equivalent maneuver should be allowed to use the same VFR minimum altitudes as provided to helicopters. This provision is adopted at § 194.306(mm) and (nn). To use this provision, the powered-lift will have to be operating either in the vertical-lift flight mode or when operating in the wing-borne flight mode be able to transition from wing-borne flight to the vertical-lift mode and then conduct a safe autorotation or approved equivalent maneuver that permits a controlled descent to a landing.

When operating in the vertical-lift flight mode, the powered-lift must be certificated and be able to conduct an autorotation or an approved equivalent maneuver to a landing. Then the provisions of § 135.203(b) will apply. If a powered-lift is not certificated or able to conduct an autorotation or an approved equivalent maneuver to a landing, then the minimums specified in § 135.203(a) would apply.

In order to utilize a lower VFR minimum altitude in the wing-borne flight mode, an operator must be authorized by Operations Specifications. The Operations Specification will specify the VFR minimum altitude for each type of powered-lift. To receive this authorization, the powered-lift's AFM must have a minimum altitude specified that enables a transition from wing-borne flight to the vertical-lift mode and then conduct a safe autorotation or approved equivalent maneuver that permits a controlled descent to a landing. This authorization will be granted to each specific type of powered-lift since each type could have a different minimum altitude specified in the respective AFM. When operating in the wing-borne flight mode a powered-lift in no case will be allowed to go below 300 feet above the surface. If the powered-lift does not have this

⁴¹⁴ *Part 60—Air Traffic Rules*, final rule, 20 FR 6694, 6695 (Sept. 13, 1955).

limitation established in their flight manual, then when operating in the wing-borne flight mode, they will be limited to the airplane criteria found in § 135.203(a) for day and night operations. This is reflected in the amended § 194.307(dd), which is renumbered as § 194.306(mm).

Section 135.205 provides the visibility requirements for an airplane or helicopter operating under VFR in uncontrolled airspace. The FAA proposed in § 194.307(ee) that powered-lift operating under VFR in uncontrolled airspace would be required to maintain the ceiling and visibility requirements detailed for airplanes under § 135.205(a). The FAA based this proposal on the conclusion that powered-lift will have the potential to fly at airspeeds higher than rotorcraft and may need additional visibility to safely identify other aircraft and obstacles and to make appropriate corrective actions.

The FAA received nine comments on proposed § 194.307(ee). The FAA received one comment that agreed with the FAA proposal, seven comments that disagreed and wanted the FAA to apply requirements other than those specified for airplanes, and one comment relating to air ambulance operations.

Electra.aero supported the FAA's rationale and decision to apply airplane VFR/IFR weather minima to electric powered-lift. Electra.aero noted that powered-lift will have increased maneuverability and the ability to hover or loiter at lower speeds, similar to helicopters. However, according to Electra.aero, many electric powered-lift will be limited by the battery thermal capability and will only have the ability to hover for a few minutes.

Archer recommended replacing category-based operational rules regarding visibility minimums in favor of type specific rules informed by the type certification and FSB process. Archer argued that this method to establish the operations rules would allow the FAA to evaluate the operational capabilities of each powered-lift before deciding which operational rules are appropriate. Archer further asserted that powered-lift which share the key operating capabilities that enable helicopters to safely operate in reduced weather minima should be subject to the same operating rules.

CAE stated that many powered-lift will cruise at speeds lower than a fast helicopter but points out that the weather minimums for those helicopters have not been increased to mirror the airplane minimums. CAE also mentioned that, currently, weather

minimums are not based only on speed but also on maneuverability. Considering the ability of helicopters to operate at lower speeds and with increased maneuverability while maintaining safety under less restrictive minima, CAE suggested that same criteria should be considered for powered-lift.

AWPC contended that the blanket application of airplane VFR minimums for all powered-lift is prohibitive. AWPC asserted that their AW609 Tiltrotor can operate in vertical flight mode with maneuverability characteristics consistent with helicopters. AWPC argued that basic VFR and special VFR operations should be based on mode of flight.

Lilium urged the FAA to adopt a similar comprehensive and risk-based approach as Lilium suggested for altitude requirements. Lilium also suggested that the FAA evaluate the capabilities and performance of individual powered-lift for operating under the helicopter VFR weather requirements. Lilium argued that powered-lift are designed to operate in low-altitude environments (below 10,000 mean sea level (MSL) for short routes. Lilium asserted that utilizing helicopter VFR minimum weather requirements may improve airspace congestion and energy efficiencies with the ability to operate at lower in-route altitudes.

Lilium noted that ICAO Document 10103 provides guidance for the application of the appropriate operating rules based on the aircraft's performance characteristics demonstrated during type certification, effectively allowing powered-lift to utilize helicopter requirements if they are determined to be capable of safely operating under such conditions. Lilium suggested that the FAA consider adopting a similar performance-based approach, aligning with international standards and enabling U.S. operators to be competitive on a global scale. Lilium concluded by stating this approach will ensure each aircraft's safety capabilities are considered when determining appropriate visibility requirements.

GAMA stated the proposal to use the operational rules for airplanes limits the acceptability of rotorcraft rules and does not establish a pathway for the development and application of performance-based rules. GAMA mentioned that the application of prescriptive operating rules without consideration for the aircraft's performance reduces the usefulness of powered-lift. They strongly recommended the FAA to consider the diverse capabilities of powered-lift and

propose applying appropriate operating rules based on the performance characteristics of each powered-lift. Similar to Lilium, GAMA advocated for the FAA to adopt the approach laid out in ICAO Document 10103. GAMA stated that their members understand ICAO Document 10103 as an example of a performance-based approach that was developed for a large turbine-powered configuration. While the document primarily focuses on large turbine-powered tilt-rotors, GAMA argued that the document explicitly acknowledges that tilt-rotors are part of the powered-lift category. GAMA noted that, while the manual doesn't specifically address all types of powered-lift, it foresees its use as a basis for other civil powered-lift as they mature in design. GAMA argued that the FAA should recognize and allow operations based on the full capabilities of powered-lift to allow application of rotorcraft rules when appropriate, based on aircraft performance to ensure safety and operational effectiveness. GAMA firmly believed that regulations should encompass the entire spectrum of powered-lift.

GAMA suggested that the FSB report, type certificate data sheet, AFM, and other documents provide methods to establish appropriate operating rules. GAMA argued that an operator's Safety Management System (SMS), operational control policies, training requirements, and other factors demonstrate their capabilities. To achieve this, GAMA suggested the FAA can add "unless as otherwise specified," "unless otherwise authorized by the Administrator," or "as specified per Flight Standardization Board report" to §§ 194.302, 194.303, 194.307, and 194.308.

GAMA concluded by saying that powered-lift possess helicopter-like maneuverability, safe operation at low airspeeds and altitudes, and the capability of vertical takeoff and landing. Given these characteristics, GAMA asserted that the helicopter provisions for visibility minimums should apply to powered-lift.

Joby argued that powered-lift currently in development are mostly like helicopters in terms of performance and maneuverability capabilities. Joby stated that most electric powered-lift will cruise at speeds less than the fastest helicopters. Joby stated that powered-lift are able to abort continued flight and can land immediately if conditions deteriorate quickly. Joby argued that these qualities should allow electric powered-lift to operate at lower visibility and cloud clearance distances while maintaining the same degree of safety as fixed-wing aircraft flying under

more restrictive minima per the FAA's own rationale and previous policy established for helicopters. According to Joby, VFR visibility and cloud separation requirements also provide a safety margin from unintentional flight into Instrument Meteorological Conditions. Joby suggested that powered-lift can be operated with reduced visibility and cloud separation minima, while still maintaining the same degree of safety as fixed-wing aircraft flying under more restrictive minimums. Joby recommended that the FAA establish special allowances for VFR weather minima as a function of the type of operation being conducted, such as urban air taxi service, air ambulance, air tours, or regional travel. Joby argued that the FAA should consider the benefits of enhanced vision systems to support operations in basic VFR minimums.

In a group comment, AOPA, GAMA, HAI, NATA, NBAA, and VFS asserted that many powered-lift will cruise at speeds lower than fast helicopters, such as the Bell 429, Eurocopter AS365, and many other helicopter types, yet the weather minimums for those helicopters are not increased to the airplane minimums. Therefore, they contended that weather minimums are not based only on speed but also on maneuverability.

Airbus Helicopters asserted that some powered-lift designs may have performance characteristics comparable to helicopters and are expected to perform emergency medical services. They provided that the FAA's proposed approach is restrictive and could prevent the development of medical services with powered-lift. They recommended the FAA reconsider the application of these for powered-lift performing air ambulance operations.

In response to Airbus Helicopters comment, the FAA refers Airbus Helicopters to the visibility requirements specified for air ambulance operations as provided in § 194.306(qqq), pertaining to § 135.609. In the final rule the FAA made provisions for powered-lift conducting air ambulance operations to use visibility requirements based upon the mode of flight.

In reconsidering the proposal requiring powered-lift to comply only with airplane visibility minimums, the FAA has carefully re-evaluated the purpose of the visibility regulations established for helicopters to help determine if the justification used for helicopters could be applied to powered-lift today. The FAA considered the commenters' assertions that weather minimums are not only based on speed

but also on the maneuverability of an aircraft. The FAA agrees with the commenters that helicopters, which operate at lower speeds, benefit from the increased maneuverability while maintaining safety under a less restrictive visibility minima. The FAA believes powered-lift operating in the vertical-lift flight mode will benefit from increased maneuverability. The FAA has concluded that, when a powered-lift is operating in the vertical-lift flight mode at a speed that allows the pilot to see and avoid any other air traffic or any obstructions in time to avoid a collision, a lower visibility minimum can be used without any degradation of safety.

Therefore, the FAA will incorporate a change from the visibility minimums proposed in § 194.307(ee) of the NPRM by allowing powered-lift operating in the vertical-lift flight mode to comply with the helicopter visibility minimums of ½ mile during the day and 1 mile at night. This provision is adopted at § 194.306(pp). This lower visibility minimum will be limited to VFR at an altitude of 1,200 feet or less above the surface or within the lateral boundaries of the surface areas of Class B, Class C, Class D, or Class E airspace designated for an airport. Powered-lift seeking to use the helicopter visibility minimums must be operated at a speed that allows the pilot enough time to see and avoid any other air traffic, or any obstructions in time to avoid a collision. All powered-lift operating in the wing-borne flight mode, and those operating in the vertical-lift flight mode which cannot be operated at a speed that allows the pilot enough time to see and avoid any other air traffic or any obstructions to avoid a collision, must comply with the airplane visibility minimums prescribed in § 135.205(a). The FAA will adopt the proposed § 194.307(ee) as amended, though due to renumbering, it is being adopted as § 194.306(oo).

Section 135.207 outlines helicopter surface reference requirements under VFR. The FAA anticipates that powered-lift will be equipped with advanced technologies and flight instrumentation that will provide adequate situational awareness as well as an ability to maintain positive control of an aircraft in lower light and visibility situations. The FAA proposed in § 194.308(h) that § 135.207 will only apply to powered-lift that do not have the flight instrumentation listed in § 135.159 installed and operable. This will ensure that the pilot can safely control a powered-lift that is manufactured without flight instruments required by § 135.159.

The FAA received two comments on proposed § 194.308(h), one from AWPC and one from GAMA. AWPC suggested that the title of § 135.207 should be amended to "Helicopters and powered-lift surface reference requirements." For the text of § 135.207, AWPC suggested that the phrase "or powered-lift" be added after "no person may operate a helicopter."

GAMA recommended that the FAA should use the ICAO guidance provided for helicopters most of the time. Similar to AWPC, GAMA placed the term powered-lift alongside helicopter for § 135.207 in their recommendation for the FAA to follow ICAO. The change suggested by AWPC and GAMA for § 135.207 is too restrictive and would prohibit powered-lift from flying VFR over the top, or at night without visual surface references, even when a powered-lift has the instruments specified in § 135.159 to conduct the operation safely. As stated in the NPRM, the FAA anticipates that powered-lift that are equipped with advanced technologies and flight instrumentation will provide adequate situational awareness as well as an ability to maintain positive control of an aircraft in lower light and visibility situations. The FAA will adopt the proposed rule as final, though due to renumbering, it is being adopted as § 194.306(qq).

Section 135.209(a) requires airplanes to have enough fuel supply under VFR, considering wind and forecast weather conditions, to reach the first point of intended landing at normal cruise fuel consumption and then fly after that point for 30 minutes. At night, this requirement increases to 45 minutes past the first point of intended landing. Section 135.209(b) states that helicopters must have enough fuel to fly to the first point of intended landing, considering wind and forecast weather conditions, and enough fuel to fly after that for at least 20 minutes regardless of day or nighttime.

In the NPRM, the FAA proposed in § 194.307(ff) to require powered-lift to adhere to the fuel reserves set forth in § 135.209(a). This is because powered-lift will likely conduct cruise operations in configurations similar to airplanes, while they will conduct takeoff and landing operations in a manner similar to helicopters. Because powered-lift will predominately use wing-borne flight during cruise, similar to airplanes, the FAA anticipates that some powered-lift would have the potential to fly at higher altitudes and speeds. Additionally, some powered-lift may require more surface area to conduct a landing than a helicopter, thereby reducing the number of available unplanned landing

sites, and would benefit from the additional fuel reserves required for airplanes.

There were 15 comments received for § 194.307(ff). The FAA received comments from two commenters that agreed with the FAA proposal and thirteen commenters that disagreed and wanted the FAA to apply requirements other than those specified for airplanes.

An anonymous commenter agreed with the FAA's proposal, noting that battery-powered aircraft should have the same energy "fuel" reserves as other propeller or jet aircraft, 30 minutes during the day and 45 minutes at night. The commenter pointed out that weather can be unpredictable. This commenter provided an anecdote from their own experience when flying on the Bay area side of the Pacific Coast mountains. During a flight, by the time the commenter saw the fingers of fog coming through the mountain passes from the Pacific Coast they barely had enough time to get back to Palo Alto airport, fly a landing pattern, and still land in VFR. Additionally, the commenter pointed out that un-forecast winds could exceed the capability of the powered-lift to land at a vertiport located on top of a building, thus requiring a diversion to another location, meriting extra reserves.

The Advanced Air Mobility Institute suggested the FAA consult with the Department of Defense to determine powered-lift fuel requirements.

Electra.aero supported the FAA's rationale and decision to apply airplane fuel reserve requirements to eVTOL aircraft. Electra.aero pointed out that operations in the National Airspace System (NAS) require margin, which can only come from appropriate reserves to allow for unexpected circumstances. Electra.aero also noted that electric energy storage technologies still have significant uncertainties which warrant this more conservative approach until sufficient operational experience is achieved.

Archer believed that the application of airplane fuel reserves to the powered-lift category is inappropriate and argues that the FAA is failing to consider the unique operational capabilities of powered-lift that are able to take off and land vertically. Archer pointed out that there is limited range and endurance inherent in battery electric propulsion. Archer urged the FAA to consider regulations that will enable approvals of performance-based fuel reserves tailored specifically for those eVTOL powered-lift seeking certification.

Archer further argued that aircraft certification should inform the decision on fuel reserves rather than operational

data. For example, Archer noted that, while helicopters have multiple single-point-of-failure vulnerabilities, their own "Midnight" aircraft has no single-point-of-failure vulnerabilities, a reliability Archer feels should also be recognized in the determination of reserve fuel.

Archer pointed out that existing airplane fuel reserve regulations in part 91 and 135 would permit, as an example, an aircraft operating a 3,000 nm, 5-hour flight, with a requirement to land on runways in excess of 5,000' in length, to carry just 30 minutes of reserve fuel. Archer said this should not be the standard applied to an aircraft anticipated to typically operate less than 50 nm, 20-minute flights.

In order to recognize the unique, short-range operating environment anticipated by powered-lift eVTOLs, Archer recommended a regulation that can follow long-standing precedent of the fuel reserve OpSpecs that are utilized by many part 121 air carriers. Archer argued that this data-driven fuel planning would recognize that eVTOLs operating on very short stage lengths are likely to be able to demonstrate, with data, consistency in operations that enable lower fuel reserves with equivalent levels of safety.

Archer recommended that the FAA adopt language in part 194 that will allow for Performance Based Contingency Fuel (PBCF) approvals for part 135 based on operational data.

CAE asserted that the FAA has failed to consider powered-lift characteristics and their operating environment. CAE noted that airplanes require longer fuel reserves because they might have to fly a farther distance to reach a suitable landing site, while helicopters are afforded the advantage of shorter fuel reserves because they are capable of landing in smaller locations. According to CAE, the same is true for powered-lift, which can land in a vertical mode at the same types of locations as helicopters.

Additionally, CAE argued that the proposed SFAR prescriptive time-based requirements do not consider each individual aircraft's performance-based capabilities when determining fuel reserves. CAE then suggested that the FAA should apply ICAO Document 10103 when assessing operational rules, as an application of the ICAO guidance would result in helicopter fuel reserve regulations being applied to powered-lift. Additionally, CAE proffered that the FAA should allow operators and manufacturers to seek waivers or exemptions based on the performance of their powered-lift.

AWPC argued that powered-lift capable of VTOL should be allowed to use helicopter VFR fuel reserves and that powered-lift authorized to utilize copter procedures should be allowed to use helicopter IFR fuel reserves. AWPC stated that this recommendation aligns with ICAO Document 10103, which they argue supports applying helicopter fuel reserves to powered-lift such as the AW609 Tiltrotor. AWPC argued that a performance-based approach to the fuel reserve requirements for their own AW609 Tiltrotor is appropriate based on its capabilities consistent with helicopters and confirmed by the empirical data from the V-22 operations. AWPC believed that applying the helicopter fuel reserves to their powered-lift likely would exceed the level of safety of existing helicopters and airplanes.

Eve stated that, while the FAA acknowledges that powered-lift operations seem to be more aligned with the type of missions helicopters operate, the FAA still disregards the rotorcraft fuel reserve requirements of 20-minute regardless of whether the operation occurs during the day or night. Eve argued that the FAA has opted for a much more conservative approach without considering the performance-based capabilities of powered-lift to be operated in urban environment. Eve recommended considering appropriate operational requirements applied for energy reserve based on the design and performance capabilities of each individual certified powered-lift. Eve further recommended that the FAA consider alignment with ICAO Document 10103 guidance to meet the existing operational safety level applied for helicopters and airplanes.

Eve recommended for the SFAR that the FAA introduce more practical, performance-based energy reserve requirements applied for planned routes and consider the type of energy used by the powered-lift relating to the operation applied for each type of aircraft (shorter range, alternate landing sites, energy capacity, performance capabilities). Eve provided an example of their concept for "Alternative Energy Reserve Requirement," which includes a specific risk mitigation assessment. Eve's proposed specific risk mitigation assessment would include at a minimum, certified energy consumption data provided by the manufacturer, energy planning and in-flight replanning, the selection of alternate landing sites, and in-flight energy management."

Lilium stated that the FAA's proposed requirement will create obstacles to market success for eVTOL powered-lift

operators. Lilium recommended a more flexible approach that allows powered-lift and part 135 commercial operators meeting specific performance requirements to utilize performance-based and/or helicopter reserve requirements. Lilium believed that the necessary aircraft performance criteria could be determined during aircraft certification and type rating evaluation processes. Lilium also believed the performance-based requirements combined with the appropriate operator requirements and evaluations can provide a safer and more appropriate reserve solution for certain powered-lift.

Lilium suggested taking cues from EASA, which is adopting a performance-based approach. Lilium suggested similarly embracing modern and sophisticated energy planning standards that surpass the FAA's adoption of airplane standards rooted in 1950–70s technology. Lilium proposed allowing operators who comply with EASA's proposed performance standards to adopt those standards for U.S. operations, thus enabling the use of EASA-approved performance-based reserve requirements.

Lilium supported the system framework and concepts outlined in an upcoming GAMA white paper⁴¹⁵ and asserts it should be adopted by the FAA as an alternative to what Lilium sees as overly strict airplane fuel reserve requirements. Alternatively, Lilium suggested that the FAA consider applying the 20-minute VFR fuel reserve requirements for helicopters to powered-lift or have available a performance-based fuel reserve requirement that would be approved by the FAA, in lieu of airplane requirements. Lilium believed such an approach, combined with the appropriate aircraft equipment and operator capabilities, would better serve the unique operational needs of powered-lift.

BETA asserted the FAA's proposal of the existing airplane VFR and IFR reserve requirements is overly burdensome for powered-lift that may only be capable of short duration flights and does not consider the variability in required energy reserves for electric propulsion powered-lift based on the planned flight profile and landing type. BETA recommended the FAA add an option for a performance-based fuel reserve that can be determined based on the capability of the aircraft and the intended flight plan because they

asserted the safety intent of the fuel reserve requirement can be met by using those parameters.

BETA argued that the initial certified electric propulsion powered-lift will likely have range capability below traditionally fueled aircraft of the same size and capability due to current technology limitations in energy storage. BETA also believed for short duration flights the existing airplane reserve requirements may represent carrying more than double the required energy for a VFR mission and triple the energy required for an IFR mission. BETA argued that this is a disproportionately heavy burden when compared to the performance impact of the same reserve on traditional aircraft using standard aviation fuels. BETA further stated that the FAA's proposed fuel reserve does not provide a commensurate increase in safety that balances the reduction in usefulness of the aircraft.

According to BETA, for electric propulsion aircraft, the rate of energy consumption is significantly higher during vertical flight operations like takeoff and landing and is not generally proportional to duration of flight or distance flown. BETA also mentioned that electric propulsion powered-lift will have variable energy reserve needs based on the planned flight profile.

The Vertical Aerospace Group stated the 30-minute energy reserve requirement for day VFR operation is overly conservative and fails to consider the unique operating characteristics of powered-lift, which are capable of vertical landings and performing approach and go-around maneuvers in low-speed thrust-borne mode, allowing more flexibility in emergency conditions.

The Vertical Aerospace Group argued that the proposed reserve requirement will hinder the development of the powered-lift industry in the United States. According to the Vertical Aerospace Group, eVTOLs are primarily designed for short distances, such as urban air mobility operations, and applying fuel reserve requirements for airplanes, which often undertake longer cross-country flights, is not aligned with the typical mission profiles of powered-lift eVTOLs and could hinder growth of this emerging sector.

Given the variation of aircraft designs within the powered-lift category, the Vertical Aerospace Group encouraged the FAA to take a performance-based approach, setting fuel requirements based on the performance and the type of operation of the specific aircraft, allowing for a more tailored approach in which the overall design, operational profile, and safety requirements of the

aircraft are considered. In addition, the Vertical Aerospace Group stated that such an approach would be in line with other regulators such as EASA supporting greater regulatory harmonization.

GAMA argued the approach to use airplane requirements for many of the operational rules does not consider that many powered-lift have performance capabilities similar to rotorcraft. GAMA further stated that the application of prescriptive operating rules without consideration for vehicle performance reduces the usefulness of powered-lift. GAMA strongly recommended the FAA consider the diverse capabilities of powered-lift and mentions that the broad diversity for the blanket application of airplane rules is not suitable for accommodating the unique design characteristics of these new aircraft.

According to GAMA, the distinct performance capabilities of powered-lift significantly impact their flight operations, fuel consumption, and the ability to respond to varying weather conditions and other unexpected circumstances that would drive a reserve requirement. GAMA noted that the ability for powered-lift to engage in vertical takeoff and landing means powered-lift can avoid lengthy diversions often required of fixed-wing aircraft to find suitable runways in emergency or uncertain conditions, thus reducing the need for prolonged extra reserve fuel. GAMA further stated that the ability to hover, decelerate rapidly, and maneuver at low speeds allows both helicopters and powered-lift to safely operate in conditions of reduced visibility, further justifying a reduced fuel reserve requirement.

GAMA believed a performance-based energy reserve concept has the same overarching objective as the prescriptive time-based reserve approach, which is to ensure a safe landing. According to GAMA, the FAA could assess the energy capabilities of each powered-lift in order to determine the performance-based energy reserve.

Joby argued that the FAA should amend their part 194 requirements to specify fuel reserves for powered-lift to align with today's requirements for helicopters. Joby stated that powered-lift share unique performance capabilities with helicopters, which differentiates them from traditional fixed-wing aircraft. Joby argued that these capabilities mean powered-lift can sidestep extensive detours to locate appropriate runways during emergencies or uncertain situations, thereby decreasing the necessity for extended reserve energy. According to

⁴¹⁵ General Aviation Manufacturers Association, *Managing Range and Endurance of Battery-Electric Aircraft* (2023), [gama.aero/wp-content/uploads/Managing-Range-and-Endurance-of-Battery-Electric-Aircraft_v1-1.pdf](https://www.gama.aero/wp-content/uploads/Managing-Range-and-Endurance-of-Battery-Electric-Aircraft_v1-1.pdf).

Joby, the proficiency to hover and navigate at low velocities permits helicopters and powered-lift to function in reduced visibility scenarios.

Considering these abilities, powered-lift are often able to land in environments where conventional aircraft would be compelled to divert, further endorsing the case for equivalency with respect to reserve energy.

Joby noted that an electric powered-lift, when being dispatched, might be required to carry a more significant portion of its energy reserve under the proposed regulation compared to conventionally fueled aircraft and might be restricted from commencing flights merely because of disproportionate energy reserve mandates.

AOPA, GAMA, HAI, NATA, NBAA, and VFS provided a comment as a single document submitted by NBAA. These organizations stated they believe the FAA failed to consider the characteristics powered-lift and their operating environment by unilaterally applying airplane fuel reserves to all powered-lift. They also stated that airplanes require longer fuel reserves because they might have to fly a farther distance to reach a suitable landing site, while helicopters are afforded the advantage of shorter fuel reserves because they are capable of landing in smaller locations. The same should hold true of powered-lift, which can land in a vertical mode at the same types of locations as helicopters. These commenters recommended the FAA consider the capabilities of powered-lift and apply ICAO Document 10103 to its assessment of operational rules. This will allow for international harmonization and for aircraft to best utilize each aircraft's capabilities. The group also mentioned that if the FAA does not allow blanket permission for powered-lift to utilize helicopter operational rules while in vertical flight mode, the FAA should provide a pathway for an operator or manufacturer to seek approval or authorization to adopt the alternate rule.

Like several other commenters, L3Harris stated that the FAA should utilize ICAO Document 10103. Specific to the fuel requirements, L3 Harris suggests the FAA add a specific section to the SFAR that specifies fuel reserve requirements for both VFR and IFR operations.

An individual commenter asserted the FAA SFAR is far too conservative on operational guidance and that the FAA fails to understand the performance capability of powered-lift. The commenter indicated they have flown powered-lift for 11 years and indicated that having the flexibility to use

helicopter regulations and operating procedures has ensured their ability to safely complete the mission and care for the crew and passengers.

The FAA has considered the many comments requesting the FAA to allow powered-lift to use the helicopter VFR fuel minimums. In response, the FAA has decided to provide some relief from the VFR fuel supply requirements the FAA originally proposed in the NPRM for powered-lift when the aircraft has the performance capability to always conduct a landing in the vertical-lift flight mode along the entire route of flight. The FAA has considered the hybrid nature of a powered-lift and its ability to operate similar to a helicopter or an airplane, depending on the mode of flight in which it is being operated. The FAA acknowledges that, when a powered-lift can conduct a landing in the vertical-lift flight mode, which enables it to land in areas similar to what a helicopter requires, there will be more landing sites available to the powered-lift as compared to airplanes. Therefore, the FAA will allow a powered-lift to use the VFR helicopter fuel minimums when they are able to conduct a landing in the vertical-lift flight mode. This provision would not prevent a powered-lift from operating in the wing-borne flight mode but will require the powered-lift to have the performance capability, as detailed in the AFM, to conduct a landing in the vertical-lift flight mode along the entire route of flight.

This will provide powered-lift operational flexibility without a degradation of safety, as there is a long history of helicopter operations using the 20-minute fuel reserve requirement. When using this provision, a person must consider any landing performance data that enables a landing in the vertical-lift flight mode, including taking into consideration the energy requirements to successfully complete a descent and landing in the vertical-lift flight mode from the altitude they plan to use. There may be performance requirements or limitations contained in the AFM that would prevent a powered-lift from conducting a landing in the vertical-lift flight mode, such as a landing weight limitation, thereby requiring the use of the airplane fuel supply requirements of § 135.209(a).

In the comments, the FAA received requests from manufacturers that are developing aircraft with a non-traditional fuel supply, such as battery powered, to allow fuel requirements other than the prescriptive airplane or helicopter VFR fuel supply requirements. The FAA has decided to adopt a deviation process as an

alternative pathway to the VFR fuel supply requirements. The FAA concluded that the deviation process could maintain the level of safety provided by § 135.209 and be beneficial to those powered-lift using non-traditional fuel sources. In order to maintain this level of safety, the FAA has determined a deviation will be available only to those powered-lift operating over specific routes that have predetermined suitable landing areas available. A suitable landing area under § 194.306(rr) and (ss) is an area that provides the operator reasonable capability to land without causing undue hazard to persons or property. These suitable landing areas must be site-specific, designated by the operator, and accepted by the FAA. This will ensure that any operation conducted with less than the prescriptive VFR fuel supply minimums will be conducted under a controlled environment. The controlled environment will incorporate pre-determined suitable landing areas that are known by the pilot in advance and be based upon the specific route being flown along with the VFR fuel reserve specified in minutes. The FAA will evaluate each certificate holder's deviation request to determine if the proposed operation will maintain an equivalent level of safety as currently provided in the prescriptive rule. The authorization to use this deviation would be granted to the certificate holder via Operations Specifications (OpSpecs). In response to Archer's point on operational data being determined during aircraft certification, the FAA notes that the fuel reserve requirements are based upon the operational rules in which the flight is conducted and, unlike Archer alleged, are not determined during aircraft certification. Archer also mentioned that, while helicopters have multiple single-point-of-failure vulnerabilities, Archer's "Midnight" aircraft has none, a reliability Archer believed should also be recognized in the determination of reserve fuel. In response to this comment, the FAA states reliability is not a consideration for the fuel requirements of this rule. The FAA also disagrees with Archer's assertion that fuel reserve requirements should vary based upon the range of the aircraft. The FAA has consistently held that fuel reserve requirements do not vary based upon the range of the aircraft.

The FAA also disagrees with Eve's assertion that the FAA should consider appropriate operational requirements applied for energy reserve based on the design and performance capabilities of each individual certified powered-lift.

Fuel reserve requirements are based upon the operational rules in which the flight is conducted and are not based upon an aircraft's individual design or performance capability.

BETA also mentioned that electric propulsion powered-lift will have variable energy reserve needs based on the planned flight profile. The FAA does agree with BETA's assertion that fuel reserve requirements are not entirely based upon the duration of flight or distance flown. All operators must take into consideration the energy requirements based upon their entire planned flight including any extra energy requirements for vertical-lift flight operations. The FAA disagrees with BETA's argument that the variable energy reserve should be based upon the planned flight profile without any kind of mitigations to ensure the continued safety of the operation. However, as discussed above, the FAA is providing a pathway, through deviations, for a reserve amount less than the prescriptive airplane or helicopter fuel reserve minimums.

In response to the Vertical Aerospace Group's comments, the FAA notes that fuel reserves are based upon time to enable a pilot to take corrective/alternative action, not on the type of energy used to propel the aircraft. Therefore, time is the factor for fuel reserve planning, and that time computes into a specific quantity of fuel or energy remaining, based upon the fuel/energy usage of the aircraft.

In response to the Advanced Air Mobility Institute's comment, the FAA asserts that commercial flight operations do not have the same level of acceptable risk as Department of Defense operations. Therefore, using the Department of Defense VFR fuel requirements would not be the benchmark for setting the VFR fuel requirements for powered-lift in part 135 operations.

In conclusion, the FAA will require a powered-lift unable to land in the vertical-lift flight mode along the entire route to have 30 minutes fuel reserve during the daytime and 45 minutes during nighttime, as outlined in § 135.209(a). The FAA will add a provision enabling powered-lift that are continuously capable of conducting a landing in the vertical-lift flight mode along the entire route of flight to use 20 minutes of fuel reserve, as outlined in § 135.209(b). This provision is adopted at § 194.306(ss). Additionally, the Administrator may authorize deviations from the airplane or helicopter prescriptive fuel reserve requirements for powered-lift operations on specific routes that have one or more

predetermined suitable landing areas, if the FAA finds the operation can be conducted safely. The FAA will adopt the proposed § 194.307(ff) as amended, though due to renumbering, it is being adopted as § 194.306(rr).

Section 135.221 provides the requirements for alternate airport weather minimums. Per § 135.221(a), no person operating an aircraft other than rotorcraft may designate an alternate airport unless the weather reports or forecasts indicate the weather conditions will be at or above authorized alternate airport landing minimums for that airport at the estimated time of arrival. Section 135.221(b) provides alternate airport weather minimums for rotorcraft.

The FAA notes that powered-lift will likely spend the majority of flight time in wing-borne flight and cruise at higher altitudes with the potential for higher speeds than rotorcraft. As such, the FAA proposed the rules for rotorcraft in § 135.221(b) will not apply to powered-lift.

The FAA received four comments on the FAA's proposal to apply the requirements of § 135.221(a) to powered-lift and not permit powered-lift to use the provisions of § 135.221(b).

AWPC argued that their AW609 Tiltrotor, is capable of VTOL, can conduct copter instrument approaches, and has an endurance comparable to helicopters. AWPC noted the AW609 Tiltrotor can conduct copter instrument approaches as well as meet the requirements for copter procedures as defined in § 97.3 (allow for reduced visibility minimums). As such, AWPC argued that their powered-lift should be subject to a performance-based IFR alternate airport weather minima requirement.

Lilium believed that the safe use of helicopter flight rules for powered-lift can be evaluated during aircraft certification and/or the type rating evaluation process. Lilium recommended that the FAA adopt a similar comprehensive and risk-based approach as suggested by Lilium for altitude requirements in order to evaluate the capabilities and performance of each individual powered-lift to safely operate under helicopter IFR.

While GAMA did not specifically address § 135.221, GAMA recommended that the FAA consider the capabilities of powered-lift rather than adopting what GAMA characterized as a "blanket application" of airplane rules. GAMA generally supported the FAA adopting performance-based operating regulations for powered-lift and points

to ICAO Document 10103 as a source of guidance.

In response to the comments received, the FAA made changes to the original proposal and will add regulatory text at § 194.306(tt) to allow powered-lift to have the ability to use the rotorcraft alternate airport weather minimums specified in § 135.221(b), provided the powered-lift has the authorization to conduct copter procedures and can land in the vertical-lift flight mode, as provided in the AFM.

A powered-lift will only be authorized to utilize copter procedures if they are able to fly at the slower airspeeds necessary to conduct those procedures. Powered-lift that are unable to meet the requirements for copter procedures will be required to use standard approach procedures and therefore the alternate airport minimums specified for aircraft in § 135.221(a). During aircraft certification, the FAA will assess the aircraft's stability, system, and equipment for IFR operations. A powered-lift that does not possess these characteristics may still be certificated for IFR but will be prohibited from performing copter procedures and have a limitation in the AFM to that effect. Those powered-lift would not be authorized to use the rotorcraft option and would be required to use the IFR alternate airport minimums specified for aircraft. This requirement is adopted at § 194.306(tt).

When taking into consideration whether a powered-lift can land in the vertical-lift flight mode, a person must consider any landing performance data contained in the AFM that enables the aircraft to conduct a landing in the vertical-lift flight mode. There may be performance requirements or limitations contained in the AFM that would prevent a powered-lift from conducting a landing in the vertical-lift flight mode, such as a landing weight limitation, thereby requiring a person to use the IFR alternate airport minimums specified for aircraft in § 135.221(a).

In response to Lilium's comment about establishing operational rules during aircraft certification, the FAA disagrees with Lilium. During the certification process, an applicant should have an understanding of the requirements of the rules in which they wish to market their aircraft and design them accordingly.

Section 135.223(a) requires aircraft other than helicopters to carry a 45-minute fuel reserve. Section 135.223(a)(3) requires a fuel reserve for helicopters of at least 30 minutes. In the NPRM, the FAA proposed to retain the 45-minute fuel reserve requirement specified for aircraft for powered-lift

and did not apply the less restrictive helicopter fuel reserve requirement set forth in § 135.223(a)(3).

The FAA received one comment in support of and twelve comments opposing the FAA's proposal to apply § 135.223(a)(3).

An anonymous commenter agreed with the FAA's proposal noting that battery-powered aircraft should have the same energy "fuel" reserves as other propeller or jet aircraft, 30 minutes at day and 45 minutes at night, and 45 minutes IFR reserve plus "fuel" or battery power to fly to an alternate airport and conduct the approach if necessary.

Archer believed that the application of airplane fuel reserves to the powered-lift category is inappropriate, and that the FAA is failing to consider the unique operational capability of a powered-lift's ability to take off and land vertically. Archer urged the FAA to consider regulations that will enable approvals of performance-based fuel reserves tailored specifically for those eVTOL powered-lift seeking certification.

According to Archer, in order to recognize the unique, short-range operating environment anticipated by powered-lift eVTOLs, they recommend a regulation that can follow long-standing precedent of the fuel reserve OpSpecs that are utilized by many part 121 air carriers. This data-driven fuel planning would recognize that eVTOLs operating on very short stage lengths are likely to be able to demonstrate, with data, consistency in operations that enable lower fuel reserves with equivalent levels of safety. Archer recommended that the FAA adopt language in part 194 that will allow for Performance Based Contingency Fuel (PBCF) approvals for part 135 based on operational data.

The Advanced Air Mobility Institute suggested the FAA consult with the Department of Defense to determine powered-lift fuel requirements.

As stated above, CAE provided comments on fuel reserves distinguishing between the varying characteristics and differences between airplanes and powered-lift. CAE also recommended that the FAA should provide an alternate pathway for an operator or manufacturer to obtain approval for a different fuel reserve minimum.

AWPC argued that powered-lift capable of VTOL should be allowed to use helicopter VFR fuel reserves.

Eve recommended considering appropriate operational requirements applied for energy reserve based on the design and performance capabilities of

each individual certified powered-lift. Eve recommended that the FAA consider alignment with ICAO Document 10103 guidance to meet the existing operational safety level applied for helicopters and airplanes.

Eve recommended that the FAA introduce more practical, performance-based energy reserve requirements applied for planned routes and consider the type of energy used by the powered-lift relating to the operation applied for each type of aircraft.

Lilium recommended that the FAA adopt appropriate regulatory amendments to provide flexibility for certificate holders to operate powered-lift under helicopter instrument requirements where it has been determined appropriate and approved by the Administrator.

BETA asserted that the FAA's adoption of the existing airplane VFR and IFR reserve requirements is overly burdensome for powered-lift that may only be capable of short duration flights and fails to consider the variability in required energy reserves for electric propulsion powered-lift based on the planned flight profile and landing type.

The Vertical Aerospace Group asserted that the 30-minute energy reserve requirement for day VFR operation is overly conservative and that the FAA failed to consider the unique operating characteristics of powered-lift and access to powered-lift would be limited. It also alleged that powered-lift are capable of vertical landings and performing approach and go-around maneuvers in low-speed thrust-borne mode, allowing more flexibility in emergency conditions.

Vertical Aerospace Group also stated that the FAA should recognize that electric powered-lift have fundamentally different energy densities and limitations compared to traditional aviation fuel and the FAA should take this into consideration in setting the appropriate requirements. Powered-lift are primarily designed for short distance urban air mobility operations, and applying fuel reserve requirements for airplanes is not aligned with the typical mission profiles of these aircraft. It also asserted that electric propulsion systems offer a markedly higher precision in remaining energy indication compared to traditional turbine engines. This enhanced precision makes a time-based approach to energy-reserves limiting and fails to capitalize on the real-time, high-fidelity data that will be available for more precise energy management.

Vertical Aerospace Group encouraged the FAA to take a performance-based approach, setting fuel requirements based on the performance and the type

of operation of the specific aircraft. According to Vertical Aerospace Group, this will allow for a more tailored approach in which the overall design, operational profile, and safety requirements of the aircraft are taken into account. In addition, such an approach would be in line with other key regulators, such as EASA, supporting the collective ambition for greater regulatory harmonization.

GAMA stated that the approach to use airplane requirements for many of the operational rules does not consider that many powered-lift have performance capabilities similar to rotorcraft. GAMA further asserted that the application of prescriptive operating rules without consideration for the vehicle performance reduces the usefulness of powered-lift. GAMA strongly recommended that the FAA consider the diverse capabilities of powered-lift and mentions that the broad diversity for the blanket application of airplane rules is not suitable for accommodating the unique design characteristics of these new aircraft. GAMA's comments submitted for this section are identical to the comments submitted for § 135.209 and are cited in that section.

GAMA also submitted an additional document that recommends adopting most of the recommendations from ICAO Document 10103, stating that, for most operating rules where the term helicopter is used, powered-lift should also fit. The exception would extend certain operating rules applicable to airplanes to powered-lift, such as over water operations and oxygen requirements. GAMA recommended using operational concepts for some electric powered-lift that may be supported by performance-based fuel/energy reserves as an alternative to current time-based concepts. They stated that this approach would allow for adequate mission-specific energy reserves without lowering today's established safety levels and thus eliminate the need for recurring exemptions.

Joby stated the FAA should amend their part 194 requirements that specify fuel reserves for powered-lift to align with today's requirements for helicopters. Joby stated that powered-lift share unique performance capabilities with helicopters, which differentiates them from traditional fixed-wing aircraft. Joby argued that, under the proposed regulation, an electric powered-lift might be required to carry a more significant portion of its energy reserve compared to conventionally fueled aircraft. Joby's comments are identical to their comments for § 135.209 and are cited in that section.

AOPA, GAMA, HAI, NATA, NBAA, and VFS provided a comment as a single document submitted by NBAA. They believed the FAA failed to consider the characteristics powered-lift and their operating environment by unilaterally applying airplane fuel reserves to all powered-lift. They asserted that powered-lift should be permitted to utilize helicopter fuel reserves since powered-lift are capable of landing like helicopters. AOPA, GAMA, HAI, NATA, NBAA, and VFS comments are identical to their comments for § 135.209 and are cited in that section.

L3Harris Commercial Aviation Solutions—Advanced Air Mobility asserted the FAA's NPRM for powered-lift does not align with ICAO. L3Harris recommended that the FAA clarify the framework for powered-lift utilizing ICAO Document 10103.

In response to the commenters such as Archer, CAE, LTDA/Eve, Lilium, GAMA, Joby, and NBAA and their assertions stated above with regard to fuel reserves, the FAA will add an option to the final rule allowing powered-lift to use a 30-minute fuel reserve for IFR flight, which is the IFR fuel reserves specified for helicopters. The FAA will allow this provision only for those powered-lift that can use copter procedures and have the performance capability to land in the vertical-lift flight mode. If the powered-lift can meet those two provisions, they will be allowed to use the 30-minute fuel reserve requirement.

A powered-lift will only be authorized to utilize copter procedures if they are able to fly at the slower airspeeds necessary to conduct those procedures, see section IV.B. part 97. During aircraft certification, the FAA will assess the aircraft's stability, system, and equipment for IFR operations. This assessment will occur during the type certification process. A powered-lift design that meets the standards, which provides an equivalent level of safety to the relevant standards in parts 27 or 29, can be certificated for IFR flight and authorized to execute copter procedures. However, a powered-lift may still be certificated for IFR flight but could be prohibited from performing copter procedures and have a limitation in the AFM to that effect. Therefore, those powered-lift with a limitation in the AFM prohibiting copter procedures would not be authorized to use the 30-minute fuel reserve option and would be required to use the 45-minute fuel reserves specified for aircraft.

Although in the NPRM the FAA stated it did not have sufficient experience to grant relief for powered-

lift fuel requirements, the FAA evaluated the comments received about how a powered-lift can have the ability to fly at slower airspeeds like a helicopter. Therefore, the FAA considers that the mitigations of requiring a powered-lift to be able to conduct copter procedures and always be able to conduct a landing in the vertical-lift flight mode along the entire flight should ensure the safety of the operations will be comparable to those conducted with helicopters. Therefore, a person operating a powered-lift will have the option to use the 30-minute helicopter IFR fuel reserve requirement when the powered-lift is authorized to conduct copter procedures and has the performance capability, as provided in the AFM, to always conduct a landing in the vertical-lift flight mode along the entire flight. This aligns with the rationale provided in the March 13, 1985, NPRM where the FAA proposed to permit helicopters to use a 30-minute IFR fuel reserve. In that NPRM, the FAA asserted that helicopters, with their reduced IFR approach minimums stipulated in part 97, will have a better probability of completing a flight to the planned destination. On November 7, 1986, the FAA codified the 30-minute IFR fuel reserve requirement.⁴¹⁶ Therefore, by ensuring that a specific powered-lift can operate in flight at the reduced airspeeds required to conduct copter procedures, a powered-lift would also have a better probability of completing a flight to the planned destination and will be able to use a 30-minute IFR fuel reserve.

When taking into consideration the performance capability to conduct a landing in the vertical-lift flight mode, a person must consider the energy required to successfully complete a descent from the altitude they plan to use, any required instrument or visual procedure, and land in the vertical-lift flight mode. There may be performance requirements or limitations contained in the AFM, or in any approved Minimum Equipment List (MEL), that would prevent a powered-lift from conducting a landing in the vertical-lift flight mode, such as a landing weight limitation or a deferred maintenance item, thereby requiring a person to use the 45-minutes of reserve fuel.

In response to Archer's and Eve's argument related to operational data being determined during aircraft certification, the FAA notes that the fuel reserve requirements are based upon the operational rules under which the flight is conducted. Fuel reserve requirements

are not determined during aircraft certification.

In response to Archer's comment about single-point-of-failure vulnerabilities, the FAA notes that reliability is not a consideration for the fuel requirements of this rule. The FAA does not use reliability of an aircraft design as a determining factor for IFR fuel requirements.

Archer recommended the use of an Operations Specification to permit operators to use a lower fuel requirement for IFR flights. The FAA has determined that such an Operations Specification would not be in the interest of safety for short-haul domestic IFR flights. The FAA notes that Operations Specification B043 is only allowed for international flights, and the short haul domestic flights that Archer referenced in their comment is not within scope of what this Operation Specification permits.

In response to the Vertical Aerospace Group, GAMA, and Joby comments on fuel/energy reserve, the FAA asserts the operational rules for IFR fuel requirements that are based upon time are appropriate. The requirement, which is based upon a known amount of time, provides a suitable safety mitigation for unforeseen circumstances a pilot might encounter during an IFR flight. Utilizing a time-based requirement allows a universal standard in which a variety of aircraft (whose fuel/energy consumption can vary by significant margins due to the size of the aircraft and type of powerplant) will have the same amount of time available to deal with unforeseen circumstances.

Vertical Aerospace Group commented on electric propulsion systems offering a higher precision in remaining energy. The FAA agrees that having a highly precise display of remaining energy would be beneficial for a pilot to determine the amount of fuel/energy available. However, having an accurate reading of remaining fuel/energy onboard an aircraft is not a suitable replacement for the time aloft prescribed by the rule to deal with unforeseen circumstances that may occur during an IFR flight.

In response to the Advanced Air Mobility Institute's comment, the FAA asserts that commercial flight operations and their level of acceptable risk are not the same as what the Department of Defense would deem acceptable. Therefore, using the Department of Defense IFR fuel requirements would not be the appropriate benchmark for determining the IFR fuel requirements for powered-lift in part 135 operations.

In response to the comments received, the FAA will allow a powered-lift the

⁴¹⁶ 51 FR 40710 (November 7, 1986).

option to use the 30-minute helicopter IFR fuel reserve requirement when the powered-lift is authorized to conduct copter procedures and has the performance capability, as provided in the AFM, to always conduct a landing in the vertical-lift flight mode along the entire flight. Therefore, the FAA will add § 194.306(uu) to the final rule.

Section 135.225 contains requirements generally applicable to aircraft performing instrument approaches to airports. Section 135.225(e) requires a PIC of a turbine powered airplane who has not served at least 100 hours as PIC in that type of airplane to increase the Minimum Descent Altitude (MDA) or Decision Altitude/Decision Height (DA/DH) and visibility landing minimums by 100 feet and ½ mile, respectively.

In the NPRM, the FAA proposed in § 194.307(gg) to apply § 135.225(e) to powered-lift. PICs of powered-lift should also possess a high degree of familiarity with their aircraft and its controls, instruments, and performance requirements, and due to the complexity required as the aircraft transitions from winged to vertical flight during a critical phase of flight, the PICs of all powered-lift will have the increased MDA or DA/DH and visibility landing minimums.

The FAA received one comment on proposed § 194.307(gg) from Archer, generally expressing support for ensuring that there is an equivalent level of safety between airplanes, helicopters, and powered-lift.

In response to the comment received, the FAA did not make any changes to the proposed regulatory text. Therefore, the FAA adopts the proposed § 194.307(gg) as final, though due to renumbering, it is being adopted as § 194.306(vv).

Section 135.227 addresses the operating limitations in icing conditions for airplanes and helicopters. Section 135.227(a) applies to all aircraft, meaning that powered-lift must comply with those requirements as written. Paragraph (b) applies to only airplane operations and requires pilots to have completed training required by § 135.341 prior to conducting operations when the conditions are such that frost, ice, or snow may reasonably be expected to adhere to the airplane, if the certificate holder authorizes takeoffs in ground icing conditions.⁴¹⁷ In the

⁴¹⁷ Section 135.227 references training required by § 135.341. Section 135.341(b) requires the training program for part 135 operators to include ground training for initial, transition, and upgrade training. Section 135.345 specifies the required content of initial, transition, and upgrade ground training. Specifically, § 135.345(b)(6)(iv) requires training on operating during ground icing

NPRM, the FAA proposed to apply § 135.227(b) to powered-lift in § 194.307(hh).

Section 135.227(d) states that no pilot may operate a helicopter under IFR into known or forecasted icing conditions, or under VFR into known icing conditions, unless the helicopter has been type-certificated and is appropriately equipped for operating in icing conditions. The FAA proposed in § 194.308(i) to apply § 135.227(d) to powered-lift, allowing powered-lift to conduct flights into known or forecast light or moderate icing conditions, providing the powered-lift has been type certificated and is appropriately equipped.

The FAA received one comment generally on operating in icing conditions and one comment on proposed § 194.308(i).

The Advanced Air Mobility Institute recommended that the FAA consult with the Department of Defense (DoD) on the final rulemaking regarding operations in known or forecast severe icing conditions.

This rulemaking is not addressing powered-lift operations in known forecast severe icing conditions. However, the FAA will take this recommendation into consideration if the FAA contemplates additional rulemaking permitting powered-lift to operate in known or forecast severe icing conditions.

GAMA agreed with the FAA's proposal in § 194.308(i), the helicopter requirement, to apply the requirements of § 135.227(d) to powered-lift.

The FAA did not make any changes to the proposed regulatory text in response to the comments received. The FAA noticed during the consolidation of the part 135 airplane and rotorcraft tables that the reference contained in proposed § 194.308(i) in the additional requirements column was incorrectly listed as § 194.307(ii). The FAA also determined the critical surface reference in the proposed § 194.308(i) would no longer be required because § 194.306(ww) already covers the critical surfaces requirement. Furthermore, the reference leading the reader to the helicopter requirements in proposed § 194.307(hh)(3), which stated "For IFR and VFR flight into certain icing conditions, see § 194.308(i)" is no longer needed. Due to the consolidation and subsequent renumbering, the proposed § 194.307(hh) is being adopted as § 194.306(ww) and proposed

conditions (*i.e.*, any time conditions are such that frost, ice, or snow may reasonably be expected to adhere to the airplane), if the certificate holder expects to authorize takeoffs in those conditions.

§ 194.308(i) is being adopted as § 194.306(xx).

Section 135.229 provides the airport requirements for part 135 operations. The requirements of § 135.229 apply to all aircraft, with the exception of § 135.229(b)(2)(ii), which states that helicopters are also allowed to land at an airport where the limits of the area to be used for takeoff and landing are marked using reflective material. The landing lights on helicopters are generally oriented so that they shine at an angle approximate to a normal approach angle used by helicopters.⁴¹⁸ This negates the need for illuminated runway lights on the landing area and permits the helicopter pilot to easily pick out and maintain a safe approach angle to an area marked by reflective material.

The FAA proposed in § 194.308(j) to allow powered-lift to takeoff from or land at an airport that uses reflective material when conducting a takeoff or landing in the vertical-lift flight mode and is equipped with landing lights oriented in a direction that enables the pilot to see the takeoff or landing area marked by reflective material.

The FAA received one comment from GAMA on proposed § 194.308(j) agreeing with the FAA's proposal to allow a powered-lift to takeoff from or land at an airport that uses reflective material when conducting a takeoff or landing.

The FAA did not make any substantive changes to the proposed regulatory text. In finalizing this rule, however, the FAA determined that it needed to revise the regulatory text to clarify the FAA's intent, as described in the NPRM, which was to include areas used for both takeoffs and landings. This also aligns with the provisions contained within the text of § 135.229. As a result, the FAA has clarified that § 135.229, adopted as final as § 194.306(yy), includes areas used for both takeoff and landing, not just landing areas.

5. Subpart F: Crewmember Flight Time and Duty Period Limitations and Rest Requirements

Subpart F details crewmember flight time, duty period limitations, and rest requirements.

Section 135.271 provides the rest and duty requirements for Helicopter Air Ambulance (HAA) operations conducted from a hospital. In order to ensure that the helicopter pilot is adequately rested, § 135.271(f) requires there to be an approved place of rest at,

⁴¹⁸ Miscellaneous Amendments, 29 FR 2988 (Mar. 5, 1964).

or in close proximity to, the hospital where the helicopter is based.

Powered-lift can conduct vertical takeoffs and landings and can conduct air ambulance operations at a hospital heliport. Therefore, powered-lift operators authorized to conduct air ambulance operations based at a hospital should be allowed to use the rest and duty rules permitted by § 135.271. Therefore, the FAA proposed in § 194.308(k) that § 135.271 could apply to powered-lift conducting HAA operations in accordance with subpart L of part 135.

The FAA received two comments on proposed § 194.308(k). ALPA and GAMA both agreed with the FAA's proposal to apply § 135.271 to powered-lift conducting HAA operations in accordance with subpart L of part 135.

The FAA did not make any changes to the proposed regulatory text and adopts § 194.308(k) as final, though due to renumbering, it is being adopted as § 194.306(zz).

6. Subpart I: Airplane Performance Operating Limitations

Subpart I outlines the airplane performance operating limitations applicable to large transport category, large nontransport category, small transport category, and small nontransport category airplanes with different types of powerplants. Although Subpart I is airplane specific, the FAA acknowledged in this SFAR that some powered-lift may fit the definition of large aircraft, which is more than 12,500 pounds, while others will be considered small aircraft, which are 12,500 pounds or less. The FAA anticipated some powered-lift could operate similarly to an airplane during takeoff and landing and will routinely operate similarly to an airplane during horizontal flight. In those cases, the powered-lift will be supported in flight by the dynamic reaction of the air against their wings (termed wing-borne flight).

In the NPRM, the FAA anticipated that some powered-lift will only be able to conduct VTOL operations, while others may have the ability to conduct a takeoff or landing that depends on wing-borne lift, similar to an airplane. For the latter, some of the requirements of subpart I should be applicable.

For powered-lift that can conduct takeoff and landings using wing-borne lift, the performance data will be published in the AFM and will contain items such as: takeoff roll, takeoff distance, and landing distance required. This will enable a pilot of a powered-lift to determine that an adequate area is available to enable a safe takeoff or

landing. Persons or property being transported on powered-lift meeting the size and certification standards of this subpart should be afforded the safety requirements of this subpart that are currently afforded to those transported on airplanes.

Although the FAA has not yet published a transport category certification standard for powered-lift, the FAA proposed to apply the transport category requirements of subpart I to large powered-lift. Due to the novel designs of powered-lift and the varying capabilities of those aircraft, a combination of the aircraft certification standards from the various sections of parts 23, 25, 27, and 29 may be used to develop the certification criteria for each individual powered-lift design.

Section 135.361(a) states that subpart I of part 135 applies to the operation of the categories of airplanes listed in § 135.363 when operated under part 135. The FAA proposed in § 194.307(ii) that the sections of subpart I of part 135 should apply to powered-lift, regardless of powerplant type. The FAA has clarified in the regulatory text that any provisions within subpart I of part 135 that reference a specific category of aircraft, such as an airplane, and that are not referenced in the SFAR tables to §§ 194.302 or 194.306, do not apply to powered-lift.

The FAA received no comments on proposed § 194.307(ii); therefore, the FAA adopts the proposed § 194.307(ii) as final, though due to renumbering, it is being adopted as § 194.306(aaa).

Section 135.363(a) through (e) outline which sections of subpart I apply to certain types of airplanes, considering factors such as: the size, type of powerplant, and certification basis for the airplane. The FAA did not anticipate that there would be a large powered-lift produced with a reciprocating engine, therefore paragraph § 135.363(a) will not be applicable. The FAA proposed in § 194.307(jj) that when a powered-lift meets the criteria established in paragraphs (b) through (e), regardless of powerplant type, the referenced regulatory sections will apply.

Section 135.363(f) requires the performance data in the AFM to be used in determining compliance with §§ 135.365 through 135.387. Section 135.363(f) also contains a provision to allow the interpolation and computing the effects of changes in specific variables, so long as those calculations are substantially as accurate as the results of direct tests. The FAA proposed in § 194.307(kk) that if a powered-lift is required to be in compliance with a section contained in

§§ 135.365 through 135.387, then the provisions of § 135.363(f) will apply. Although § 135.365(f) specifies an AFM, the FAA asserted that for any powered-lift that requires compliance with a section contained in §§ 135.365 through 135.387, the powered-lift AFM will contain any applicable performance data. Additionally, the FAA expects that the interpolation and computation that is permitted in § 135.363(f) could be accomplished for powered-lift without any degradation of safety, just as it is allowed for airplanes.

The FAA received no comments on proposed § 194.307(jj) and (kk). Therefore, the FAA adopts the proposed § 194.307(jj) and (kk) as final, though due to renumbering, these sections are being adopted as § 194.306(bbb) and (ccc). Additionally, the FAA inadvertently included § 135.363(a) in the proposed § 194.307(jj), though the accompanying preamble text in the NPRM made clear that § 194.307(jj) was meant to only apply § 135.363(b) through (e) to powered-lift. The adopted § 194.306(bbb) corrects this error.

Section 135.379 contains takeoff limitations applicable to large turbine engine-powered transport category airplanes.

Section 135.379(a) states that no person operating a turbine engine-powered large transport category airplane may take off that airplane at a weight greater than that listed in the AFM. The calculation for determining that takeoff weight must consider the elevation of the airport and the ambient temperature existing at the time of takeoff.

Section 135.379(c) requires that an airplane subject to § 135.379(c) cannot takeoff at a weight greater than that listed in the AFM. Section 135.379(c) also lists specific performance requirements, such as the takeoff run must not be greater than the length of the runway, accelerate-stop distances, and required takeoff distance.

Section 135.379(d) states that an airplane cannot takeoff at a weight greater than that listed in the Airplane Flight Manual and lists specific performance requirements for obstacle clearance in the takeoff path (for airplanes certificated after August 26, 1957, but before October 1, 1958) and takeoff flight path (for airplanes certificated after September 30, 1958).

Section 135.379(e) requires certain corrections to be considered when determining maximum takeoff weights, minimum distances, and flight paths under § 135.379(a) through (d). These corrections include which runway is used and its gradient, airport elevation, ambient temperature, or wind

component. These corrections are made to ensure that operators take all relevant performance factors related to takeoff operations into account to ensure that the airplane safely remains within its weight limitations for a particular takeoff.

Section 135.379(f) sets two assumptions when calculating takeoff performance: the airplane is not banked before reaching a height of 50 feet, and after reaching a height of 50 feet, the maximum bank is not more than 15 degrees.

Section 135.379(g) applies the terms *takeoff distance*, *takeoff run*, *net takeoff flight path* to have the same meanings as set forth in the rules under which the airplane was certificated. In the NPRM, the FAA included paragraph (g) in the regulation text table making it applicable to large powered-lift certificated to conduct takeoff operations that utilize wing-borne lift as indicated in the AFM. For those powered-lift that have a takeoff distance, takeoff run and net takeoff flight path this will ensure the safety requirements relevant to those terms are taken in consideration just as they are for airplanes.

The FAA proposed in § 194.307(ll) that paragraphs (a) and (d) of § 135.379 apply to large powered-lift. In addition, the FAA proposed in § 194.307(mm) that paragraphs (c), (e), (f), and (g) of § 135.379 apply to large powered-lift that utilize wing-borne lift during takeoff and have the takeoff performance information contained in the AFM. The FAA finds that the expected commonalities between transport category airplane and large powered-lift operations warrant application of these provisions to large powered-lift. The accelerate-stop distance set forth in § 135.379(c)(1) must either meet § 25.109 or such airworthiness criteria as the FAA may find provides an equivalent level of safety in accordance with § 21.17(b).

The FAA received no comments on proposed § 194.307(ll) and (mm) and therefore, the FAA adopts the proposed § 194.307(ll) and (mm) as final. However, due to renumbering, these sections are being adopted as § 194.306(ddd) and (eee).

Section 135.381(a) specifies that a person operating a turbine engine-powered large transport category airplane must takeoff at a weight, allowing for normal consumption of fuel and oil, which will ensure that the airplane will be able to clear all terrain and obstructions within its flightpath with one engine inoperative. Section 135.381(b) lists six assumptions that must be considered when computing

the net flight path and horizontal and vertical safety areas required by § 135.381(a)(2). Large powered-lift will conduct en-route operations similar to transport category airplanes. The important safety criteria of § 135.381 should apply to powered-lift if one engine were to become inoperative. As such, the FAA proposed in § 194.307(nn) that this section be applicable to large powered-lift.

The FAA received no comments on proposed § 194.307(nn), and therefore, the FAA adopts § 194.307(nn) as final, though due to renumbering, it is being adopted as § 194.306(fff).

Section 135.383 provides en route limitations for turbine engine-powered large transport category airplanes with two engines inoperative. Specifically, § 135.383(c) specifies that a person operating a turbine engine-powered large transport category airplane on an intended route must ensure that the airplane is no more than 90 minutes away from an alternate airport, or that a powered-lift with two inoperative engines will clear all terrain and obstructions within its flightpath. Large powered-lift will conduct en route operations similar to airplanes, and this important safety criteria should apply if two engines were to become inoperative. Additionally, § 135.383(c)(2) contains assumptions that must be considered when computing the net flight path, required horizontal and vertical safety areas and fuel requirements. Having alternate airports planned along the route is essential for en route operations. Therefore, the FAA proposed in § 194.307(oo) that § 135.383(c) should apply to large powered-lift.

The FAA received no comments on proposed § 194.307(oo) and adopts § 194.307(oo) as final, though due to renumbering, it is being adopted as § 194.306(ggg).

Section 135.385 provides required landing limitations at destination airports for large turbine engine-powered transport category airplanes.

Section 135.385(a) stipulates that no person operating a turbine engine powered large transport category airplane may take off at a weight if the weight of the airplane on arrival would exceed the landing weight as contained in the AFM. Section 135.385(a) is intended to ensure an airplane will not arrive overweight for landing. Section 135.385(b) through (f) detail which factors must be applied when determining the required landing distances. The FAA believes these considerations are equally applicable to large powered-lift and therefore proposed in § 194.307(pp) that

paragraph (a) be applicable to large powered-lift.

Section 135.385(b) specifies that, in order for a person to conduct a takeoff in a turbine engine-powered large transport category airplane, the airplane weight on arrival must allow a full stop landing at the intended destination airport within 60 percent of the effective length of each runway. This rule provides for a 40 percent safety margin to help ensure that an airplane can safely land and prevents a person from attempting to operate into runways where there is no margin of error, which is also important for large powered-lift that utilize wing-borne lift during landing. The FAA proposed in § 194.307(qq) that § 135.385(b) applies to large powered-lift that utilize wing-borne lift during landing and provide landing performance information in the AFM.

Section 135.385(d) requires that, unless approved and included in the airplane flight manual, a large transport category turbojet airplane must add an additional 15 percent margin onto the landing distance calculated per § 135.385(b) when the destination may be wet or slippery at the estimated time of arrival. The FAA proposed in § 194.307(qq) that § 135.385(d) would be applicable to large powered-lift that utilize wing-borne lift during landing and have landing performance information contained in the AFM.

Section 135.385(e) provides that a turbojet-powered airplane that would otherwise be prohibited from conducting a takeoff because the airplane could not be landed on the most suitable runway may takeoff if an alternate airport is selected.

The FAA proposed in § 194.307(qq) that § 135.385(e) would apply to large powered-lift that conduct landing operations that depend on wing-borne lift and have that landing performance information contained in the AFM.

Section 135.385(f) provides an option to eligible on-demand operators to conduct a takeoff if the operation is permitted by an approved Destination Airport Analysis in that operator's manual and certain conditions are met. The eligible on-demand operator is authorized to calculate the required runway distance at 80 percent of the effective length of the runway. A powered-lift using the wing-borne lift mode during landing is similar in operation to a landing airplane. Therefore, the FAA proposed in § 194.307(qq) this paragraph be applicable to large powered-lift that utilize wing-borne lift during landing and have landing performance information contained in the AFM.

The FAA received no comments on proposed § 194.307(pp) or (qq); therefore, the FAA adopts § 194.307(pp) and (qq), as final. However, due to renumbering, these sections are being adopted as § 194.306(hhh) and (iii).

Section 135.387 stipulates landing limitations for selecting an alternate airport for large turbine engine powered transport category airplanes.

Specifically, § 135.387 requires that the selected alternate airport must allow the airplane to be brought to a full stop landing based on the weight of the airplane expected at the time of arrival at the alternate airport. The FAA proposed in § 194.307(rr) that paragraphs (a) and, for eligible on-demand operators, paragraph (b) would apply to large powered-lift that utilize wing-borne lift during landing and has landing performance information contained in the AFM.

The FAA received no comments on proposed § 194.307(rr) and is adopting § 194.307(rr) as final, though due to renumbering, it is being adopted as § 194.306(jjj).

Section 135.397 stipulates the performance operating limitations for small transport category airplanes.

Section 135.397(a) and (b) outline the performance requirements for small transport category airplanes. This section requires compliance with weight, takeoff, and landing limitations as contained in other sections of subpart I. Section 135.397(a) is applicable to reciprocating engine powered airplanes, and the FAA asserts that paragraph (a) would not be applicable to powered-lift. Therefore, the FAA proposed in § 194.307(ss) that only paragraph (b) be applicable for small powered-lift that have a passenger seating configuration of more than 19 seats, that utilize wing-borne lift during takeoff or landing, and that have takeoff or landing performance information contained in the AFM.

The FAA received no comments on proposed § 194.307(ss); therefore, the FAA adopts § 194.307(ss) as final, though due to renumbering, it is being adopted as § 194.306(kkk).

7. Subpart J: Maintenance, Preventative Maintenance, and Alterations

Section 135.429 applies to all aircraft used for operations conducted under part 135, including powered-lift, with the exception of § 135.429(d). Section 135.429(d) is focused on rotorcraft and states that the FAA may approve procedures for the performance of required inspection items by a pilot of a rotorcraft that operates in remote areas or sites. The rule is intended to allow a certificate holder the opportunity to establish a preventive maintenance

process when a mechanical interruption occurs in a remote area or site. Because powered-lift may take off and land like a rotorcraft, some powered-lift may operate in remote areas or sites. Consequently, powered-lift used in such operations experience the same challenges that exist for rotorcraft when an unscheduled mechanical interruption occurs. Therefore, the FAA proposed in § 194.308(l) to apply § 135.429(d) to powered-lift that operate in remote areas or sites.

The FAA received three comments, a group comment from AOPA, GAMA, HAI, NATA, NBAA, and VFS, and comments from CAE and Joby on proposed § 194.308(l). All three were in support of the FAA's proposal to apply the preventive maintenance requirements available to certificate holders operating rotorcraft under part 135 in remote areas to certificate holders operating powered-lift under part 135 in remote areas.

The FAA adopts § 194.308(l) as final, though due to renumbering, it is being adopted as § 194.306(III).

8. Subpart L: Helicopter Air Ambulance Equipment, Operations, and Training Requirements

Helicopter air ambulance (HAA) operations must comply with subpart L of part 135, as well as the other requirements of part 135. In the NPRM, the FAA proposed that powered-lift conducting air ambulance operations should be required to comply with subpart L of part 135. Because the FAA proposed that subpart L apply to powered-lift, it also proposed in § 194.308(a) that § 135.1(a)(9) apply to powered-lift conducting air ambulance operations.

Section 135.601 provides the applicability and definitions for subpart L of part 135. The FAA anticipated that operators utilizing powered-lift for air ambulance activities will present a new dynamic because these aircraft can be operated like an airplane and a helicopter. The FAA currently differentiates between airplane air ambulance operations and HAA operations including the required equipment, weather minimums, required risk analysis, flight monitoring, and the authorizing document issued to the operator.⁴¹⁹

Powered-lift conducting air ambulance operations should be

⁴¹⁹ Air ambulance operations conducted in an airplane are approved through issuance of Operations Specification A024, while air ambulance conducted in a helicopter are approved through issuance of A021. When the type of operation is proposed in powered-lift, the FAA will issue the appropriate operations specification.

provided to the public at the same level of safety as HAA operations, and the rules contained in subpart L provide this level of safety. Accordingly, the FAA proposed in § 194.308(m) that the applicability and definitions section of subpart L also apply to powered-lift.

The FAA received one comment on proposed § 194.308(m) from GAMA, who expressed support for the FAA's proposal that the applicability and definitions section of subpart L apply to powered-lift that conduct air ambulance operations. Therefore, the FAA adopts § 194.308(m) as final, though due to renumbering, it is being adopted as § 194.306(mmm).

Section 135.603 requires the PIC of a helicopter air ambulance operation to meet the requirements of § 135.243 and to hold either a helicopter instrument rating or an ATP certificate with a category and class rating for that aircraft, not limited to VFR. It is equally important for PICs of powered-lift air ambulance operations to meet the requirements set forth in this section. The FAA proposed in § 194.308(n) that these requirements also apply for powered-lift operations occurring under subpart L.

The FAA received one comment on proposed § 194.308(n) from GAMA that supported the FAA's proposal that the requirements of § 135.603 should apply to powered-lift that conduct air ambulance operations. The FAA realized in finalizing this rule that further clarification is necessary under § 194.306(nnn), pertaining to § 135.603. As mentioned above, the regulation currently requires the PIC to hold either a helicopter instrument rating or an ATP certificate with a category and class rating for that aircraft, that is not limited to VFR. These references are not applicable to powered-lift.⁴²⁰ As a result, the FAA has clarified that the PIC must hold a "powered-lift" instrument rating or an ATP certificate with a category rating for that aircraft. Therefore, the FAA adopts § 194.308(n) as final, though due to renumbering, it is being adopted as § 194.306(nnn).

Section 135.605 stipulates the requirements for using a HTAWS. Consistent with proposed § 194.307(q), for powered-lift operating under subpart L, the FAA proposed to allow a hybrid system in a powered-lift that utilizes the features of a TAWS A system for wing-borne flight and HTAWS for vertical-lift flight modes of operation for compliance with § 135.605. The FAA proposed in § 194.308(o) that any powered-lift that is used in air

⁴²⁰ For discussion on "class" ratings, see Section V.A ("Certification of Powered-Lift Pilots").

ambulance operations as defined § 135.601 be equipped with HTAWS, unless equipped with an FAA approved TAWS A/HTAWS hybrid system, in accordance with § 135.605.

The FAA received no comments on proposed § 194.308(o) and therefore adopts § 194.308(o) as final, though due to renumbering, it is being adopted as § 194.306(ooo).

Section 135.607 requires flight data monitoring systems for HAA operations. The FAA determined that it would be appropriate to apply the requirement for helicopters to have flight data monitoring system capable of recording flight performance data to powered-lift conducting air ambulance operations as set forth in § 135.607. The FAA did not identify any reason to differentiate between helicopters and powered-lift conducting air ambulance operations for purposes of compliance with this requirement, as it would be equally important for powered-lift to record flight performance data in the dynamic environment contemplated by subpart L. Accordingly, the FAA proposed § 194.308(p).

The FAA received one comment on proposed § 194.308(p) from ALPA that referenced both a Flight Data Monitoring Systems (FDMS) and § 135.607. ALPA's comment was not specifically directed toward the FAA's requirement for powered-lift conducting air ambulance operations to equip the aircraft with a FDMS, but rather that all powered-lift should be required to be equipped with an FDMS. While the FAA is not requiring FDMS for all powered-lift, as discussed in section VI.B.6. of this preamble, the FAA is requiring all powered-lift that conduct air ambulance operations to equip their aircraft with an FDMS. As such, the FAA adopts § 194.308(p) as final, though due to renumbering, it is being adopted as § 194.306(ppp).

Section 135.609 provides rules for VFR ceiling and visibility requirements for part 135 air ambulance operations in Class G airspace. For powered-lift, the FAA evaluated the VFR minimum altitudes, required visibility, and distance from cloud requirements for airplanes as contained in § 135.203 (VFR minimum altitudes), § 135.205 (VFR visibility requirements), and § 91.155 (distance from cloud requirements) and applied these airplane minimums to the table contained in § 135.609(a), which resulted in minimums that are most closely aligned with the FAA's intent

during the NPRM of applying the ceiling and visibility requirements of airplanes to powered-lift. In § 194.308(q), the FAA proposed the ceiling and visibility requirements for powered-lift air ambulance operations. In the NPRM the FAA proposed to change the nighttime ceiling requirements for all powered-lift operating as an air ambulance regardless of the mode of flight. The FAA also proposed no changes to the current ceiling and visibility minimums for daytime operations.

The FAA received three comments on the proposed visibility requirements for powered-lift air ambulance operations.

GAMA recommended that the FAA use the ICAO guidance provided for helicopters for this rule.

AWPC argued that the FAA's proposal to limit powered-lift to airplane minimums will inhibit the ability of their aircraft to conduct low altitude air ambulance operations. AWPC also stated that their powered-lift, the AW609, is able to operate in horizontal flight mode and reach the patient's location faster than helicopters. However, AWPC expressed concern that the proposed rule will prohibit the use of helicopter minimums, helicopter routes, or hospital helipads.

Airbus Helicopters stated that some powered-lift designs are expected to perform emergency medical services and may have performance characteristics comparable to helicopters. According to Airbus Helicopters, the restrictive approach proposed in the NPRM could prevent the development of medical services with powered-lift that would have been otherwise beneficial for the public. Airbus Helicopters therefore proposed the FAA reconsider the proposed § 194.308(q).

The FAA disagrees with GAMA's recommendation to universally apply the helicopter VFR ceiling and visibility requirements for Class G airspace for HAA operations to powered-lift. Universally applying the helicopter minimums provided in § 135.609 to powered-lift when they are operating in the wing-borne flight mode during night operations would not provide the same level of safety required by the minimums specified for airplanes in § 135.203(a)(2). Applying higher nighttime minimums, as proposed in the NPRM, to powered-lift operating in wing-borne flight mode will maintain the safety margins already built into the regulations when a powered-lift is being

operated in a manner similar to an airplane.

Based upon the comments received, the FAA reevaluated the requirements that were proposed in the NPRM and has added minimums based upon existing helicopter minimums. These new minimums will apply to a powered-lift being operated in the vertical-lift flight mode at night. When operating in the vertical-lift flight mode, much like a helicopter, a powered-lift will benefit from the increased maneuverability and the ability to conduct flight at slower speeds to include hovering. Therefore, the FAA will apply the helicopter minimums as provided for day and nighttime operations in § 135.609 when a powered-lift is operating in the vertical-lift flight mode. The daytime helicopter minimums for powered-lift operating in vertical-lift flight mode are the same minimums proposed in the NPRM. The nighttime minimums for powered-lift operating in vertical-lift flight mode are lower than what the FAA proposed, and they are the same minimums currently outlined for helicopters operating at night with an approved HTAWS under § 135.609(a). Since the flight characteristics are akin to helicopters, there should be no degradation of safety by allowing powered-lift to use the helicopter minimums when operating in the vertical-lift flight mode.

The FAA will apply the minimums as proposed in the NPRM when the powered-lift is being operated in the wing-borne flight mode, which includes both daytime and nighttime ceiling and visibility minimums. These VFR ceiling and visibility requirements will provide the pilot the time and space to maneuver the powered-lift to avoid other aircraft, terrain, and obstacles. As mentioned in the NPRM, the intent behind the HAA rules is to ensure a higher level of safety for air ambulance operations because they are conducted under unique conditions. The below table outlines the amended ceiling and visibility requirements for powered-lift depending on the flight mode and whether the operations occur during the day or at night. As mentioned, the only change to the minimums that were proposed in the NPRM is the addition of the ceiling and visibility minimums for powered-lift operating at night in the vertical-lift flight mode, and those minimums reflect the current helicopter (with HTAWS) nighttime minimums under § 135.609(a).

TABLE 9—REVISED VFR AIR AMBULANCE MINIMUMS IN CLASS G AIRSPACE

Location	Day vertical-lift and wing-borne mode		Night vertical-lift mode		Night—wing-borne mode	
	Ceiling (FT)	Visibility (SM)	Ceiling (FT)	Visibility (SM)	Ceiling (FT)	Visibility (SM)
Non-mountainous Local Flying Areas	800	2	800	3	1500	3
Non-mountainous Non-Local Flying Areas	800	3	1000	3	1500	3
Mountainous Local Flying Areas	800	3	1000	3	2500	3
Mountainous Non-Local Flying Areas	1000	3	1000	5	2500	5

The FAA adopts § 194.308(q) as revised and as § 194.306(qq), due to renumbering.

Section 135.611 sets forth requirements for HAA IFR operations at locations without weather reporting. The FAA proposed the applicability of this section in § 194.308(r). The provisions of § 135.611 are only available to certificate holders that are authorized to conduct IFR operations under subpart L and are authorized to conduct IFR air ambulance operations at airports with an instrument approach procedure and at which a weather report is not available from the U.S. National Weather Service (NWS), a source approved by the NWS, or a source approved by the FAA. That authorization will be subject to the provisions detailed in § 135.611 and is also available to powered-lift authorized to conduct air ambulance operations.

The FAA received one comment on proposed § 194.308(r) from GAMA that supported the FAA’s proposal that a powered-lift conducting air ambulance operations can be authorized by the Administrator to conduct IFR helicopter air ambulance operations at airports with an instrument approach procedure and at which a weather report is not available from the U.S. National Weather Service (NWS), a source approved by the NWS, or a source approved by the FAA. Therefore, the FAA adopts § 194.308(r) as final, though due to renumbering, it is being adopted as § 194.306(rrr).

Section 135.613 details the ceiling and visibility requirements for approach and departure IFR transitions for HAA operations. Section 135.613 establishes weather minimums for HAA that are using an instrument approach and are now transitioning to visual flight for landing. Section 135.613 also permits VFR to IFR transitions for departures if the pilot has filed an IFR flight plan, will obtain an IFR clearance within 3 NM of the departure location, and departs following an FAA-approved obstacle departure procedure. In § 194.308(s), the FAA proposed applying § 135.613 to powered-lift

conducting operations in accordance with subpart L of part 135.

The FAA received one comment on § 194.308(s) from GAMA, which recommended the FAA apply ICAO rules for helicopters for § 135.613. The FAA took this general comment into consideration when writing this final rule and made some changes throughout the SFAR to provide some flexibility to enable powered-lift to use helicopter-based requirements when they are operating in the vertical-lift flight mode.

Section 135.613(a)(1) requires a flight visibility of 1 statute mile (SM) and a ceiling based upon the minimums published on the approach chart. This is applicable for Point-in-Space (PinS) Copter Instrument approaches that are annotated with a “Proceed VFR” segment, and the distance from the missed approach point to the landing area is 1 NM or less. The FAA proposed in § 194.308(s) that § 135.613(a)(1) only apply to powered-lift that are equipped and certified to conduct these PinS approaches. The FAA is not making changes from the proposed regulatory text in § 194.308(s) related to § 135.613(a)(1).

Section 135.613(a)(2) has VFR ceiling and visibility requirements for helicopters when conducting instrument approaches to a landing area that is 3 NM or less away from the missed approach point. As stated in the NPRM, the FAA established more stringent VFR ceiling minimums for powered-lift because the minimums currently prescribed for helicopters in § 135.613(a)(2)(i) and (ii) would not allow a powered-lift to maintain an acceptable level of obstacle and cloud clearances when operating in the wing-borne flight mode and conducting VFR transitions to landing areas. Therefore, the FAA will leave the VFR ceiling of 1,000 feet and visibility requirements of 2 NM for day operations and 1,500-foot ceiling and 3 NM visibility for night operations as proposed in the NPRM for powered-lift when they are operating in the wing-borne flight mode.

The FAA has determined that, when the powered-lift is operating in the vertical-lift flight mode during the

visual transition from the approach to the landing area, helicopter minimums will be acceptable. Because a powered-lift will be flying like a helicopter when in the vertical-lift flight mode and operating at slower speeds, the aircraft is able to maneuver more like a helicopter. Therefore, in the final rule, the FAA will allow powered-lift that are operating in the vertical-lift flight mode to use the VFR ceiling and visibility minimums prescribed for helicopters in § 135.613(a)(2)(i) and (ii). Therefore, the FAA adopts § 194.308(s) as revised and as § 194.306(sss), due to renumbering.

Section 135.613(b) provides two scenarios for transitions from VFR to IFR upon departure. The first scenario provided in § 135.613(b)(1) stipulates the VFR weather minimums providing the powered-lift follows an FAA-approved obstacle departure procedure, and an IFR clearance is obtained on or before reaching a predetermined location that is not more than 3 NM from the departure location. In these instances, the FAA proposed weather minimums for powered-lift of no less than 1000-foot ceiling with 2 statute miles visibility for day and no less than 1500-foot ceiling and 3 statute mile visibility for nighttime. The FAA will retain this requirement for those powered-lift operating in the wing-borne flight mode. When the powered-lift is operating in the vertical-lift flight mode during the transition from VFR to IFR and meets the above requirements regarding an obstacle departure procedure and the 3 nautical mile distance from the departure location, then the VFR weather minimums for day operations will be no less than a 600-foot ceiling and 2 statute miles flight visibility, and for night operations, no less than a 600-foot ceiling and 3 statute miles flight visibility.

In the second scenario for § 135.613(b)(2) if the departure does not meet the criteria relating to the obstacle departure procedure and is unable to obtain the IFR clearance within 3 NM from the departure location then the VFR weather minimums required for

powered-lift by the class of airspace apply.

Therefore, the FAA is adding § 194.306(ttt) to ensure the weather minimums stipulated in § 194.306(sss) are captured dependent on the mode of flight.

Section 135.615 requires helicopter air ambulance pilots to perform pre-flight planning to determine the minimum safe cruise altitude and to identify and document the highest obstacle along the planned en route phase of flight prior to conducting VFR operations. Section 135.615(b) requires the pilot in command, while conducting VFR operations, to ensure that all terrain and obstacles along the route of flight are cleared vertically by no less than those prescribed in § 135.615(b). In proposed § 194.308(t), the FAA proposed applying § 135.615 to powered-lift conducting operations in accordance with subpart L of part 135 using the VFR minimum altitudes specified for airplanes in § 135.203(a)(1) and (2).

The FAA received one comment on proposed § 194.308(t) from GAMA, who requested that the FAA allow powered-lift to use the helicopter minimums stipulated in § 135.615(b)(1) and (2). In the NPRM, the FAA noted that there are similarities between airplanes and powered-lift using wing-borne lift during the cruise portions of flight. In the proposed § 194.308(t), in order to comply with the en route altitude requirements of § 135.615(b)(1) and (2), a powered-lift conducting a VFR air ambulance operation must clear all terrain and obstacles along the route of flight vertically by the minimum altitudes and horizontal distances specified in § 135.203(a)(1) and (2). Similarly, the FAA proposed that the pilot in command of a powered-lift must use the minimum altitudes specified in § 135.203(a)(1) and (2) when making the determinations required by § 135.615(a)(3). In the final rule, the FAA will still require the pilot in command of a powered-lift to use the minimums specified in § 135.203(a)(1) and (2) for the VFR flight planning required by § 135.615(a) and for the enroute operations required by § 135.615(b) when the powered-lift will be operated enroute in the wing-borne flight mode.

In consideration of the comments received, the FAA will now allow a powered-lift operated in the vertical-lift flight mode during enroute operations to use the minimums described in § 135.615(b). Powered-lift that will be operated in the vertical-lift flight mode during the enroute phase of flight will use the altitudes specified in

§ 135.615(b) to determine the minimum required ceiling and visibility to conduct that planned flight as required by § 135.615(a). The FAA made this change because a powered-lift in the vertical-lift flight mode will be flying like a helicopter and operating at slower speeds thus enabling the powered-lift to maneuver more like a helicopter.

Section 135.615(c) addresses the rerouting of the planned flight path, change in destination, or other changes to the planned flight that occur while the helicopter is on the ground at an intermediate stop. This occurrence requires an evaluation of the new route in accordance with § 135.615(a). In the NPRM, the FAA proposed this provision apply to powered-lift and adopts it as final. When the powered-lift is operated in the vertical-lift flight mode during the enroute phase of flight, when conducting the evaluation of the new route, the altitudes specified in § 135.615(b) will apply. However, when the powered-lift is operated in the wing-borne flight mode during the enroute phase of flight, when conducting the evaluation of the new route, the altitudes specified in § 135.203(a)(1) and (2) will apply.

Therefore, the FAA adopts § 194.308(t) as revised, but as a result of renumbering, it is now § 194.306(uuu).

The FAA also proposed in § 194.308(u) that the pre-flight risk analysis requirements contained in § 135.617 apply to powered-lift. This section details several items that must be documented in the certificate holder's manual regarding pre-flight considerations, such as human factors, weathers, and other critical considerations.

The FAA received one comment on proposed § 194.308(u) from GAMA, which agreed with the FAA's proposal to apply the pre-flight risk analysis requirements of § 135.617 to powered-lift conducting air ambulance operations. Therefore, the FAA adopts § 194.308(u) as final, though due to renumbering, it is being adopted as § 194.306(vvv).

Section 135.619 requires a certificate holder who is authorized to conduct HAA operations with 10 or more helicopter air ambulances assigned to the certificate holder's operations specifications to have an operations control center. The FAA proposed in § 194.308(v) that any operator utilizing helicopters, powered-lift, or any combination thereof, that total 10 or more of these aircraft utilized in air ambulance operations would trigger the requirements to have an operations control center as detailed in § 135.619.

The FAA received one comment on proposed § 194.308(v) from GAMA, which agreed with the FAA's proposal to apply the Operations control center requirements of § 135.619 operators utilizing powered-lift to conduct air ambulance operations. Therefore, the FAA adopts § 194.308(v) as final, though due to renumbering, it is being adopted as § 194.306(www).

Section 135.621 stipulates the requirements for the briefing of medical personnel on HAA flights. The FAA proposed in § 194.308(w) to apply the briefing requirements contained in § 135.621 for medical personnel to air ambulance operations that occur in powered-lift.

The FAA received one comment on proposed § 194.308(w) from GAMA, which agreed with the FAA's proposal to apply the briefing of medical personnel requirements of § 135.621 to operators utilizing powered-lift to conduct air ambulance operations. Therefore, the FAA adopts § 194.308(w) as final, though due to renumbering, it is being adopted as § 194.306(xxx).

E. Part 136 Rules for Powered-Lift

In the Update to Air Carrier Definitions final rule, the FAA expanded the definitions and applicability of part 136 to accommodate powered-lift and to ensure that the stringent safety risk mitigations would apply to powered-lift that conduct commercial air tours.⁴²¹ In the NPRM, the FAA proposed to apply certain part 136 requirements that are specific to helicopters to powered-lift. The FAA also took into consideration powered-lift may conduct commercial air tours in the wing-borne flight mode to address the risks associated with enabling the operation of commercial air tours in powered-lift.

The FAA received six comments relating to part 136 with one commenter submitting two comments. Some comments were specific to the sections within part 136. Most comments broadly suggested the FAA follow ICAO Document 10103, Guidance on the Implementation of ICAO Standards and Recommended Practices for Tilt-rotors and apply the airplane rules. All commenters agreed the safety provisions of part 136 should also apply to powered-lift.

GAMA recommended the FAA follow ICAO guidance and to read "helicopter" or "rotorcraft" as "powered-lift" or read "airplane" as "powered-lift" depending on the regulation. GAMA suggested the FAA should apply the relevant airplane

⁴²¹ See Update to Air Carrier Definitions NPRM, 87 FR 75005 (Dec. 07, 2022).

version of the rule to §§ 136.9 and 136.11 and the relevant rotorcraft version of the rule to §§ 136.1 and 136.13. According to GAMA, certain powered-lift demonstrate the capability to glide in a manner similar to airplanes, therefore GAMA suggested the FAA take full advantage of the similarities to airplanes during overwater operations.

CAE and ADS (a UK trade association) both stated that using the ICAO Document 10103 as a basis for powered-lift should be considered. For part 136 this would translate to using the airplane rules for overwater operations. NBAA submitted a group comment for AOPA/GAMA/HAI/NATA/NBAA/VFS which also stated the FAA should consider using the ICAO Document 10103 as a basis for powered-lift rule development.

In response to these comments from GAMA, and CAE, ADS, and NBAA who also recommended the FAA follow the ICAO document 10103 in relation to part 136, the FAA notes that these recommendations did not provide any justification for following ICAO document 10103. This ICAO guidance acknowledges the operation of tilt-rotors closely aligns with that of helicopters and therefore states that ICAO Annex 6, Part III, Section 2, the helicopter provisions should apply most of the time. In some cases, the ICAO guidance recommends the use of Annex 6, Part I, which are provisions for airplanes. Flight over water is one example in which this guidance recommends airplane provisions. The FAA noted that no comments were provided relating to part 136 and features that may influence buoyancy or whether powered-lift will take on water or float for a longer period of time after ditching. The FAA does not have the historical data on these new aircraft designs to assert that the positive buoyancy characteristics and the potential to float for a longer period—characteristics of airplane designs—will exist in all powered-lift. Therefore, the FAA will not adopt the ICAO guidance across the board for powered-lift but will look at each regulation individually.

In finalizing this rule, the FAA determined that creating a table for part 136 would maintain consistency throughout the SFAR operating rules for parts 91, 135, and 136. In addition, as already explained in the introduction to the operational rules, the FAA combined the airplane and rotorcraft provisions in parts 91 and 135 so that each section now only has one table instead of two. Similarly, the FAA has created a table to § 194.308 outlining both the airplane and rotorcraft provisions applicable to powered-lift

under part 136. As part of this revision, the FAA added paragraph § 194.308(a) reiterating that powered-lift must continue to comply with rules applicable to all aircraft under part 136.

1. Suitable Landing Area for Rotorcraft (§ 136.1)

The term “suitable landing area for rotorcraft” is codified in § 136.1 as an area that provides the operator reasonable capability to land in an emergency without causing serious injury to persons. These suitable landing areas must be site-specific, designated by the operator, and accepted by the FAA.⁴²² In the NPRM, the FAA proposed to apply § 136.1 to powered-lift in § 194.310(b)(1). Applying the definition for suitable landing areas for rotorcraft to powered-lift ensures powered-lift operators designate potential landing areas in advance of an operation. Designating potential landing areas reduces the risk of an accident because the PIC is aware of potential sites for emergency landings. The FAA expects operators conducting commercial air tours in powered-lift to designate a site-specific landing area that, when used, would not cause serious injury to persons.

The FAA received one comment on proposed § 194.310(b)(1) from GAMA who agreed with FAA that powered-lift should be aligned with rotorcraft in § 136.1 and therefore adopts as proposed. As a result of renumbering, this is now codified under § 194.308(b).

2. Life Preservers for Over Water (§ 136.9)

Section 136.9(a), which applies to powered-lift as written, requires the operator and PIC of commercial air tours over water beyond the shoreline to ensure each occupant is wearing a life preserver from before takeoff until the flight is no longer over water.⁴²³ Section 136.9(b) provides exceptions to this requirement when a life preserver is readily available and easily accessible to each occupant. Section 136.9(c) states no life preserver is required if the overwater operation is necessary only for takeoff or landing. In the NPRM, the FAA stated the exceptions in § 136.9(b)(1), (b)(3), and (c) apply to powered-lift as written.

Section 136.9(b)(2) requires the operator and PIC of a commercial air tour over water beyond the shoreline to ensure that a life preserver for each occupant is readily available and easily accessible if the airplane is within power-off gliding distance to the

shoreline for the duration of the time that the flight is over water. In the NPRM, the FAA proposed in § 194.310(a)(1) to apply § 136.9(b)(2) to powered-lift when it is operating in the wing-borne flight mode within the power-off gliding distance to the shoreline. Therefore, when a powered-lift is operating in the wing-borne flight mode, life preservers only need to be readily available and easily accessible to each occupant. Conversely, when operating in vertical-lift mode, those life preservers must be worn by each occupant.

The FAA received one comment on proposed § 194.310(a)(1) from GAMA, who agreed with the FAA that powered-lift should be aligned with airplanes in § 136.9(b)(2). The FAA therefore adopts § 194.310(a)(1) as proposed but, as a result of renumbering, it is now § 194.308(d)(1)(i).

The FAA received a comment from Joby related to § 136.9(b)(3), which was not explicitly addressed in the NPRM because § 136.9(b)(3) already applies to aircraft in general, including powered-lift. Joby indicated the critical engine inoperative for multiengine aircraft does not apply to electric powered-lift. Joby also mentioned that electric powered-lift currently being developed may not have a single engine failure which would be critical for performance or handling qualities. Joby commented about the airworthiness criteria and design standards for electric powered-lift, mentioning they have adopted the concept of “critical loss of thrust,” which is specific to an aircraft and the electric propulsion system architecture being used. Therefore, Joby recommended adding “or critical loss of thrust for distributed electric propulsion systems” to § 136.9(b)(3) to better accommodate multi-engine aircraft with distributed electric propulsion systems.

The FAA agrees with Joby that another term to capture aircraft that does not have a “critical engine” but may have other powerplants that could experience a loss of thrust impacting the aircraft’s ability to stay aloft needs to be addressed. The FAA addresses Joby’s comment in section VI.D.3 of this preamble.⁴²⁴ For the reasons previously discussed, the FAA will add “or while experiencing a critical change of thrust” under § 194.308(d)(1)(ii) in the final rule which will read, “Section 136.9(b)(3) applies to multiengine powered-lift that can be operated with the critical engine inoperative or while experiencing a critical change of thrust, at a weight that

⁴²² § 136.1.

⁴²³ § 136.9.

⁴²⁴ For a more detailed discussion on “critical change of thrust” see Section V.C.3 regarding § 135.168.

will allow it to climb, at least 50 feet a minute, at an altitude of 1,000 feet above the surface, as provided in the approved Aircraft Flight Manual for that aircraft.” By adding this term to the SFAR, it will allow the exception for a life preserver to be readily available for its intended use and easily accessible to each occupant rather than requiring each occupant to wear a life preserver providing the powered-lift can meet the performance criteria discussed above. If a powered-lift cannot meet the performance criteria as discussed above or is not equipped with floats, then each occupant must wear a life preserver from before takeoff until the flight is no longer over water.

The FAA did not include the term “distributed electric propulsion” as recommended by Joby because the FAA wanted this change to apply to all future propulsion systems that could experience a critical change of thrust, and not just those that are electrically driven.

Joby also recommended, regarding § 136.9(b)(3), that the term aircraft be used in place of airplane and rotorcraft in reference to flight manual. That change was made in the Update to Air Carrier Definitions rule which was published July 26, 2023.

As a result of the foregoing, the FAA adopts § 194.308(a)(1) as proposed, but as a result of renumbering it is now § 194.308(d)(1)(i). The FAA also adds § 194.308(d)(1)(ii), which adds the term “critical change of thrust” to § 136.9(b)(3) in response to Joby’s comment.

3. Rotorcraft Floats Over Water (§ 136.11)

Section 136.11 permits single-engine rotorcraft in commercial air tours to operate over water beyond the shoreline only when they are equipped with fixed floats or an inflatable flotation system adequate to accomplish a safe emergency ditching. Similarly, multiengine rotorcraft that cannot be operated with the critical engine inoperative at a weight that will allow it to climb at least 50 feet a minute at an altitude of 1,000 feet above the surface as provided in the AFM also must be equipped with fixed floats or an inflatable flotation system.

Rotorcraft that are equipped with flotation systems must have an activation switch for that system on one of the primary flight controls, and the system must be armed when the rotorcraft is over water and flying at a speed that does not exceed the maximum speed prescribed in the AFM. These requirements, however, do not apply to operations over water during

the takeoff and landing portions of flight, or to operations within the power-off gliding distance to the shoreline for the duration of the flight provided each occupant is wearing a life preserver from before takeoff until the aircraft is no longer over water.⁴²⁵

In the NPRM, the FAA proposed to apply § 136.11(a)(2), (b), and (c) to powered-lift that are conducting air tour operations in the vertical-lift flight mode beyond the auto-rotational distance or gliding distance from the shoreline. Requiring flotation equipment is a necessary requirement for mitigating the serious risks posed by engine failures over water for these aircraft.

Joby commented on § 136.11 with a suggestion to add the term powered-lift alongside helicopter to the entire section except for § 136.11(a)(1), which is for single-engine rotorcraft. Joby also requested to add “critical loss of thrust for distributed electric propulsion systems” to § 136.11(a)(2) for the same reasons specified in their comment on § 136.9(b)(3).

GAMA suggested § 136.11 would not need to be changed because the overwater requirements for powered-lift are covered by § 136.9. The FAA disagrees with GAMA. These two overwater regulatory requirements are both necessary for powered-lift, as § 136.11 provides criteria for inflatable floats that is not found within § 136.9 (b)(1). Section 136.11 requires rotorcraft to install floats when used in commercial air tours over water beyond the shoreline unless it is a multi-engine aircraft that can meet the performance criteria to keep it out of the water. The same criteria are equally important for powered-lift. If the powered-lift is operating beyond the shoreline and cannot meet that performance criteria to keep it out of the water, then each occupant must wear a life preserver. Powered-lift, just like multiengine rotorcraft, that have the performance capability to keep the aircraft out of the water are not required to install floats. However, the operator or pilot in command of a commercial air tour over water beyond the shoreline must still ensure a life preserver is readily available and easily accessible to each occupant as required for all aircraft under § 136.9(b).

Based on the information the FAA received during the comment period, the FAA decided to remove the reference to “vertical-lift flight mode” in § 194.310(b)(2) because powered-lift designs are still in the development

phase and there is no operational data to support that most powered-lift designs will behave like an airplane in a ditching scenario regardless of the flight mode. One of the purposes of the SFAR is to gain knowledge such as this before a final rule is codified. The FAA also believes many of the powered-lift will have the performance capability to keep the aircraft out of the water and will therefore not be required to install floats. As a result, the FAA has removed reference to “vertical-lift flight mode” in § 194.308(d)(2).

As discussed above, in the NPRM, the FAA proposed to apply § 136.11(a)(2), (b), and (c) to powered-lift that are conducting air tour operations beyond the “auto-rotational distance or gliding distance from the shoreline.” The FAA is removing this reference for three reasons. First, due to the removal of the reference to vertical-lift flight mode, the FAA determined the term “auto-rotational” is no longer required for § 194.308(d)(1) and (2). Second, in review of the *National Air Tours Safety Standards* final rule published February 13, 2007, the FAA used the term “gliding distance” with respect to helicopters and implied that the use of the term gliding was inclusive of an autorotation.⁴²⁶ Third, removing the reference “auto-rotational” will maintain consistency and avoid any confusion with the term “gliding” contained in § 136.11. As a result, the FAA has used the verbiage from § 136.11 stating that § 136.11(a), (b), and (c) apply to powered-lift “used in commercial air tours over water beyond the shoreline.” In addition, the exceptions under § 136.11(c) still apply—the exception under § 136.11(c)(2) would apply to powered-lift that meet those criteria, which includes both autorotating and gliding distance to the shoreline.

In the NPRM, the FAA stated it would not apply the single-engine provision from § 136.11(a)(1) to powered-lift because all powered-lift coming to the market are currently multiengine, not single-engine. However, the FAA has reconsidered the decision to not apply § 136.11(a) to single-engine powered-lift because a single-engine powered-lift could be developed during the duration of the SFAR and should be equally covered by the safety provisions stipulated for rotorcraft in § 136.11(a). Without knowing whether a powered-lift will float for a longer period of time than a rotorcraft after ditching, the safety justifications to require floats be installed on single-engine powered-lift

⁴²⁵ See Update to Air Carrier Definitions NPRM, 87 FR 75004 (Dec. 07, 2022).

⁴²⁶ *National Air Tours Safety Standards*, final rule, 72 FR 6904 (Feb. 13, 2007).

are equal to those for single-engine rotorcraft used in commercial air tours over water beyond the shoreline. Therefore, the FAA will add powered-lift alongside rotorcraft in the SFAR and change § 194.310(b)(2) to meet the intent of § 136.11(a)(1). This new provision is codified at § 194.308(d)(2)(i).

The FAA is making a change to the final regulatory text pertaining to § 136.11(a)(2). Joby's comment on § 136.11(a)(2) is identical to their comment on § 136.9(b)(3), and therefore the FAA will incorporate the verbiage into SFAR § 194.308(d)(2)(ii) with minor revision to Joby's proposal for § 136.11(a)(2) as discussed in the section regarding § 136.9(b)(3). As discussed in § 136.9(b)(3), the FAA will add the term "critical change of thrust" to § 194.308(d)(2)(ii). Adding this paragraph will ensure a powered-lift operating in commercial air tours over water beyond the shoreline must meet the performance requirements of § 136.11(a)(2) or be equipped with fixed floats or an inflatable flotation system adequate to accomplish a safe emergency ditching.

In their comment relating to § 136.11(b)(2), Joby also recommended that the term aircraft be used in place of airplane and rotorcraft in reference to flight manual. That change was made in the Update to Air Carrier Definitions rule which was published July 26, 2023.

Therefore, the FAA adopts § 194.310(b)(2) with the changes referenced above; however, due to renumbering this provision is now § 194.308(d)(2). The FAA will add the provisions of § 136.11(a) to single-engine powered-lift under § 194.308(d)(2)(i), add the term "critical change of thrust" to § 194.308(d)(2)(ii), remove the provision that § 194.308(d)(2) is only applicable to powered-lift operating in the vertical-lift flight mode, and remove references to "auto-rotational or gliding distance" in § 194.308(d)(2).

4. Rotorcraft Performance Plans and Operations (§ 136.13)

Section 136.13 requires operators using rotorcraft to develop a performance plan before each commercial air tour operation. These plans must be reviewed by the Pilot in Command (PIC) for accuracy and adhered to during flights. Such plans play a crucial role in mitigating risks by requiring the PIC to be prepared to respond to unexpected situations.

Similar to rotorcraft, commercial air tour operators of powered-lift will likely take advantage of the vertical takeoff, out of ground effect hovering capabilities, and out of ground effect

slow flight capabilities of these aircraft while operating at speeds that may not exceed effective translational lift airspeed. Operating in this condition increases the exposure to the risk of not being able to perform a successful autorotation landing in the event of an engine failure. The FAA acknowledged that operating within the "avoid" zone of the height/velocity (H/V) diagram or the "avoidance area related to the transitions that may occur between the vertical-lift and wing-borne mode" decreases the ability to successfully perform an autorotation, or a safe landing following a critical change of thrust. Hence, operators must not just plan, but operate in alignment with the performance plan to ensure aviation safety. As a result, operators should be aware of H/V diagrams or the performance capability of their aircraft following a critical change of thrust. This will require a performance plan for commercial air tours that are conducted in powered-lift which have height velocity information or performance criteria with avoidance area information contained in the AFM related to the transitions that occur between the vertical-lift and wing-borne mode.

The FAA received one comment from GAMA who agreed the provision of § 136.13 should apply to powered-lift. The FAA did not make any substantive changes to the proposed regulatory text. As a result, the FAA adopts § 194.310(b)(3), which requires a person to comply with the requirements specified for rotorcraft contained § 136.13, as final. As a result of renumbering, it is now § 194.308(d)(3).

5. Commercial Air Tours in Hawaii

In the Update to Air Carrier Definitions final rule, the FAA amended the applicability and definitions that were contained in subpart A of part 136 and appendix A to include powered-lift.⁴²⁷ Additionally, the information contained in appendix A to part 136 was moved to subpart D of part 136. Subpart D of part 136 now contains the special operating rules for air tour operators in Hawaii.⁴²⁸ This subpart prescribes operating rules for air tour flights conducted in airplanes, powered-lift, or rotorcraft under VFR in the State of Hawaii pursuant to parts 91, 121, and 135.⁴²⁹

⁴²⁷ Update to Air Carrier Definitions final rule, 88 FR 48077 (July 26, 2023).

⁴²⁸ In the Update to Air Carrier Definitions final rule, the FAA recodified appendix A, which was previously SFAR No. 71, as subpart D of part 136. Update to Air Carrier Definitions, final rule, 88 FR 48078 (July 26, 2023).

⁴²⁹ *Id.*

The FAA received one comment from GAMA relating to appendix A Special Operating Rules for State of Hawaii. They made a broad statement to apply either airplane or helicopter rules for powered-lift, including for appendix A, without any specifics. The FAA agrees with GAMA, as their broad statement is in line with the FAA's general approach to integrating powered-lift into the regulations. As stated in the NPRM, for rules that are not generally applicable to aircraft, the FAA will apply the rotorcraft rules to powered-lift as contained in subpart D of part 136—Special Operating Rules for Air Tour Operators in the State of Hawaii.

Flotation Equipment: Section 136.75(a) replaced section 3 of appendix A, as identified in the NPRM, and does not permit an air tour in Hawaii in a single-engine⁴³⁰ rotorcraft beyond the shore of any island unless the rotorcraft is amphibious, equipped with floats adequate to accomplish a safe emergency ditching, and approved flotation gear is easily accessible for each occupant or each person on board the rotorcraft is wearing approved flotation gear. The FAA proposed to apply section 3 of appendix A (now § 136.75(a)) to powered-lift in § 194.310(b)(4)(i). Applying the requirement for flotation equipment would increase the likelihood of surviving in the event of a water landing. These requirements were created specifically for Hawaii due to the rugged terrain. The FAA determined that extending this requirement to all powered-lift operators conducting air tours in Hawaii beyond the shore of any island was appropriate because powered-lift will likely operate in a manner that is similar to rotorcraft when conducting air tour operations in Hawaii.

The FAA did not receive any comments on SFAR 194.310(b)(4)(i). The only change the FAA is making to the proposed § 194.310(b)(4)(i) is that it now references § 136.75(a), rather than section 3 of Appendix A. The FAA adopts § 194.310(b)(4)(i) as amended, but as a result of renumbering, it is now § 194.308(d)(4).

i. Performance Plan (§ 136.75(b))

Section 136.75(b) replaced section 4 of appendix A as identified in the NPRM and requires each rotorcraft operator to complete a performance plan that is based on the current approved AFM for that aircraft and the PIC must

⁴³⁰ See below for further discussion on the FAA permanently amending § 136.75(a) to refer to "single-engine" rotorcraft.

comply with that plan.⁴³¹ The performance plan must be based upon information contained in the AFM and must consider the maximum density altitude for the flight; maximum gross weight and center of gravity for hovering while in and out of ground effect; and the highest combination of weight, altitude, and temperature. Environmental conditions relevant to the altitude and temperature of the operation are critical considerations in ensuring safety of flight because both affect the performance of the aircraft. Operators' performance plans would ensure operators' awareness of how conditions could affect the flight; as a result, operators will be in a position to make appropriate contingency plans and make suitable decisions should they encounter hazards during an air tour operation.

In the NPRM, the FAA proposed to apply section 4 of appendix A (now § 136.75(b)) to powered-lift in § 194.310(b)(4)(ii). Applying this performance plan requirement to operators of powered-lift conducting air tours in Hawaii would ensure the operator conducting the operation is aware of the necessary information concerning the aircraft and operation.

In response to the one comment received from GAMA, noted above, the FAA did not make any changes to the proposed regulatory text. The only change the FAA is making to § 194.310(b)(4)(ii) is that it now references § 136.75(b), rather than section 4 of appendix A. The FAA adopts § 194.310(b)(4)(ii) as revised, but as a result of renumbering, it is now § 194.108(d)(5).

Section 136.75(c) replaced section 5 of appendix A as identified in the NPRM and requires the PIC to operate at a combination of height and forward speed that would permit a safe landing in the event of engine power loss or a critical change of thrust in accordance with the height-speed envelope under current weight and aircraft altitude.

In the NPRM, the FAA proposed to apply section 5 of appendix A (now § 136.75(c)) to powered-lift in § 194.310(b)(4)(iii). Applying the operational limitations for rotorcraft to powered-lift was determined to be appropriate because the FAA expects powered-lift will hover and have other operating characteristics like rotorcraft when conducting air tours. Because engine power loss or a critical change of thrust could have detrimental consequences, powered-lift may require quick landings in response to engine failures or critical changes of thrust. The

FAA determined that requiring the PIC to operate the aircraft in a manner that permits the PIC to land safely was an appropriate means of mitigating the risk associated with engine power loss or critical changes of thrust. Overall, the proposal aims to ensure that powered-lift operations in commercial air tours adhere to safety standards equivalent to those established for rotorcraft in Hawaii. This extension was deemed appropriate given the similarities in operating profiles between powered-lift and rotorcraft during air tour operations in Hawaii.

In response to the one comment received from GAMA as mentioned above, the FAA did not make any changes to the proposed regulatory text. However, to align with the new verbiage, critical change of thrust, associated with powered-lift and previously discussed in section VI.D.3. of this final rule, the FAA will add language to clarify that the term "critical change of thrust" is included after "in event of engine power loss" in § 136.75(c). The FAA is further amending § 194.310(b)(4)(iii) to refer to § 136.75(c), rather than section 5 of appendix A. As a result, the FAA adopts § 194.310(b)(4)(iii) as amended, but as a result of renumbering, these amendments are reflected in § 194.308(d)(6).

ii. Permanent Rule Change for § 136.75(a)

In the *Update to Air Carrier Definitions* rule, when appendix A was moved to subpart D and the term helicopter was changed to rotorcraft, a word was inadvertently omitted. As a result, the applicability of required flotation equipment was mistakenly expanded to all rotorcraft, instead of only single-engine rotorcraft. Therefore, the FAA will add the term "single-engine" ahead of "rotorcraft" as a permanent change in § 136.75(a) because the FAA never intended for this requirement to apply to all rotorcraft, but instead to only apply to single-engine rotorcraft.

F. Part 43 Applicability to Powered-Lift

Part 43 outlines maintenance, preventive maintenance, rebuilding, and alteration rules for any aircraft with U.S. airworthiness certificates; foreign-registered civil aircraft used in common carriage or carriage of mail under the provisions of part 121 or 135; and airframe, aircraft engines, propellers, appliances, and component parts of such aircraft.⁴³² Aircraft operating under parts 91 or 135 must be

maintained and inspected in accordance with part 43.

Section 43.3(h) states that the Administrator may approve a certificate holder, operating rotorcraft in a remote area under part 135, to allow a pilot to perform specific preventive maintenance items, under certain limitations, when no certificated mechanic is available and an unscheduled malfunction occurs. The FAA proposed in § 194.402(a) that the preventive maintenance protocols outlined in § 43.3(h) also apply to certificate holders under part 135 operating powered-lift in remote areas. A pilot who is trained under the requirements of § 43.3(h) would provide the same level of competency as a certificated mechanic when performing the authorized preventive maintenance function.⁴³³ The pilot is required to complete an FAA-approved training program and perform the specific preventive maintenance items under the direct control of the certificate holder's preventive maintenance program. Some powered-lift pilots may operate in remote areas and would consequently experience the same challenges that exist for rotorcraft when an unscheduled malfunction occurs.

The FAA did not receive any comments on § 43.3(h). Therefore, the FAA adopts § 194.402 as final and applies § 43.3(h) to powered-lift.⁴³⁴

The FAA also proposed to apply § 43.15(b) to powered-lift in § 194.402(b). Section 43.15(b) requires persons performing an inspection on a rotorcraft, as required by part 91, to inspect certain rotorcraft systems in accordance with the maintenance manual or Instructions for Continued Airworthiness.⁴³⁵

The systems listed under § 43.15(b) are generally considered systems comprised of "critical parts" as defined in §§ 27.602 and 29.602.⁴³⁶ However, these systems are specific to rotorcraft and may or may not apply to powered-lift. Powered-lift are new entrant aircraft, and as a result, the FAA did not

⁴³³ See Rotorcraft Regulatory Review Program Amendment No. 5; Operations and Maintenance, 51 FR 40692 at 40702 (Nov. 7, 1986).

⁴³⁴ The regulations under Title 14 of the Code of Federal Regulations that reference "aircraft" currently apply to powered-lift. Sections 43.2, 43.5, 43.10, 43.11, 43.12, 43.13, 43.17, and Appendix F to part 43 all apply to "aircraft," and, accordingly, to powered-lift. See 14 CFR part 43.

⁴³⁵ § 43.15(b).

⁴³⁶ Sections 27.602 and 29.602 define a "critical part" as "a part, the failure of which could have a catastrophic effect upon the rotorcraft, and for which critical characteristics have been identified which must be controlled to ensure the required level of integrity." The procedures referenced in §§ 27.602(b) and 29.602(b) will be addressed during the § 21.17(b) certification process.

⁴³¹ § 136.75(b).

⁴³² § 43.1.

have the information to know all the systems on any given powered-lift that may be considered a critical part. The parts the powered-lift manufacturer identifies as “critical parts” for flight are required inspection items and must be listed in the aircraft manufacturer’s maintenance manual. In determining critical parts, the manufacturer must consider a flight safety-critical aircraft part list which, if nonconforming, missing, or degraded, could cause a catastrophic failure resulting in loss of, or serious damage to, the aircraft or an uncommanded engine shutdown resulting in an unsafe condition. The characteristic can be critical in terms of dimension, tolerance, finish, or material; an assembly, manufacturing, or inspection process; or an operation, maintenance, or overhaul requirement.

For powered-lift with critical parts, a type design must include a critical parts list and define the critical design characteristics, identify processes that affect those characteristics, and identify the design change and process change controls necessary for showing compliance with the quality assurance requirements of part 21. Requiring a powered-lift critical parts inspection under § 194.402(b) will ensure that the owner or operator’s inspections comply with both § 43.15(b) as well as § 91.409, which requires aircraft inspections conducted in accordance with part 43 to obtain or keep an airworthiness certificate. The FAA did not receive any comments on the proposed § 194.402.

Therefore, the FAA adopts § 194.402 as final and applies §§ 43.3(h) and 43.15(b) to powered-lift.

G. Pilot Records Database

Part 111 prescribes rules governing the use of the Pilot Records Database (PRD). The PRD facilitates the sharing of pilot records among air carriers and other operators in an electronic data system managed by the FAA. Part 111 requires air carriers, specific operators holding out to the public, entities conducting public aircraft operations, air tour operators, fractional ownerships, and corporate flight departments to enter relevant data on individuals employed as pilots into the PRD. The PRD is intended to help maintain records about a pilot’s performance with previous employers that could influence a future employer’s hiring decision.

Section 111.1(b)(4) states that part 111 applies to an operator who operates two or more aircraft described in paragraphs (i) and (ii), solely pursuant to the general operating rules in part 91, or that operates aircraft pursuant to a Letter of Deviation Authority issued

under § 125.3. Paragraphs (i) and (ii) apply to standard airworthiness airplanes that require a type rating under § 61.31(a) and turbine-powered rotorcraft, respectively.

In the NPRM, the FAA proposed permanently amending § 111.1(b)(4) to include a new paragraph (iii) that applies to large powered-lift. The FAA did not propose amending other paragraphs within § 111.1 because, as currently written, they already apply to operators of powered-lift. Pilots of large powered-lift may go on to work for an air carrier in the future, and reporting these pilot records would be relevant to a future hiring air carrier. This proposal aligns with the current requirements and intent of § 111.1(b)(4) and the type rating requirements in § 61.31(a).

The FAA received one comment related to § 111.1(b)(4). A4A agreed with the FAA’s proposed amendment to § 111.1(b)(4), stating that obtaining information before a pilot is hired via the FAA’s PRD is necessary for safety.

The FAA agrees with A4A that the PRD provides a crucial level of detailed information on pilots operating in the NAS. The PRD provides air carriers with pilot certificates, ratings and limitations, medical certificate information, failed attempts to pass a practical test, and accidents and incidents from the FAA, employment history from air carriers, and the date of request for motor vehicle driving records from the National Driver Register.

In response to the comment received, the FAA did not make any changes to the proposed regulatory text. Therefore, the FAA adopts § 111.1(b)(4)(iii) as final.

VII. Air Traffic Operations

In the NPRM, the FAA proposed to leverage its existing standards and procedures for powered-lift air traffic operations. These standards and procedures encompass separation protocols managed by Air Traffic Control (ATC) to ensure safe and orderly air traffic flow. These standards vary based on factors like airspace classification and aircraft type.

FAA Order JO 7110.65 details the air traffic separation standards and addresses separation standards and procedures for aircraft and helicopters differently. Factors like aircraft weight, wake turbulence, and radar distance influence separation standards, with ongoing monitoring to maintain safety. Currently, the FAA’s Air Traffic Organization is working to modify JO 7110.65, ensuring safe and efficient powered-lift operations in the National Airspace System (NAS). While updates to accommodate powered-lift are

underway, ATC will leverage its existing standards for aircraft.

Eve suggested the SFAR did not consider emerging technology and benefits of advanced traffic management services that will support operations coordination at scale. The FAA will not make any changes at this time. The FAA will use existing traffic management systems to support and manage powered-lift operations as necessary. However, the FAA may consider whether changes are appropriate as demand for powered-lift operations grows.

One commenter asserted people on the ground should be protected from the unique risks posed by eVTOLs’ battery systems, which the commenter said are highly flammable. The commenter recommended considering flight routes for battery powered eVTOLs and said, if these aircraft operate over densely populated areas, they should follow railroads, highways, and street paths, rather than cutting across neighborhoods. Additionally, the commenter argued the flying public should be made aware ahead of time whether an eVTOL they intend to fly on as a passenger has a pilot on-board.

The FAA did not make any changes to the proposed regulatory text and determined no additional rulemaking is necessary at this time to address air traffic procedures. As mentioned above, the FAA will use existing traffic management systems to support and manage powered-lift operations as necessary. In addition, these aircraft are required to be type certificated, including those used for carrying passengers, and thus required to meet the FAA’s expectations for safety and reliability. Today, one way the FAA helps protect persons and property on the ground with manned aviation is by using minimum safe altitudes which pilots must follow to help ensure the pilot has enough time to respond to an emergency. As discussed in section VI. of this preamble (“Operational Rules for Powered-Lift”), during this rulemaking, the FAA evaluated the current minimum safe altitudes to determine how they should apply to powered-lift. The FAA determined that some powered-lift have operating characteristics similar to helicopters in that they can land in a relatively small space and have the ability to autorotate (or perform an equivalent maneuver) with precision during power-out emergencies. If a powered-lift can meet the performance-based requirements outlined in the SFAR, it can use the minimum safe altitudes for helicopters with no adverse effect on safety. Powered-lift that cannot meet the

performance-based requirements will use the minimum safe altitudes outlined for aircraft other than helicopters. In regard to the suggestion that powered-lift operations alert passengers on whether a pilot is operating the aircraft, the powered-lift rule does not contemplate powered-lift operating without a pilot, and therefore does not address passenger-carrying operations without a pilot on board.

VIII. International Operations for Powered-Lift

The FAA's policy is to meet the U.S. obligations under the Convention on International Civil Aviation ("Chicago Convention") by conforming to the International Civil Aviation Organization (ICAO) Standards and Recommended Practices (SARPs) to the maximum extent practicable. ICAO annexes contain the international SARPs for safety, regulation, and efficiency of air navigation. The Chicago Convention ensures that certificates of airworthiness, certificates of competency, and licenses are recognized by other Member States as long as the issuing States meet the minimum ICAO standards. The Member States' Civil Aviation Authorities (CAAs) each integrate the ICAO SARPs into their national legal frameworks and practices and are responsible for regulatory oversight. When unable to integrate the ICAO SARP into their national legal framework, each ICAO Member State CAA is obligated to file a difference to that ICAO SARP and update their CAA's Aeronautical Information Publication (AIP). When the FAA is notified that ICAO adopted a new standard which is impracticable to comply with in all respects of the standard or procedure, or to bring its own regulations or practices into full accord with any international standard, the FAA will notify ICAO of the differences between its own practice and that established by the international standard.

As these aircraft obtain type certification, the FAA will amend, as appropriate, operational rules and pilot training requirements to support the varied designs being proposed by the manufacturers. Longer term, the agency will continue to develop permanent powered-lift regulations to safely enable powered-lift operations by working with industry and international partners. This process is performed in parallel to the FAA's international partners' efforts and in alignment with international safety requirements. This is an ongoing project and relies on data-gathering processes to develop more permanent regulations.

A. Personnel Licensing

Part 61 prescribes the requirements for the issuance of pilot, flight instructor, and ground instructor certificates, as well as the privileges and limitations of such. Similarly, ICAO Annex 1 provides SARPs for personnel licensing, including those for powered-lift ratings. Specifically, ICAO included a permissive transitional measure in ICAO Annex 1, providing ICAO member States a temporary recommendation for the issuance of a powered-lift type rating. In the transitional measures, section 2.1.1.4 states that a licensing authority may endorse a type rating for a powered-lift category on an existing airplane or helicopter pilot license (*i.e.*, certificate). Should a licensing authority implement this endorsement, the endorsement must indicate the aircraft is part of the powered-lift category and must result from training during a course of approved training. Additionally, the training must consider previous experience in an airplane or helicopter, as appropriate, and incorporate all relevant operational aspects of a powered-lift.

The FAA has chosen not to implement this permissive transitional measure as written, but rather require a powered-lift category rating in addition to a type rating for each make/model of aircraft. This is due to the wide range of powered-lift being developed that have complex and varied design, flight, and handling characteristics, making the establishment of classes within powered-lift not practicable at this time. Therefore, pilots with an airplane category or rotorcraft category helicopter class rating may transition and/or add a powered-lift category rating, hence providing a substantial pool of qualified candidates to staff the initial cadre of powered-lift pilots and instructors. This meets the standards in ICAO Annex 1 and establishes a path toward pilot certification with an equivalent level of safety by providing pilots training on the unique designs of powered-lift while leveraging those pilots' prior experience and advanced training devices to create the first group of powered-lift pilots. These pilots will then go on to form the first instructors for subsequent applicants. Should the ICAO transitional measure become a standard in the future, the FAA will undertake measures to align with ICAO standards to the greatest extent practicable, which may include filing a difference.

EASA stated that the FAA's definition of "powered-lift" will not fit all innovative VTOL aircraft because they do not all have non-rotating airfoils to create lift during horizontal flight and

expressed concern regarding international harmonization efforts. The agency described its approach to certify innovative VTOL aircraft as a separate "VTOL-capable aircraft" category with a new, flexible regulatory framework for pilot licensing and operations of such aircraft. EASA invited the FAA to reconsider its own approach in the proposed SFAR, stating that European VTOL aircraft manufacturers view the powered-lift category rating requirement as an obstacle to achieving innovative VTOL aircraft operations. While EASA acknowledged that the FAA's approach to powered-lift pilot licensing is comparable to the agency's own approach in many respects, the principal difference is the powered-lift category rating requirement where, instead, EASA proposed alignment with § 2.1.1.4.⁴³⁷

The FAA received many comments on the decision to decline to implement ICAO's transitional measure. These comments are summarized and addressed in section V.A. of this preamble, Establish a Type Rating Requirement for Persons Seeking to Act as PIC of Powered-Lift, of this preamble. The FAA is actively engaged with international certification authorities to define and align the certification requirements for Advanced Air Mobility. In addition to alignment with the ICAO Annexes, the FAA also maintains bilateral agreements, which cover innovative projects such as eVTOL aircraft. The FAA will continue to work with other foreign regulators to validate their eVTOL aircraft under development and to develop a path for U.S. eVTOL aircraft to be validated by them, especially with EASA, where aircraft certification and airman certification pathways may diverge. The level of new and innovative technology in an eVTOL aircraft is of course very high, so early partnerships and cross-authority communication to harmonize our approach for these technology areas are critical to our success. International engagement, collaboration, and harmonization are integral parts of our mission given the global nature of this industry when it comes to aviation

⁴³⁷ Additionally, EASA described that in CM-FCD-001, EASA proposed requiring each applicant for a Type Certificate (TC) of VTOL-capable aircraft carry out a gap analysis, or Training Needs Analysis (TNA), to develop a customized syllabus to be approved as part of the Operational Suitability Data: Flight Crew (OSD FC). EASA described that the TNA, conducted in coordination with the agency, would identify the elements of pilot type rating training and checking based on the specific characteristics of the aircraft and will be the foundation of the training syllabi. NBAA also emphasized the proposal in CM-FCD-001 as a means to qualify FAA airmen.

safety. The FAA remains committed to improving the sharing of knowledge and information to advance global aviation safety—in other words, transparency.

B. Operations of Aircraft

Under parts 91 and 135, while operating outside the United States,⁴³⁸ the FAA requires U.S. operators to comply with ICAO Annex 2, Rules of the Air. As a result, powered-lift operators that are type-certificated with a standard airworthiness certificate and conduct their operations in accordance with the standards outlined in Annex 2 would be eligible to operate over the high seas. The FAA's approach to powered-lift operational requirements centered on determining which airplane-, helicopter-, or rotorcraft-specific rules apply to powered-lift and takes into account which flight mode, either vertical-lift or wing-borne flight mode, the aircraft will operate in during those operations. The FAA has determined this approach meets an equivalent level of safety with the current rules in parts 91 and 135 while allowing operational flexibility commensurate with the variable nature of powered-lift flight modes.

Several commenters contended that the proposed SFAR does not fully align with ICAO SARPs.

Commenters recommended the FAA revise the NPRM to apply helicopter altitude and weather minima for approach, departure, and landing; and revise the existing fuel reserve requirement to a performance-based standard for powered-lift to maintain an equivalent level of safety.

Archer recommended clarifying the framework via ICAO Document 10103 "Guidance on the Implementation of ICAO Standards and Recommended Practices for Tilt-rotors."

A joint association letter from AIA, AUVSI, HAL, NATA, NBAA, and VFS encouraged the FAA to consider language in the Advanced Aviation Act⁴³⁹ when adjudicating comments as well as considering the guidance found in ICAO Document 10103.

⁴³⁸ See § 91.703 for additional requirements for operations of civil aircraft of U.S. registry while conducting operations outside of the United States.

⁴³⁹ The Advanced Aviation Act "directs the DOT to redesignate the Office of NextGen as the Office of Advanced Aviation whose duties include the coordination of rulemaking and approval processes on manners relating to advanced aviation systems." The bill also seeks to promote a practical pathway for pilot qualifications and operations, aligning those pathways with section 2.1.1.4 of ICAO Annex 1, adoption of recommendations in Document 10103, applying performance-based requirements for energy reserves, and consulting with the U.S. Air Force Agility Prime Program. *Advanced Aviation Act*, H.R. 220, 118th Congress.

To achieve better alignment with ICAO standards, Joby suggested the FAA reverse proposed §§ 194.302 and 194.303, add "unless otherwise specified" to those proposed sections to allow flexibility, or regulate all powered-lift operations according to helicopter rules.⁴⁴⁰ AWPC, ADS, and GAMA suggested conforming with ICAO SARPs by including performance-based operational rules that account for the diverse operational capabilities of powered-lift.

Commenters identified ICAO Document 10103⁴⁴¹ as providing a framework for harmonizing powered-lift standards. Joby, Supernal, AWPC, the NBAA, and L3Harris contended that the ICAO SARPs and ICAO Document 10103 were dismissed, misrepresented, or ignored by the FAA in the proposed SFAR. With regard to ICAO Document 10103, the NPRM acknowledged this document as providing "basic guidance relative to large turbine-powered tilt-rotors (a kind of powered-lift),"⁴⁴² but determined that it does not address electric-powered tilt-rotors or other types of powered-lift. Joby disagreed with this assessment and asserted that the document does not solely apply to large turbine-powered tilt-rotors as the NPRM stated. Supernal and the NBAA argued that the document's standards do not explicitly exclude electric propulsion and that there is no safety case made for the FAA's conclusion confirming ICAO intended to exclude electric propulsion. The NBAA stated that other National Aviation Authorities (NAAs) seem prepared to follow the concepts of ICAO Document 10103. EASA, for example, utilized ICAO Document 10103 in consideration of rulemaking efforts related to air mobility. The commenters believe the rationale in the preamble is insufficient to support dismissal of Document 10103.

AWPC argued that the FAA did not consider ICAO Standards and Recommended Practices in the proposed SFAR and its applicability to the AW609 Tiltrotor. AWPC noted throughout the SFAR that the FAA states it lacks sufficient operational data regarding powered-lift operations. The commenter disagreed because, with over

⁴⁴⁰ If applying helicopter rules to all powered-lift operations, Joby recommended addressing other relevant regulations with limitations in the Airplane Flight Manual (AFM).

⁴⁴¹ Guidance on the Implementation of ICAO Standards and Recommended Practices for Tilt-rotors (10103), International Civil Aviation Organization (2019).

⁴⁴² Integration of Powered-Lift: Pilot Certification and Operations; Miscellaneous Amendments Related to Rotorcraft and Airplanes NPRM, 88 FR 39068 (June 14, 2023).

700,000 large turbine powered tiltrotor flight hours, AWPC believed sufficient operational data exists for the FAA to review when evaluating the rules and regulations that should apply to the AW609 tiltrotor operations.

CAE and NBAA stated that the NPRM's proposal to adopt airplane rules for powered-lift (except where helicopter rules are more conservative) endangers harmonization efforts with ICAO member states, and that manufacturers and operators in states closely aligned with ICAO have less costly regulatory burdens while achieving the same safety goals. As mentioned above, CAE and the NBAA believed the FAA should consider ICAO Document 10103. CAE and the NBAA further stated that powered-lift aircraft should utilize helicopter fuel reserves, weather minimums and most other helicopter operational rules in parts 91, 135, and 136; however, because the aircraft can glide farther than rotorcraft and some are capable of high altitudes, airplane rules should apply for overwater operations and high-altitude oxygen requirements.

Supernal recommended revision to the SFAR purporting that ICAO has adopted a helicopter-based requirement for vertical flight and aircraft for on-wing flight. The commenter believes this approach aligns powered-lift with helicopter requirements in FAA operational rules in parts 91, 135, and 136. The commenter stated that the FAA's proposal to align powered-lift more closely with airplane regulations creates unreasonable mandates for energy reserves, minimum safe altitudes, and weather minima. Supernal also stated that powered-lift perform with the same low speed and maneuverability as a helicopter and that the requirements should reflect these characteristics for takeoff and landing. Finally, Supernal commented that ICAO Guidance Document 10103 provides operational rule standards for powered-lift and that this guidance is the basis for the ICAO approach.

ADS placed heavy emphasis on the harmonization of regulations in aligning with international standards, including the United Kingdom. ADS is the trade association for the United Kingdom's aerospace, defense, security, and space industries. ADS asserted stakeholders will seek to export products to U.S. customers and therefore have a vested interest in the regulatory framework currently under review. ADS encourages the FAA to align with current guidance published in ICAO Doc 10103 because this would allow rules to be aligned with the aircraft type's capabilities, whether airplane or helicopter. Finally,

ADS stated that the ICAO Guidance Document 10103 also supports the development of performance-based operational rules based on the specific performance characteristics of an aircraft.

Ferrovial Vertiports stated the FAA approach deviates from the international standards for powered-lift pilot qualification and operations. According to the commenter, to remain globally competitive, the United States should align with the standards developed by ICAO regarding powered-lift and tilt-rotor aircraft and seek harmonization with trusted allies such as the EASA. In addition, HAI maintained the SFAR does not address the requirements of our bilateral safety agreements, particularly with the European Union. That agreement requires discussions between the FAA and EASA when each is contemplating regulations affecting design, production, or maintenance.

L3Harris supported the FAA's intention to use the SFAR as a bridge to permanent rulemaking and gathering data for future adjustments. However, this commenter stated that the proposed SFAR does not provide the necessary conditions to enable initial operations and the collection and sharing of performance data. L3Harris believes that alignment with the ICAO Document 10103 framework in the final rule would enable operators to collect and share data about the suitability of rotorcraft operational rules for powered-lift, adjust current standards, and accommodate the diverse range of vehicle types and performance within the powered-lift category effectively. L3Harris further proposed the SFAR should be reexamined by a permanent rulemaking effort as soon as practicable.

The NBAA stated that using ICAO Document 10103 as a basis, powered-lift aircraft would utilize helicopter fuel reserves, weather minimums and most other helicopter operational rules in parts 91, 135, and 136; however, because the aircraft can glide farther than rotorcraft and some are capable of high altitudes, airplane rules would apply to overwater operations and high-altitude oxygen requirements. Supernal suggested revising existing fuel reserve requirements to a performance-based standard for powered-lift. In doing so, Supernal believes an equivalent level of safety can be maintained. Further, Supernal also requested the SFAR to apply helicopter altitude and weather minima for approach, departure, and landing.

In the past, when the FAA has found that it lacks sufficient experience regarding new operations, the use of an

SFAR has been an effective way to gain such experience while enabling some degree of limited operations. Such SFARs have typically temporarily enacted conservative safety approaches to enable operations, allowing both the FAA and industry to observe those operations and then incorporate additional efficiencies while maintaining safety in a later permanent change to the regulations.

The FAA acknowledges that AWPC has accomplished many flight hours while working toward the type certification of the AW609. However, there are many other powered-lift entering the market and the FAA notes that these rules are applicable to all powered-lift. Further, the FAA notes that ICAO Document 10103 sets forth basic guidance relative only to large turbine-powered tilt-rotors; however, this guidance does not address electric-powered tilt-rotors or other types of powered-lift. Additionally, the FAA reviews and evaluates training and operational suitability during an FSB in which AWPC will deliver its proposed type rating course to FAA FSB members for approval.

ICAO Document 10103 addresses the fact that tilt-rotor aircraft are a class of powered-lift. This document also makes a note that the manual does not address other aircraft within the powered-lift category such as vectored-thrust or ducted fan. The FAA is aware and fully understands the nature of this document in that the recommendation is to replace the terminology in regard to other regulations specific to helicopters with that of tilt-rotor. Although ICAO at the time anticipated the document would be used as a basis for other civil-powered aircraft as they approach design maturity, the FAA's position is that the tilt-rotor is a class of powered-lift, and a one-for-one swap of this terminology would not align in general terms with the intent in issuing a powered-lift category rating.

Notwithstanding, the FAA has evaluated each specific operating rule and the safety intent provided. Specifically, in response to comments received, the FAA determined that an equivalent level of safety may be maintained in some instances by applying performance-based criteria with certain parameters under parts 91 and 135. These new requirements allow the use of some helicopter rules as long as the operator complies with the appropriate risk mitigations that are detailed in the final rule. Therefore, there is no longer a distinct dividing line between airplane or helicopter rules being applicable to powered-lift. This approach more fully aligns with the

ICAO Document 10103. While the FAA notes that the Document 10103 is guidance material—rather than international standards—the FAA believes the final rule addresses these comments and may consider these comments again in the future as empirical evidence and data are obtained through initial operations. Specific performance-based operating rules are outlined in the SFAR tables to §§ 194.302 and 194.306.

C. Airworthiness of Aircraft

ICAO Annex 8 does not address powered-lift airworthiness standards. Because ICAO has declared Annex 8 as constituting the minimum standards for the purpose of Article 33 of the Chicago Convention, it is not clear whether the lack of ICAO standards would result in States not recognizing another State's airworthiness certificate for a powered-lift since no minimum international standards currently exist. Since publication of the NPRM, no revision of ICAO Annex 8 design standards for powered-lift has been initiated by ICAO. While ICAO Document 10103 provides basic guidance related to large turbine-powered tilt-rotors, the guidance does not address electric-powered tilt-rotors or other types of powered-lift at this time.

Powered-lift are special class aircraft for FAA type certification. The FAA will apply airworthiness criteria that meet an equivalent level of safety to the existing airworthiness standards in § 21.17(b), which would be eligible for a standard airworthiness certificate under § 21.183. The FAA continues to hold that leveraging its existing standards through the process in § 21.17(b) meets the intent of ICAO Annex 8 since design standards for these aircraft currently do not exist. The FAA received no comments on the airworthiness standards for powered-lift as it relates to ICAO and international standards.

IX. Advanced Air Mobility

The FAA noted in the NPRM that powered-lift will support future deployment of advanced air mobility (AAM) operations and this rulemaking is a key step in integrating AAM into the national airspace. The AAM Coordination and Leadership Act defines "advanced air mobility" as "a transportation system that transports people and property by air between two points in the United States using aircraft with advanced technologies, including electric aircraft or electric vertical take-off and landing aircraft, in both controlled and uncontrolled

airspace.”⁴⁴³ The FAA Reauthorization Act of 2024 updated the definition to mean “a transportation system that is comprised of urban air mobility and regional air mobility using manned or unmanned aircraft.”⁴⁴⁴ AAM includes transporting passengers in concentrated urban environments with electric Vertical Takeoff and Landing (eVTOL) aircraft.

Many commenters suggested there are potential benefits of AAM, including increased transportation efficiency and environmental benefits, among others. A4A expressed its enthusiasm for the potential advancements in air transportation that AAM will bring and noted safety should be the highest priority for AAM oversight and integration in the aviation environment. A4A urged the FAA to adopt A4A’s recommendations⁴⁴⁵ made in response to the DOT’s request for information on AAM strategy⁴⁴⁶ and expressed its support for the proposed SFAR for powered-lift pilots, noting that it expects “for hire” operations will be regulated and certificated as air carriers conducting operations under part 135.

The FAA’s research strategy is evolving to incorporate research needed to inform AAM integration, in alignment with the agency’s increasing focus on AAM. This AAM research strategy follows a crawl, walk, run approach. The crawl phase focuses on research to enable initial operations. The walk phase is characterized by research to support increased AAM operations and increased levels of automation. The run phase includes highly automated traffic management, remotely piloted and autonomous aircraft, and increased operational frequency.

The FAA envisions a safe and efficient aviation transportation system that will use highly automated aircraft to transport passengers and/or cargo within urban areas. As it relates to powered-lift, the FAA’s research priorities regarding AAM and Urban Air Mobility focus on Air Carrier Operations—investigating and identifying the key differences between current air carrier operations and future AAM transport operations.

As part of the powered-lift rulemaking effort, the FAA is modifying its

regulatory approach for certifying operation of powered-lift as well as certification requirements for the pilots operating these types of vehicles. The change is part of the agency’s efforts to integrate new types of aircraft safely and efficiently into the NAS, while providing a simpler pathway for applicants to obtain the necessary FAA approvals. The agency is type certificating powered-lift under its special class aircraft process in § 21.17(b), using performance-based airworthiness standards contained in part 23 for normal category airplanes. The special class process is designed to address the many novel features of unique aircraft such as these emerging powered-lift designs. The FAA’s first powered-lift rulemaking effort for a specific manufacturer was published on November 8, 2022, and made available for public comment in the **Federal Register**,⁴⁴⁷ with a final document published on March 8, 2024.

Using performance-based criteria enables the FAA to more effectively manage new concepts in new technology and innovation, including powered-lift. In addition, in this final rule, the FAA will implement certain performance-based regulations in parts 91 and 135 that will allow more operational flexibility for powered-lift.

Supernal expressed concern about AAM access to the National Airspace System (NAS). According to the commenter, the NPRM’s principle that AAM operations cannot disrupt existing operations would significantly limit AAM access to the NAS, thereby creating a barrier to AAM operations. Supernal urged the agency not to wait to initiate ATC support for AAM in the NAS given the lead times associated with developing and implementing NAS-wide ATC capabilities. Currently, the FAA’s Air Traffic Organization and Aviation Safety Organization are working together to modify JO 7110.65, which details air traffic separation standards. While the FAA may determine that future changes to JO 7110.65 are needed to efficiently and safely integrate AAM into the NAS, ATC will continue to use its existing standards for integration of new aircraft into air traffic operations.

An individual said that because eVTOLs are unprecedented in their level of connectivity within the aircraft in terms of linkages to controls and an electric powerplant, as well as the external environment, eVTOL pilots

should be certified for proficiency in cybersecurity. The commenter said areas for training should include preventing and detecting potential cyber incidents and cyber incident response management for all phases of flight. Another commenter stated that the FAA should consider cybersecurity issues, wireless communications issues, and regulatory challenges such as certification for autonomous systems and remote safety pilots.

The FAA agrees that new technology utilized by eVTOLs presents unique and novel challenges regarding linkages to controls and electric powerplants. However, the FAA disagrees with the commenter’s assertion that pilot training should include the prevention, detection, and response management principles because cybersecurity is addressed in the aircraft design during type certification. The FAA further notes that cybersecurity prevention, detection, and mitigation is not typically a flight crew responsibility and is not an element of pilot training. Rather, cybersecurity is accomplished when the aircraft is designed and certificated, ensuring aircraft system(s) security, integrity, and availability of the data networks are not compromised.

Several commenters suggested that alignment with ICAO standards and collaboration with the international community would enhance the FAA’s global leadership role in powered-lift and AAM more broadly. The FAA is actively engaged with international certification authorities to define and align the certification requirements for AAM. FAA bilateral agreements cover innovative projects such as eVTOL aircraft, and the FAA is working with other foreign regulators to validate their eVTOL aircraft under development and to develop a path for U.S. eVTOL aircraft to be validated by them. The level of new and innovative technology in an eVTOL aircraft is high, so early partnerships and cross-authority communication to harmonize the FAA’s approach for these technology areas are critical to the FAA’s success.

International engagement, collaboration, and harmonization are integral parts of the FAA’s mission given the global nature of this industry when it comes to aviation safety. The FAA remains committed to improving the sharing of knowledge and information to advance global aviation safety and to advance technological advancements. Additionally, the FAA co-leads the Asia-Pacific Bilateral Partners (APAC) AAM Working Group (WG). The APAC AAM WG endeavors to improve understanding and collaboration on the certification of

⁴⁴³ AAM Coordination and Leadership Act, Public Law 117–203 (Oct. 17, 2022).

⁴⁴⁴ FAA Reauthorization Act of 2024, Public Law 118–63 (May 16, 2024).

⁴⁴⁵ Airlines for America’s response to DOT–OST–2023–0079.

⁴⁴⁶ Request for Information on Advanced Air Mobility, 88 FR 31593 (May 17, 2023). The DOT’s RFI was published to inform the national strategy required by the AAM Coordination and Leadership Act.

⁴⁴⁷ Airworthiness Criteria: Special Class Airworthiness Criteria for the Joby Aero, Inc. Model JAS4–1 Powered-Lift, 89 FR 17230 (Mar. 8, 2024).

AAM. This includes promoting the use of a risk-based approach to ensure that the level of certification rigor reflects the level of safety risk presented by the design and operation of the product.

X. SFAR Framework and Duration

In the NPRM, the FAA proposed to enable powered-lift operations on a temporary basis⁴⁴⁸ through the adoption of an SFAR to supplement existing rules, create temporary alternatives for airman certification, remove operational barriers, and mitigate safety risks for powered-lift. The FAA proposed a duration of 10 years to facilitate industry's entrance into operations and provide the FAA an opportunity to assess operations and gather data to inform a future permanent comprehensive regulatory scheme.

Commenters generally supported the temporary adaptability of the SFAR. CAE and NBAA recommended the FAA either apply a shorter duration to the SFAR effective period or commit to revisiting on a more frequent basis of 2 or 3 years.

Supernal similarly stated that, while the industry lacks sufficient safety data today, data will become available in the next few years. Supernal requested that the FAA revise the proposed regulation by creating a mechanism to allow for periodic reviews every 2 years, allowing industry to provide new safety data to support alternative means of compliance. Supernal argued that waiting 10 years before proposing updated rules for powered-lift would limit the ability of the AAM industry to mature and would compromise the FAA's ability to maintain global leadership in this critical new sector of aviation. GAMA also suggested that the FAA revisit the proposed SFAR and take inventory of operational data at regular intervals, such as 2 years, in order to make the necessary refinements based on lessons learned during initial operations.

Lilium and BETA recommended applying a performance-based approach in the SFAR. Lilium contended that a "one-size-fits-all" approach to powered-lift inadvertently stifles innovation. It recommended allowing discretion to approve alternate requirements by adding language like "unless authorized by the Administrator." BETA said the SFAR should include provisions supporting performance-based requirements and provide a path for manufacturers and operators to share

aircraft or training device performance data with the FAA.

One commenter requested additional information pertaining to training and testing under requirements for powered-lift pilots, flight instructors, and examiners. Specifically, the commenter asked how the SFAR training and testing requirements would be different from existing airplane and helicopter pilots, flight instructors, and examiners. For example, the commenter seeks clarification on whether courses, modules, or hours of ground and flight training would be required, or whether certain written, oral, or practical tests would be required. The commenter suggested the FAA outline the specific content and format of training.

One pilot expressed concern about whether the proposed SFAR was premature, in terms of its ability to adequately anticipate future powered-lift designs, which the pilot said could risk developing overly restrictive rules.

As explained in the NPRM, the FAA considered several different factors when selecting 10 years as the appropriate duration for the SFAR. The FAA considered the time it will take to initiate operations after the adoption of a final rule, the number of powered-lift that will be type certificated and commercially viable when the final rule is effective, and the appropriate length of time to collect operational data and documentation to support permanent amendments to the FAA's regulations. To balance the time necessary to inform a permanent rulemaking, facilitate powered-lift operations, and ensure the SFAR maintains its temporary nature, the FAA is adopting the 10-year effectivity duration, as proposed. In response to the commenters who recommended a shorter duration for the SFAR, the FAA notes that the 10-year duration does not prevent the FAA from making interim changes to the SFAR in the interest of safety. Similarly, the 10-year duration does not preclude the FAA from amending the SFAR during the 10-year period by removing a regulatory burden on the powered-lift industry, provided the operational data collected demonstrates that safety is unaffected.⁴⁴⁹ As stated in § 194.107, the FAA may amend or rescind provisions of the SFAR as necessary.

In response to the commenters who recommended the FAA revisit the SFAR every 2 to 3 years, the FAA recognizes the benefits of routinely evaluating the temporary regulatory framework in light of the operational data the FAA will

receive from industry. The FAA agrees that periodic reviews will be beneficial and necessary to ensure the regulatory framework adapts as powered-lift operations progress. However, the FAA does not require rule language to enable its periodic review of the SFAR. Maintaining flexibility in its ability to review the SFAR is beneficial and necessary for the following reasons.

First, with such a nascent industry, it is unpredictable when formal reviews and subsequent revisions to the SFAR will be necessary, and codifying a review timeline diminishes the flexibility the FAA needs to ensure the regulations are appropriately adapting to changes in the powered-lift industry. The FAA may evaluate its regulations at any time it deems necessary or if an individual petitions for rulemaking or an exemption under 14 CFR part 11. FAA regulations at 14 CFR part 11.61 provide a mechanism for an individual or entity to petition for rulemaking or an exemption, thereby requiring the FAA to conduct a review of that request. Not codifying a review timeline allows the FAA to initiate its own internal review when it deems appropriate, and part 11 allows the public to request a rulemaking or exemption, requiring the FAA to further assess whether it should amend its regulations.

Second, FAA believes that the approach required by section 955 of the FAA Reauthorization Act of 2024, will enable FAA to obtain necessary real world operational data to inform future rulemaking, on a reasonable timeline. Section 955 mandates that the FAA establish an aviation rulemaking committee (ARC) no later than three years after the FAA issues the first powered-lift commercial operating certificate to provide the Administrator with specific findings and recommendations for, at a minimum, the creation of a standard pathway for the performance-based certification of powered-lift; the certification of airmen capable of serving as pilot-in-command of a powered-lift; and operation of powered-lift in commercial service and air transportation. In addition, section 955(d) requires the FAA to initiate a rulemaking no later than 270 days after the ARC submits its report to implement the findings and recommendations of the ARC, as determined appropriate by the Administrator.⁴⁵⁰ Not only does this language impose a timeline for establishing the ARC and subsequent rulemaking, it acknowledges that an ARC will first need real-world operational data from commercial powered-lift operations before it can

⁴⁴⁸ To enable a more comprehensive SFAR, the NPRM also proposed several limited permanent changes.

⁴⁴⁹ Similarly, the FAA may find it necessary to revise the SFAR to include additional requirements to mitigate an unanticipated safety risk.

⁴⁵⁰ See Public Law 118–63, § 955(c) and (d).

provide informed recommendations for a permanent rulemaking. The FAA finds it impractical to impose rigid, codified timelines mandating periodic regulatory review when it is unclear when operational data and information will be available.

Consequently, it is unnecessary to revise the proposed rule language, as Supernal requested, to create a mechanism to require the FAA to conduct periodic reviews every 2 years. As discussed above, the FAA intends to routinely revisit the SFAR as it gathers data from the powered-lift industry—and if it receives part 11 petitions—to evaluate whether adjustments to the SFAR are necessary. It is also committed to establishing an ARC in accordance with section 955(c) to determine what the permanent comprehensive regulatory framework should look like for powered-lift and to initiating a rulemaking in accordance with section 955(d).

In response to Supernal's assertion that waiting 10 years before proposing updated regulations for powered-lift would stifle the AAM industry and compromise the FAA's ability to maintain global leadership in this new sector of aviation, the FAA clarifies that the 10-year duration for the effectivity of the SFAR does not mean that the FAA will not propose any updated regulations in the interim. As previously stated, the FAA may amend or rescind provisions of the SFAR as necessary. Thus, the FAA is not precluded from proposing updating regulations prior to the expiration of the SFAR.

Additionally, the FAA intends to have permanent regulations in effect by the end of the 10-year SFAR duration, not simply begin the rulemaking process in 10 years (*i.e.*, publication of an NPRM).

However, the FAA maintains its position that it needs time to gather data from powered-lift in civilian operations to better inform permanent regulations for powered-lift. The FAA anticipates gathering data and information through (1) information collections; (2) regulatory requirements; (3) regular, formal, and informal interactions with the public, including conferences, data-sharing systems, and outreach initiatives; (4) the ARC to be established in accordance with section 955(c) of the FAA Reauthorization Act; and (5) informal anecdotal information and observations. The delay in proposing permanent regulations for powered-lift will not stifle AAM innovation or compromise the FAA's ability to maintain global leadership in this sector of aviation. Rather, the FAA is taking a regulatory approach that will enable the safe integration of powered-lift in the

NAS and allow industry to evolve and innovate under a temporary regulatory framework. The temporary nature of the SFAR will provide FAA an opportunity to gain experience with powered-lift and learn what the permanent regulatory framework should look like for these operations through assessment of powered-lift operations, training, and certification to determine the most appropriate permanent regulations for this new category of aircraft.⁴⁵¹

With regard to the potential prematurity of the SFAR, the FAA notes that the leading powered-lift manufacturers expect to receive initial type certification for their powered-lift in 2025. Thus, rulemaking is necessary to ensure the essential regulations are in place for the operation of these powered-lift. Further, when the FAA lacks sufficient experience regarding new operations, the use of an SFAR has been an effective way to gain such experience while enabling a degree of limited operations.⁴⁵² If the FAA determines during the term of the SFAR that the SFAR imposes overly restrictive or conservative requirements on powered-lift, the FAA may amend requirements in the SFAR as necessary.

A performance-based regulation is an “outcome-based” regulation that specifies the desired, measurable outcome to be achieved without prescribing the specific requirements to achieve that outcome. Thus, adding a provision that permits the FAA to authorize another means of complying with a prescriptive requirement does not make the underlying requirement “performance-based.” Because the FAA needs time to gain experience with powered-lift designs and operations, the FAA finds that it would be premature to develop a comprehensive performance-based regulatory scheme in the SFAR at this time. However, the FAA recognizes the importance of adopting requirements in the SFAR that allow for innovation and that enable the safe integration of powered-lift into the NAS. To that end, the FAA has evaluated its proposed requirements based on the comments received to determine where

it can add flexibility, performance-based elements, and alternate pathways, and it has added some performance-based criteria where appropriate. In response to the comments about providing a path for manufacturers and operators to share data with the FAA, the FAA finds that rule language is not necessary to enable this communication with industry. The FAA welcomes data from powered-lift manufacturers and operators during the course of the SFAR. For example, as OEMs continue to work through the type certification process in partnership with the FAA and interact with their certificate management teams, the FAA will naturally obtain data and information from the regulated community. To the extent commenters suggested applying performance-based regulations to specific sections of the SFAR (*e.g.*, airman certification), these comments are adjudicated in their respective section.

In response to the comment regarding outlining the content and format of training during the SFAR, the FAA notes that part 194, as adopted by this final rule, provides the training and testing requirements in tandem with the standing requirements in parts 61, 135, 141, and 142, as applicable. Specifically, an applicant for a certificate with powered-lift ratings will be required to comply with the basic training and testing requirements expected of, for instance, an applicant for a certificate with airplane ratings, with the exception of certain alternate requirements set forth by part 194. Course and module requirements were not specifically outlined in the SFAR, aside from the alternate experience requirements, because a training program would be required to comply with the part under which the training program is conducted (*i.e.*, part 135, 141, or 142). Similarly, part 61 and part 194 will set forth the expected number of ground and flight training hours. Section V. of this preamble comprehensively describes the training and testing expectations for powered-lift airman certification.⁴⁵³

XI. Autonomous Powered-Lift

As noted in the proposed rule, the FAA anticipates a variety of civilian powered-lift will come to the market with “varying degrees of

⁴⁵¹ The FAA further notes that other pathways remain available to industry to explore innovation. Powered-lift manufacturers and operators may petition for exemption if they develop new and novel approaches to address powered-lift issues. Any member of the public may also petition for rulemaking to request the FAA consider specific revisions or new regulations, as necessary.

⁴⁵² For example, SFAR No. 29 allowed the FAA to obtain rotorcraft IFR operational data before issuing permanent rotorcraft IFR regulations. See *FAA Study of Limited IFR Operations in Rotorcraft*, 40 FR 2420 (Jan. 13, 1975) (SFAR No. 29); see also *Limited IFR Operations of Rotorcraft*, 41 FR 1060 (Jan. 6, 1976) (SFAR No. 29–1).

⁴⁵³ The FAA further notes that other pathways remain available to industry to explore innovation. Powered-lift manufacturers and operators may petition for exemption if they develop new and novel approaches to address powered-lift issues. Any member of the public may also petition for rulemaking to request the FAA consider specific revisions or new regulations, as necessary.

automation.”⁴⁵⁴ Although the NPRM proposed requirements for pilot certification and operation of powered-lift, some commenters addressed autonomous powered-lift in response to the proposed SFAR.

Sabrewing Aircraft Company (SACO) approved the NPRM’s general approach to powered-lift certification as applicable to manned operations but proposed that remote pilots who operate powered-lift that use auto-flight control systems and no manual flight controls should be exempt from the proposed requirements of a powered-lift pilot certificate. The commenter argued that, because these aircraft have no manual flight controls, demonstrated manual pilot proficiency should not be required. SACO also stated these vehicles would be operated in auto-pilot mode for all phases of flight with remote pilots using “push buttons” to change flight modes (takeoff, cruise, descent, etc.). The commenter proposed that these remote pilots should instead be required to, first, be familiar with IFR rules and procedures for rotorcraft operations during arrivals and departures and, second, possess at least a commercial certificate with any category rating and the corresponding instrument rating.

One commenter suggested that waivers should be granted for autonomous cargo-only powered-lift flights conducted in remote offshore locations such as mining sites and offshore platforms. The commenter stated that operational risks are lower in these remote locations because there are few, if any, people or critical public infrastructure located in these areas, and the only conflicting air traffic is offshore helicopters at low altitudes. The commenter argued that relaxing regulatory requirements would—in addition to enhancing the efficiency of material transportation to remote locations—provide the FAA with early data to aid its decision-making processes and increase readiness for passenger flights on both crewed and uncrewed powered-lift. Lastly, the commenter noted issues requiring consideration before deploying autonomous powered-lift flights to these remote locations, including the need for some form of certification of safety pilots who would need to monitor and potentially take control of the aircraft.

While industry may manufacture an unmanned powered-lift, this rulemaking is not addressing aircraft certification, airman certification, or operational

requirements of such an aircraft and, thus, addressing pilot certification in this context is outside the scope of this rulemaking. Any UAS falling outside the requirements of part 107 would require exemptions and/or other FAA authorization to operate.

A pilot stated that the NPRM either misunderstands or ignores the latest automated technologies, from sensor-fusion to auto-flight, auto-landing, and auto-recovery systems that will render some of the SFAR requirements obsolete. The commenter recommended more thoroughly considering these automated technologies. Similarly, AUVSI expressed concern that an overly conservative application of legacy requirements to regulate fully electric highly autonomous aircraft will not promote safety or serve the AAM industry. Further, an individual stated that greater levels of autonomous controls and detection sensors will be necessary at some point to address saturation. The commenter emphasized that onboard and decentralized ground sources will initially be needed to augment controls, but that fixed routes and pilot or centralized ground control will not be necessary long term. The individual also raised the issue of cyber resiliency. The FAA did not propose any new or prescriptive aircraft certification procedures in relation to new technology because certificating powered-lift through the special class process allows the FAA to address the novel features of unique and nonconventional aircraft without the need for additional processes such as special conditions or exemptions that would be required if the FAA used the airworthiness standards already in place.

Other commenters expressed concern that the proposed rule did not adequately consider automation and emerging technologies. AUVSI noted this concern and encouraged the FAA to acknowledge the safety benefits that automated systems can provide for powered-lift operations and training. Similarly, L3Harris stated that Simplified Vehicle Operations concepts will facilitate the safe certification, training, and entry into service of these aircraft. SAE International contended the level of automation across the various VTOL-capable aircraft in process requires a more flexible, performance-based approach to certification. FlightSafety International, Inc. requested the FAA clarify certain statements in the NPRM regarding SVO, to recognize that many powered-lift in design have SVO and to more accurately characterize new VTOL AAM aircraft coming to the civilian market.

The FAA recognizes that autonomous powered-lift may be developed for the market in the future and that a subsequent rulemaking addressing autonomous aircraft and their operations could be necessary. Notwithstanding, the FAA’s scope in this powered-lift SFAR only addresses piloted powered-lift. Because the comments are outside the scope of this rulemaking, the FAA did not amend the proposed regulatory text. Additionally, concerns regarding SVO requiring a more flexible, performance-based approach to pilot certification are adjudicated by virtue of the approach taken to ensure waiver of a certain task is possible in circumstances where a powered-lift is not capable of performing a certain task during the aircraft certification process as outlined in section V.H.1. of this preamble.

Therefore, the FAA did not revise the proposed SFAR in response to these comments.

XII. Comments to Regulatory Impact Analysis

The FAA invited interested persons to participate in this rulemaking by submitting written comments, data, or views on the regulatory impact analysis for the proposal. Specifically, the FAA requested information and data that could be used to quantify the incremental benefits and costs of the finalized rule. The FAA also requested information on the assumptions and uncertainties discussed in the regulatory impact analysis. Presented below is a summary of those comments.

Many commenters stated that the costs of the proposal could be as much as four times greater than what was presented in the regulatory impact analysis. The FAA thanks the commenters for their input and acknowledges not all costs of the proposed SFAR were monetized due to a lack of information to develop informed estimates. The FAA stated in the proposal that individuals and entities choosing to operate powered-lift would incur incremental costs to do so, but on a scale no greater than the costs imposed on individuals and entities choosing to operate airplanes and rotorcraft under existing regulations. The FAA concedes that the analysis of the proposal could have better emphasized that not all costs were monetized. For the analysis of the final rule, the FAA has incorporated information received during the notice and comment period and as a result has revised the monetization of the rule’s costs.

A commenter stated it engaged NERA Economic Consulting to assist with

⁴⁵⁴ Integration of Powered-Lift: Pilot Certification and Operations; Miscellaneous Amendments Related to Rotorcraft and Airplanes NPRM, 88 FR 38947 (June 14, 2023).

estimating the total cost of the NPRM. The analysis concluded that the proposed rules would impose social costs of approximately \$961.9 million over the 10-year regulation period. The estimate included \$695.8 million attributable to the cost of full flight simulators (FFS) and associated infrastructure based on industry data indicating that each manufacturer would require six FFSs. The same analysis also concluded that the proposed 45-minute fuel reserve requirement would cost approximately \$127.8 million due to disruptions in optimized charging cycles, leading to reduced battery life and more frequent battery replacement. The same commenter also provided information estimating the cost for manufacturers to provide dual-control aircraft for the purpose of training (\$93.75 million over 10 years) and information for the number of individuals that would be required to operate the fleet of aircraft anticipated to enter the fleet over the 10-year period of the SFAR.

The FAA values the many comments submitted on the costs of the regulatory impact analysis for the proposed rule, and especially those comments containing information or data that can be used to monetize costs. Based on information received from one of the commenters the FAA has revised the regulatory impact analysis for the finalized rule to reflect the monetization of costs associated with the minimum fuel reserve requirement and the provision of dual-control aircraft for training. In addition, the forecast for pilots required to operate the powered-lift anticipated to enter the fleet has been revised upward.⁴⁵⁵ The same commenter also provided an estimate of costs for full flight simulators and the associated infrastructure to house them. The FAA notes the final rule provides three pathways for relief from costs for the provision of dual-control aircraft for the purpose of training. The costs for the alternative pathways are not included as this would create double-counting of costs for the SFAR and are not included in the costs of the final rule.

The first pathway provides relief by allowing for flight training in an aircraft with a single-control accessible to two pilot stations. Without this relief, the dual controls requirement of § 91.109 is aircraft generic and would require dual controls in powered-lift when used for

flight instruction. Furthermore, a manufacturer needs to determine what markets or operations they want their aircraft to be used for (*i.e.*, flight training for part 135 passenger carrying operations) and design their aircraft to meet the operational rule requirements for that operation or market. A single control accessible to two pilot stations would likely be less costly to design and build than a dual control configuration and therefore be a cost savings to an OEM. Furthermore, this provision relieves the manufacturer from the cost of developing and building an FFS to conduct flight training.

The second pathway for relief is the allowance for 100 percent use of FFSs for the provision of training. The use of FFS for training can be advantageous compared to flight training in aircraft. For example, FFSs can be used for executing flight scenarios that typically do not occur in aircraft or for practicing emergency procedures that are likely too dangerous to accomplish in an aircraft.⁴⁵⁶ As well, access to FFSs can be available for as many as 24-hours per day.

The third pathway for relief from the requirement that training be conducted in a dual-control aircraft is deviation authority. This pathway permits, based on future advancements in technology, the FAA to issue deviation authority to facilitate flight training in powered-lift with a single functioning flight control.

One commenter stated that applying a discount factor to future year training costs was unnecessary because the costs are already based on present-day costs.

The FAA notes that Federal agencies, including the FAA, follow guidance on the development of regulatory analysis provided by the Office of Management and Budget in Circular A–4.⁴⁵⁷ Circular A–4 requires estimated costs and benefits of rules to be presented in constant, undiscounted dollars, and using a present value discount rate.⁴⁵⁸ Discounting provides an accurate assessment of benefits and costs that

occur at different points in time or over different time horizons.

Some commenters stated the FAA did not accurately reflect the cost of flight time. One commenter stated the cost of the powered-lift category add-on for each pilot involved in the FSB should be included because this cost would be to meet a requirement in excess of the ICAO SARPs for pilot certification.

In response, the FAA notes that while an FSB is typically established for large jet and propeller aircraft, the requirement for an FSB is not exclusive to these kinds of aircraft. Accordingly, the costs for the FAA to establish an FSB are not included in the regulatory impact analysis for this final rule because the requirement existed prior to this rule. Additionally, the FAA has taken into consideration the guidance outlined in ICAO Document 10103, specifically Annex 1, Chapter 2, Section 2.1—Personnel Licensing. The FAA will ensure a sufficient level of safety while considering these recommendations; however, the FAA will not implement these measures at this time. The FAA will undertake measures to align with ICAO standards, as practicable, at such time when ICAO's recommendations become standards.

One commenter stated that accounting for 10 days of training to obtain a category add-on and type rating was not sufficient and that it would take several months.

The FAA appreciates the comment and understands why there may be confusion between what is already required by regulations versus new requirements because of this final rule. Prior to the final rule, regulations existed that prescribed the requirements for an individual to achieve a commercial pilot certificate with a powered-lift category rating. Since only the incremental costs of proposed rules are evaluated, only the cost of achieving the type rating is evaluated. Furthermore, the FAA further asserts that the SFAR provides relief to individuals seeking a powered-lift type rating by providing alternative pathways to certification. These alternative pathways allow for an airman that holds a commercial pilot certificate with either an airplane or rotorcraft rating to be eligible for a powered-lift type rating.

Commenters stated that the regulatory impact analysis did not properly account for the resources and timeline implications associated with its implementation, as well as the impact of potential entry into service delays due to an unprecedented use of aircraft for pilot certification. One commenter contended that if the FAA proceeds with the notice and comment

⁴⁵⁵ The pilot forecast provided in the NPRM failed to account for operational redundancy due to leave (*i.e.*, vacations, sick leave, training) and job turnover (*i.e.*, retirements and pilots changing jobs). Accordingly, the FAA adjusted the forecast for the number of pilots that would be required to operate the powered-lift upward.

⁴⁵⁶ Several eVTOL manufacturers have contracted with part 142 certificate holders for the provision of pilot training. CAE reports it is working with Joby, Vertical Aerospace and BETA Technologies, while Flight Safety International is working with Lilium. Sources: www.ainonline.com/aviation-news/business-aviation/2023-03-01/training-providers-gear-aam-market; lilium.com/newsroom-detail/lilium-flight-safety-international-partnership.

⁴⁵⁷ OMB Circular A–4 (whitehouse.gov). The link provided is to the current version of Circular A–4. The current version was released after the proposed SFAR was published. The analysis for the finalized powered-lift SFAR uses applies the present value discount rates used in the proposed SFAR in order more easily assess the change in costs between the proposed and finalized SFAR.

⁴⁵⁸ Circular A–4 has been revised since publication of the proposed SFAR.

rulemaking for each device's Qualification Performance Standards, the RIA should be updated to reflect associated costs including opportunity costs of delayed entry-into-service.

The FAA notes that, as discussed in section IV.C. of this preamble, this final rule will establish a streamlined process in accordance with new § 194.105(b) allowing an applicant of a powered-lift FSTD to forego the notice and comment period required for the proposed QPS if the FAA finds it is not in the public interest, or a prior opportunity to comment on a substantially identical proposed QPS has been provided. The FAA finds these regulatory exceptions will address commenters' concerns about resources and timeliness in proposed QPS publication. Additionally, the FAA anticipates working collaboratively with the FSTD sponsor and/or manufacturer to develop the proposed QPS to preemptively address any comments or concerns the public may raise during the open comment period. Should a notice and comment process be required, the FAA intends to mirror the period of time necessary for notice, comment, and comment adjudication with that timing typically provided for in the certification of special classes of aircraft process.

XIII. FAA Readiness

Several commenters emphasized the importance of the FAA's preparation in the implementation of this final rule. NATA stated that the FAA should ensure proper allocation of financial and human resources while maintaining adaptability without unnecessary delays. NATA recommended using a rulemaking committee that includes industry representatives, which it said could convene quickly and ensure powered-lift regulations achieve their objectives. Eve and GAMA expressed concerns about the FAA's resource limitations and the agency's ability to support the SFAR's framework in a timely manner, specifically concerning pilot certification and training. Eve recommended the FAA assess how proper resources and personnel will be assigned to successfully implement the SFAR framework.

Similarly, Supernal stated that the FAA must demonstrate that it has sufficient resources to oversee the airman qualifications and operations requirements. Supernal further stated that the effectiveness of the powered-lift rules would be greatly diminished if the FAA does not have the resources to support the airman qualifications and operations requirements for powered-lift operations. Supernal expressed

particular concern over the available pool of FAA pilots to support the number of AAM entities that will be completing the FSB approval process in the coming years.

A rulemaking committee is typically formulated prior to the commencement of rulemaking to ensure industry representatives can provide recommendations to the agency. Upon initial publication of an SFAR, the FAA does not view standing up a rulemaking committee as a beneficial use of resources because the main task of a rulemaking committee—recommendations for a rule—will be complete. Instead, as commenters asserted, the FAA must prioritize providing proper, timely training and qualifications of its workforce, which inherently includes dialogue and information sharing between industry and the FAA necessary to standup a qualified workforce. However, as the SFAR matures, the FAA does not foreclose the possibility of the formation of a rulemaking committee to gather information and properly inform the follow-on permanent rulemaking. Specific to powered-lift, this process will ensure the FAA can utilize the real-world experiences from operators of powered-lift. The information gathered via operator experience and industry input will further inform the FAA's subsequent rulemaking to codify powered-lift permanently in the rules.

The FAA agrees that the proper allocation of resources to this issue is critical to the success of this SFAR and the powered-lift industry and that rule effectivity is largely dependent on the Agency's ability to support implementation. AAM and powered-lift operations are part of the Administrator's foremost priorities; accordingly, the FAA is allocating resources to ensure that industry has the tools and regulatory structure necessary to successfully initiate powered-lift certification and operations. Additionally, as it pertains to FAA pilots, this final rule adds FAA test pilots and ASIs into the population of pilots that may utilize the alternate experience requirements as set forth by part 194 to further develop a pool of fully certificated and rated powered-lift pilots.

XIV. Definitions

In § 1.1, the FAA defines powered-lift as a heavier-than-air aircraft capable of vertical takeoff, vertical landing, and low speed flight that depends principally on engine-driven lift devices or engine thrust for lift during these flight regimes and on nonrotating

airfoil(s) for lift during horizontal flight.⁴⁵⁹

A. Definition of Powered-Lift

One commenter stated the existing powered-lift definition does not specify whether the engine-driven lift devices or engine thrust must be variable or fixed. The commenter said this distinction could impact classification of some types of aircraft, citing the example of a tiltrotor aircraft that can vary its engine thrust between vertical and horizontal flight modes. The individual suggested that the FAA clarify this point in its final rule and provide examples of types of aircraft that qualify (or do not qualify) as powered-lift.

Tiltrotors, as defined in § 36.1, are a subset of powered-lift. Aircraft that utilize fixed vertical rotors that provide the lift during hover and low speed flight combined with a wing and horizontally mounted propellers for cruise flight would also meet the definition of powered-lift. Additionally, aircraft with variable or vectored thrust, similar to the military AV-8 Harrier, would meet the definition of powered-lift. The FAA has no plans to change the part 1 powered-lift definition. See discussion on § 21.17(b) in this preamble.

One commenter stated that the phrase used to classify powered-lift⁴⁶⁰ was not fully vetted, resulting in other aircraft like the AV-8, F-35B, AW-609, and V-280 being "roped into" the powered-lift category. The commenter also stated that the fourth axis controllers were not sufficient to warrant a separate classification. The individual suggested that a better definition would incorporate the control strategy employed by a pilot to command a desired flight path in the powered-lift definition.

First, it is unclear what the commenter means by "classification;" although, the FAA interprets these comments to mean the FAA should reevaluate the powered-lift definition because of the noted characteristics of specific military or currently uncertificated aircraft. The commenter did not provide sufficient rationale for revising the definition. Furthermore, the FAA disagrees that the definition should include information pertaining to control strategies because aircraft

⁴⁵⁹ [www.ecfr.gov/current/title-14/part-1/section-1.1#p-1.1\(Powered-lift\)](http://www.ecfr.gov/current/title-14/part-1/section-1.1#p-1.1(Powered-lift)).

⁴⁶⁰ See 14 CFR 1.1: "A heavier-than-air aircraft capable of vertical takeoff, vertical landing, and low speed flight that depends principally on engine-driven lift devices or engine thrust for lift during these flight regimes and on nonrotating airfoil(s) for lift during horizontal flight."

definitions are based on how the aircraft creates lift and moves through the air. Creating an aircraft definition that is based on how the pilot interacts with the aircraft would create a disconnect with the existing definitions and likely create overlap where aircraft could fall under multiple definitions. The definitions in part 1 are used for complying with regulations dealing with pilots' qualification, operations, certification, and many others. Defining the aircraft types based on the piloting control aspects may make more sense for the pilot qualification requirements, but defining the aircraft in this way would not make sense for other aspects of operations, air traffic, and aircraft certification. Finally, the FAA believes the current definition of powered-lift (as stated in § 1.1) is specifically tailored to encompass the various types of aircraft envisioned as powered-lift, including some of the aircraft referenced by the above commenter, such as the AV-8, F-35B, and AW-609, should those aircraft enter the civilian market. In fact, the FAA references some of these aircraft as specific examples of powered-lift.⁴⁶¹

HAI stated that the definition of powered-lift does not consider current and future AAM aircraft like eVTOLs, which do not all depend upon "nonrotating airfoil(s) for lift during horizontal flight" and are therefore excluded. HAI said this is inconsistent with the NPRM's intent to cover "aircraft configuration changes such as tilt-wing, tiltrotor, or tilt-propeller; thrust vectoring; direct-lift; or other means,"⁴⁶² when thrust vectoring and direct lift do not depend upon nonrotating airfoils for horizontal flight.

The powered-lift definition does not exclude future AAM technology as it is agnostic to how propulsion is utilized to create lift, and the device that is used to generate the lift during vertical and horizontal flight is not prescribed. The definition does not exclude electric propulsion, vectored thrust, or other "non-conventional aircraft engines," therefore allowing flexibility. The only types of VTOL aircraft that it would exclude would be aircraft that never transition onto a wing (or non-rotating airfoil as the definition says). These aircraft types would qualify as rotorcraft and other novel VTOL aircraft, according to the existing § 1.1 rotorcraft definition, which are not covered in the SFAR.

One commenter in the process of developing a hybrid-electric multi-engine part 23 airplane supported categorizing electric vertical take-off and

landing (eVTOL) aircraft as "powered-lift" because it is consistent with the definitions in § 1.1 regarding powered-lift.

The FAA agrees with the commenter and the definition of "powered-lift" under § 1.1. In recent years, rapid technological advancements in powered-lift have progressed across the industry, particularly with eVTOL aircraft. And powered-lift will be used to support the deployment of AAM operations, which the FAA anticipates will include eVTOL aircraft.

B. Definition of Flight Modes

One commenter sought clarification regarding the criteria that will be used to evaluate the speed at which a powered-lift can transition between flight modes and the associated definitions. The commenter also requested clarification on how powered-lift with faster transition time between modes of flight would be accounted for in the rule.

The transitional speed between vertical-lift and wing-borne flight modes has no bearing on which class, as defined in § 1.1, will be assigned to a specific aircraft design during its certification process. The transition time between vertical-lift and wing-borne flight modes does not change the performance requirements established by the rules. An aircraft with greater performance capabilities is still required to meet the requirements stipulated in each applicable rule.

EASA requested clarification on the definition of "horizontal lift" in the context of powered-lift operations. In the NPRM, the FAA incorrectly referred to "horizontal lift" when it was discussing part 136 operations.⁴⁶³ Instead, the FAA intended to use the term "horizontal flight" because it was referring to "wing-borne flight mode," which the FAA defines as "a mode of flight . . . [that] depends exclusively or partially on nonrotating airfoil(s) for lift during takeoff, landing, or *horizontal flight*" (emphasis added).

In the NPRM, the FAA explained the differences between wing-borne and vertical-lift flight modes.⁴⁶⁴ Specifically, the FAA explained that "wing-borne flight mode" refers to powered-lift that are operating like traditional airplanes

and "vertical-lift flight mode" refers to powered-lift that are operating like traditional rotorcraft. Although the FAA did not receive specific comments on how it defines these two flight modes, it did receive comments seeking clarification on how certain flight characteristics, such as transitions, would be classified. In addition, as part of the final rule, the FAA is providing more flexibility than originally proposed by promulgating some performance-based regulations. Clearly defined flight modes will help ensure these performance-based standards are implemented safely and that operators have a clear understanding of when they are in vertical-lift flight mode and when they are in wing-borne flight mode.

Consequently, in order to provide additional clarity on these flight modes, the FAA has determined that codifying the flight modes language into definitions under § 194.103 is necessary. "Vertical-lift flight mode" is defined as "a mode of flight where a powered-lift: (1) is in a configuration that allows vertical takeoff, vertical landing, and low-speed flight; and (2) depends principally on engine-driven lift devices or engine thrust for lift." As explained in the NPRM, this flight mode resembles the characteristics of rotorcraft operations. In addition, "wing-borne flight mode" is defined as "a mode of flight where a powered-lift is not operating in the vertical-lift flight mode as defined and depends exclusively or partially on nonrotating airfoil(s) for lift during takeoff, landing, or horizontal flight." As explained in the NPRM, this flight mode largely resembles the characteristics of airplane operations.

C. Definition of Helicopter

In the NPRM, the FAA proposed to update the definition of Helicopter by adding the term "powered-lift" to ensure that powered-lift could utilize a heliport for takeoff and landing operations. In the NPRM, the FAA requested comments on the viability of powered-lift using heliports for takeoff and landing operations. The FAA did not receive any comments on this proposed change to the definition or on the viability of powered-lift using heliports. However, the FAA would like to clarify that adding the term "powered-lift" to the definition of heliport does not imply that all powered-lift would be capable of using heliports. In order for a powered-lift to use a heliport, that powered-lift must be capable of meeting or exceeding the performance requirements for helicopters with respect to their controllability and maneuverability. Additionally, the powered-lift cannot

⁴⁶³ See 88 FR 38949 (June 14, 2023) ("[T]he FAA applies operational requirements specific to helicopter operations within part 136 to powered-lift operations because the FAA expects powered-lift will hover . . . similarly to helicopters when conducting air tours, except when relying on horizontal lift.").

⁴⁶⁴ See *Integration of Powered-Lift: Pilot Certification and Operations; Miscellaneous Amendments Related to Rotorcraft and Airplanes*, NPRM, 88 FR 38946, 39026 (June 14, 2023).

⁴⁶¹ See sections V.A, V.B, and V.J.3.

⁴⁶² 88 FR 38952, June 14, 2023.

exceed the size and weight limitations established for a particular helicopter.

Ferrovial Vertiports requested the powered-lift final rule align its terminology and attributes for eVTOL landing facilities with the FAA's Office of Airports. Ferrovial stated that while the FAA conducts and gathers research to develop its performance-based Vertiport Advisory Circular, the FAA can adjust the SFAR to reflect the agency's guidance documents on this subject. This will provide consistency across FAA documents and offer clarity to industry and government and community leaders as they seek direction in integrating vertiports into future projects.

A vertiport is defined in the current FAA Vertiport Engineering Brief as an *area of land, or a structure, used or intended to be used, for electric, hydrogen, and hybrid VTOL aircraft landings and takeoffs and includes associated buildings and facilities.*⁴⁶⁵ In the future, the FAA may include this definition, or a definition consistent with it, in the SFAR or in the permanent powered-lift rule if it determines it is prudent to do so. Currently, there are varying powered-lift design concepts and performance characteristics, as well as diverse locations potentially needing vertiports. As a result, the FAA is conducting research in order to develop a performance-based standard for vertiports that will include performance classes for vertiport infrastructure with different design criteria. The performance classes will be based on the design characteristics and performance capabilities of differing VTOL aircraft groups. That standard is expected to be published in late 2025 in accordance with the results from the ongoing operational testing.

D. Definition of Autorotation

An individual commenter noted that the NPRM stated some powered-lift could be capable of autorotation.⁴⁶⁶ The commenter asked if this was correct, given that autorotation is defined in § 1.1 as a rotorcraft flight condition. In response to the commenter, the FAA has determined that adding "powered-lift" to the definition of "autorotation" is appropriate to ensure that when a regulation mentions autorotation, powered-lift that are capable of that maneuver are included in the intent of the regulation. Therefore, the FAA has revised the definition of autorotation making it applicable to powered-lift.

⁴⁶⁵ FAA Engineering Brief No. 105, *Vertiport Design* at 11 (Sept. 21, 2022).

⁴⁶⁶ 88 FR 39027 (June 14, 2023).

XV. Other Comments Related to Powered-Lift

A. Other Comments Related to Language or Definitions in the Powered-Lift NPRM

HAI commented that the FAA's approach to certifying powered-lift, as the FAA wrote in the NPRM, assumes "complex and unique design, flight, and handling characteristics." However, HAI implied this assertion contradicts other comments because the NPRM also cited the benefits of powered-lift as being "easier to design, simpler to construct, [and] less complicated to maneuver." Additionally, HAI cautioned that permanent changes to powered-lift made through the SFAR could make it difficult to remove or undo rules in the future.

First, the FAA asserts the comments regarding design and operation are not mutually exclusive; rather, they offer commentary regarding the current state of the powered-lift industry and its potential. The special class aircraft certification process under § 21.17(b) allows for the full range of design and construction complexity and ensures each aircraft will include all relevant 14 CFR Subchapter C (Aircraft) criteria, as well as other equivalent criteria if appropriate, when it is certificated. Second, the FAA has remained committed to re-evaluating the SFAR when appropriate. The FAA will routinely revisit the powered-lift SFAR regulatory framework within the ten-year period as it obtains operational data to ensure it remains as effective as possible.

An anonymous commenter asked what type of rating they would need to fly a Volocopter.⁴⁶⁷ The commenter opined that a Volocopter does not seem to meet the powered-lift definition under part 1 and that a pilot would not require anything beyond a helicopter rating because the Volocopter likely qualifies as a helicopter. The Volocopter is currently being worked as a concurrent certification project with the FAA and EASA. While specific questions about the type certification of the Volocopter are beyond the scope of this rulemaking, the FAA notes that, at this time, the Volocopter does not meet the definition of a powered-lift and, therefore, a pilot would not be required to hold powered-lift ratings on their certificate. Rather, a multicopter is considered a rotorcraft⁴⁶⁸ and would

⁴⁶⁷ A Volocopter is an electric multirotor helicopter manufactured by a company of the same name.

⁴⁶⁸ A multicopter is a rotorcraft that can have more than one rotor providing lift. Although multicopters are helicopters by definition, multicopters differ from the conventional helicopter

require the applicable rotorcraft category and helicopter class ratings, with any additional training requirements determined during the FSB phase.

B. Safety Systems or Procedures Not Addressed in the NPRM

A commenter expressed concern that the proposal did not contain any information regarding an emergency in a total failure situation. The commenter urged implementation of a safety system for powered-lift vehicles that lack the ability to glide or auto-rotate in a total system failure scenario. The commenter attached a previously submitted request to update parachute type ratings in § 65.121 and emphasized the importance of aircraft mounted parachute systems for eVTOL vehicles.

The FAA acknowledges that some powered-lift may lack an ability to glide or autorotate; however, during the aircraft certification process, as discussed in section IV.A. of this preamble, each aircraft will be evaluated against the existing airworthiness criteria to determine which rules will be applicable to that particular aircraft. The FAA is not requiring powered-lift to have a specific safety design feature, like a ballistic parachute, but instead will require the capability of a controlled emergency landing or an equivalent means to address the risks associated with certain failures like loss of power or thrust. In addition, it must be shown that any failure or combination of failures not shown to be extremely improbable must not result in a catastrophic event.

Airbus Helicopters stated that in § 194.302(y)(2) the FAA proposed to apply requirements applicable to transport category airplanes to large powered-lift in the absence of a uniform transport category standard for powered-lift. The proposed rule includes the following text: "The lifeline required by § 91.509(b)(5) must be stored in accordance with § 25.1411(g) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter." Airbus contends that an alternate path for compliance, similar to what is offered in § 91.509(b)(5), should also be available whenever a requirement that was developed for airplanes or helicopters of the normal or transport category is referred to in this SFAR.

models originally considered during the 2004 rulemaking because the takeoff and landing are intended to be automated and not require extensive pilot training and skill.

Although Airbus did not specifically identify regulations in which equivalent airworthiness standards should be considered, the FAA agrees that, in many cases, equivalent airworthiness criteria may be required to address unique features on powered-lift. As indicated throughout the NPRM, the FAA identified areas where specific airworthiness requirements required by operating rules may be met by other airworthiness criteria that the FAA has determined provide for an equivalent level of safety in accordance with § 21.17(b).

One commenter inquired whether the FAA considers specific standards for the implementation of congested area data bases for the HTAWS requirements in the context of powered-lift integration. The obstacle and terrain databases include data for congested areas and will be the same for HTAWS. In addition, this subject is covered in TSO-C194 and Section 2 of RTCA DO-309, which are incorporated by reference in this SFAR. These two documents will apply to HTAWS the same way they apply to helicopters. The SFAR sections addressing HTAWS are finalized at § 194.302(y) and (bbb) and § 194.306(s) and (ooo).

C. Other Comments Related to Powered-Lift Design

One commenter sought clarification on the expected proportional increase in surface area that some powered-lift or eVTOL aircraft may require to conduct a landing as compared to a helicopter when comparing similar passenger capacities.

Given the current number of powered-lift/eVTOL aircraft configurations under consideration, there could be an increase in surface area of the landing facility required for certain powered-lift. The need for an increase in surface area of a given landing facility will be driven by the unique performance characteristics and design features of the controlling powered-lift that will utilize that facility. As mentioned in the “heliports” discussion in section XIV.C. of this preamble, in order for a powered-lift to use a heliport, that powered-lift must be capable of meeting or exceeding the performance requirements for helicopters with respect to their controllability and maneuverability. Additionally, the powered-lift cannot exceed the size and weight limitations established for a particular heliport.

EASA said the SFAR’s approach lacks a cohesive link that explains how the aircraft certification approach is accounted for in operational limitations and airspace integration.

Part 1 includes definitions for different kinds of aircraft based on characteristics such as propulsion, flight, or landing. These aircraft definitions are then used for the purposes of determining the appropriate requirements for aircraft certification, pilot certification, and operational rule applicability.⁴⁶⁹ For instance, if an aircraft meets the definition of airplane, it must meet the airworthiness criteria set forth in parts 23 or 25 as applicable to airplanes. Powered-lift are type certificated as a special class aircraft, and the FAA will designate airworthiness requirements that match the safety levels of existing standards. Throughout the rules, the classification dictates how an aircraft is certificated, how a pilot is trained on operating that aircraft, how it is handled by air traffic control (ATC), how it is maintained, and how the FAA applies operating rules based on the aircraft in question.

Currently, powered-lift are able to proceed through type certification and conduct limited operations in the NAS—they already do this for flight testing and primarily under experimental designations. Notwithstanding, the SFAR creates a clear pathway for pilot certification and for a wider range of powered-lift operations, including commercial operations. Finally, the SFAR clarifies how certain airworthiness criteria required under the operating rules apply in the powered-lift context. Specifically, if an operating regulation requires a specific airworthiness criterion under part 23, 25, 27, or 29, the FAA may determine that an alternate airworthiness criterion applies to a certain powered-lift in accordance with the process under § 21.17(b).

Joby recommended the FAA include final rule preamble discussion clarifying that the FAA will consider detailed review of the aircraft, capabilities, existing systems and equipment, and operational use cases when making a determination about “unless otherwise authorized in the certificate holder’s approved minimum equipment list.”

Powered-Lift MMELs will be treated no differently than any other aircraft with regard to MMELs. The current process takes into account all of Joby’s concerns. Proposed MMEL relief normally comes from manufacturers or operators. The entity that requests the relief is responsible for “submitting an evaluation plan to the FOEB Chair for acceptance. The evaluation plan should

⁴⁶⁹ *Airplane* means an engine-driven fixed-wing aircraft heavier than air, that is supported in flight by the dynamic reaction of the air against its wings. See 14 CFR 1.1.

consider all phases of flight operation and demonstrate that flight operations with the proposed item inoperative have an equivalent level of safety to flight with the item operative and considering the next most critical failure.”⁴⁷⁰

Additionally, FAA Order 8900.1, Volume 8, Chapter 2, Section 3, Paragraph 8–67(C)(3) lists the justification information required to evaluate whether relief should be granted for an inoperative item. In addition to reviewing the justification items, the FOEB incorporates FAA MMEL policy letters and ensures the relief would not be contrary to § 91.213(b), which provides instruments and equipment excepted from a Minimum Equipment List. The equipment excepted from this requirement may not be instruments and equipment required by the airworthiness requirements under which the aircraft was type certificated for safe operations, instruments, and equipment required to be operational by an airworthiness directive pertaining to that particular aircraft, or any other instruments and equipment required by part 91.

EASA, when considering the use of High Voltage for many of the new entrants, requested information on whether the FAA considers particular operational and/or design provisions to cater for the risk posed by electric hazards during and after an emergency entry into water.

From the certification standpoint, the FAA is in the process of developing guidance pertaining to airworthiness criteria for ditching or emergency flotation for eVTOL powered-lift. Through the established process for type certification in accordance with § 21.17(b), applicants requesting a ditching or emergency flotation approval, the FAA would consider the risks associated with a water landing in an aircraft with a high voltage system when establishing the certification basis for that aircraft. The specific method on how a specific applicant complies with these requirements would then be documented in the means of compliance for each specific design approval.

EASA also sought clarification on the expected buoyancy and demonstrated sea states that will apply to those powered-lift opting to install floats in order to mitigate for the inability to meet § 135.183 (a) or (c). Buoyancy and sea states are defined within aircraft certification (combination of regulation and guidance material) if a ditching

⁴⁷⁰ FAA Order 8900.1 Volume 8, Chapter 2, Section 3 Flight Operations Evaluation Board, D. The Formal FOEB Meeting (3) (a).

approval is sought. If a powered-lift requested this approval, then the FAA would apply the appropriate airworthiness criteria from the existing airworthiness standards to meet the equivalent level of safety as required under § 21.17(b).

D. Congressional Comments

A U.S. Congressman said they sponsored a bipartisan amendment, which was unanimously passed by the House Transportation and Infrastructure Committee and incorporated into the 2023 FAA Reauthorization that passed the House of Representatives in July 2023. The Congressman suggested that the FAA consider this amendment and consult with the Department of Defense (DoD) on pilot qualifications before finalizing the SFAR.

A joint association letter also recommended consulting the Secretary of Defense regarding the U.S. Air Force Agility Prime Program and powered-lift deployed for military purposes such as the F-35B.

The FAA appreciates Congressional interest in the integration of powered-lift in the NAS. As discussed in section II of this preamble, the FAA has addressed requirements of section 955 of the FAA Reauthorization Act of 2024 into this final rule, including the provisions regarding pilot certification and performance-based energy reserve requirements.

As discussed in section V.D.2. of this preamble, during this rulemaking, the FAA carefully considered DoD's approach to pilot training and simulation. The FAA will continue to work with the DoD as powered-lift are integrated into the NAS and in future rulemaking activities. In addition to this rulemaking, the FAA has been engaged in a broader effort with the Department of Transportation as part of the AAM Interagency Working Group. The AAM IWG is a broad group of Federal departments and agencies, including DoD, whose mission is to foster leadership and interagency collaboration in the adoption and deployment of AAM. The FAA looks forward to continuing to learn from the Department of Defense about the use of, and research regarding, powered-lift.

XVI. Related Rulemakings

To integrate powered-lift into the NAS, the FAA is engaging in a multistep process to update the regulations applicable to powered-lift. These rulemakings include: the Update to Air Carrier Definitions, Airman Certification Standards and Practical Test Standards for Airmen: Incorporation by Reference,

and Modernization of Special Airworthiness Certification.

First, in the final rule *Update to Air Carrier Definitions*,⁴⁷¹ the FAA added powered-lift to the definitions of five kinds of air carrier operations: commuter, domestic, flag, on-demand, and supplemental to the part 110 regulatory definitions. Specifically, the definitions in part 110 apply to all operations under 14 CFR chapter I, subchapter G, which includes parts 135 and 136, as well as to the part 119 air carrier and commercial operator certification requirements. Therefore, the rules and applicability sections in 14 CFR chapter 1, subchapter G, would include use of powered-lift in those kinds of operations. Amending these definitions along with other provisions of part 119 enables powered-lift to engage in operations consistent with the applicable statutory framework that applies to air carrier and commercial operations.

Next, the Airman Certification Standards and Practical Test Standards for Airmen; Incorporation by Reference (ACS IBR)⁴⁷² revised certain part 61 regulations to incorporate the pilot certification testing standards by reference into the requirements for powered-lift pilot and flight instructor certification. As it pertains to powered-lift, the ACS IBR rule incorporated six powered-lift ACSs into part 61: (1) ATP and Type Rating for Powered-Lift Category, (2) Commercial Pilot for Powered-Lift Category, (3) Private Pilot for Powered-Lift Category, (4) Instrument Rating—Powered-Lift, (5) Flight Instructor for Powered-Lift Category, and (6) Flight Instructor Instrument Powered-Lift. Most of the Powered-Lift ACSs were drafted based on input from industry and the ACS Working Group and align with the areas of operation promulgated by the regulations for the respective certificates and/or ratings.

Finally, in the Modernization of Special Airworthiness Certification (MOSAIC) NPRM,⁴⁷³ the FAA proposed to amend rules for the manufacture, certification, operation, maintenance, and alteration of light-sport aircraft. Specifically, the current § 1.1 definition of light-sport aircraft excludes helicopters and powered-lift from being considered as light-sport aircraft. The FAA proposed to allow the airworthiness certification of rotorcraft

and powered-lift as light-sport category aircraft under § 21.190, provided these aircraft are certificated in accordance with the proposed performance-based requirements in part 22 using an FAA-accepted consensus standard as a means of compliance.

SAE International, CAE, AOPA, and L3Harris Commercial Aviation cited the MOSAIC NPRM as a notable related rulemaking. These commenters suggested the FAA should align the powered-lift SFAR with the MOSAIC NPRM, which they said describes and accommodates the enhanced safety of simplified flight controls and the benefits of a performance-based approach to certification. The MOSAIC rulemaking is in the proposal phase, working toward final rule publication. Notwithstanding, the FAA is internally coordinating to ensure that the powered-lift SFAR and the MOSAIC rule do not conflict. Specific discussion pertaining to how this rule has coordinated with the MOSAIC rule can be found in section V.A. of this preamble, regarding type rating requirements, and section VI.B.1. of this preamble, regarding § 91.113, the right-of-way rules.

CAE and NBAA referenced the Updating Manual Requirements to Accommodate Technology final rule which modernized regulations that require manuals to reflect improvements in technology. They recommended that the FAA revise the regulatory text regarding access to manuals to align with this final rule.

The *Updating Manual Requirements to Accommodate Technology* final rule creates flexibility in allowing electronic display of manuals without a rigid form and formatting. The FAA's position is that an operator may use Electronic Flight Bag (EFB) technology to meet the requirement for carrying the appropriate manuals while away from base.⁴⁷⁴ The powered-lift SFAR does not contravene the *Manual Requirements* final rule. In fact, an operator could apply for an authorization to use an EFB.⁴⁷⁵ Moreover, the powered-lift SFAR applies the current regulations to powered-lift operations. So, changes made within the regulations regarding manual requirements would also apply for powered-lift operators.

XVII. Severability

As discussed in section II. of this preamble, Congress authorized the FAA by statute to promote safe flight of civil aircraft in air commerce by prescribing,

⁴⁷¹ Final rule, *Update to Air Carrier Definitions*, 88 FR 48072 (July 28, 2023).

⁴⁷² Final rule, *Airman Certification Standards and Practical Test Standards for Airmen; Incorporation by Reference*, 89 FR 22482 (April 1, 2024).

⁴⁷³ *Modernization of Special Airworthiness Certification NPRM*, 88 FR 47650 (July 24, 2023).

⁴⁷⁴ See AC-120-76D *Authorization for Use of Electronic Flight Bags*.

⁴⁷⁵ 88 FR 34437 (May 30, 2023).

among other things, regulations and minimum standards for practices, methods, and procedures the Administrator finds necessary for safety in air commerce.⁴⁷⁶ Consistent with that mandate, the FAA promulgates the regulations described herein to facilitate the certification of powered-lift pilots and operation of powered-lift. However, the FAA recognized that certain provisions of this final rule approach operations and airman certification in unique ways due to the novel challenges presented with the integration of a new category of aircraft into the NAS. Therefore, the FAA has determined that various provisions of this SFAR are capable of operating independently of one another, are severable, and are able to operate functionally if severed from each other. In the event a court were to invalidate one or more of this final rule’s unique provisions, the remaining provisions should remain unaffected and in force to the extent those provisions maintain their intended effect without the severed provisions, thereby allowing the FAA to integrate the operation of powered-lift within its Congressionally authorized role of

promoting safe flight of civil aircraft in air commerce.

XVIII. Regulatory Notices and Analyses

Federal agencies consider impacts of regulatory actions under a variety of executive orders and other requirements. First, Executive Order 12866, Executive Order 13563, and Executive Order 14094 (“Modernizing Regulatory Review”), direct that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify the costs. Second, the Regulatory Flexibility Act of 1980 (Pub. L. 96–354) requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Trade Agreements Act (Pub. L. 96–39) prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. Fourth, the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate that may result in the expenditure by State, local, and Tribal

governments, in the aggregate, or by the private sector, of \$100 million or more (adjusted annually for inflation) in any one year. The current threshold after adjustment for inflation is \$183 million using the most current (2023) Implicit Price Deflator for the Gross Domestic Product. This portion of the preamble summarizes the FAA’s analysis of the economic impacts of this rule. The FAA has provided a detailed Regulatory Impact Analysis (RIA) in the docket for this rulemaking.

In conducting these analyses, the FAA has determined that this rule: (1) will result in benefits that justify costs; (2) is a “significant regulatory action” as defined in section 3(f)(1) of Executive Order 12866 (as amended by Executive Order 14094); (3) will not create unnecessary obstacles to the foreign commerce of the United States; and (4) will not impose an unfunded mandate on State, local, or Tribal governments, or on the private sector.

In accordance with OMB Circular A–4 (at www.whitehouse.gov/omb/circulars/), an accounting statement showing the classification of impacts associated with the rule is provided below.

TABLE 10—OMB A–4 ACCOUNTING STATEMENT

Category	OMB A–4 Accounting Statement						Notes
	Primary estimate	Low estimate	High estimate	Dollar year	Discount rate (%)	Time horizon (years)	
Benefits							
Annualized monetized benefits.	Not Estimated	Not Estimated	Not Estimated	N/A	N/A	N/A	
Annualized quantified, but non-monetized, benefits.	N/A	N/A	N/A	N/A	N/A	N/A	
Unquantified benefits	<p><i>Mitigates Risk and Narrows Safety Gap</i>—The SFAR establishes a regulatory structure that leverages airplane, helicopter, and rotorcraft rules to narrow a safety gap that would otherwise exist absent the rule.</p> <p><i>Data Collection</i>—For the duration of the SFAR, the FAA will gather data and information to evaluate the temporary requirements to determine the most appropriate permanent rulemaking path for powered-lift. The FAA anticipates gathering data and information through: (1) formal information collections; (2) regulatory requirements; (3) regular, formal and informal interactions with the public, including conferences, data-sharing systems, and outreach initiatives; and (4) informal anecdotal information and observations.</p> <p><i>Alternate Pathway to Pilot Certification</i>—The SFAR introduces an alternate pathway for pilots to obtain powered-lift ratings on the commercial pilot certificates.</p>						The powered-lift industry is nascent, and the timeframe in which commercial operations will become viable is unknown. A certain degree of operational growth is dependent on industry readiness once the regulatory framework is in place.

⁴⁷⁶ 49 U.S.C. Subtitle VII, Part A, Subpart i, Section 40113, Administrative, and Subpart iii, Section 44701, General Requirements; Section 44702, Issuance of Certificates; Section 44703,

Airman Certificates; Section 44704, Type Certificates, Production Certificates, Airworthiness Certificates, and Design and Production Organization Certificates; Section 44705, Air Carrier

Operating Certificates; and Section 44707, Examination and Rating of Air Agencies.

TABLE 10—OMB A-4 ACCOUNTING STATEMENT—Continued

Category	OMB A-4 Accounting Statement						Notes
	Primary estimate	Low estimate	High estimate	Dollar year	Discount rate (%)	Time horizon (years)	
	<p><i>Relief from the provision of dual-control a/c for training</i>—The SFAR provides for three alternatives to accomplish training for aircraft that are not equipped with dual-controls, which are: (1) accomplishing training in a powered-lift equipped with a single functioning flight control accessible by both the student and instructor; (2) accomplishing 100% of training in a full flight simulator that is combined with in-aircraft solo aeronautical experience; and (3) FAA can issue deviation authority to facilitate flight training in powered-lift with a single functioning flight control based on future advancements in technology.</p>						
Costs							
Annualized monetized costs: 2% PV.	\$101.8	\$96.4	\$107.6	2022	2	10	Costs are incurred as powered-lift enter the fleet. For the high estimate, it is determined powered-lift deliveries start during the year of the SFAR's publication. For the primary estimate and the low estimate, it is determined powered-lift enter the fleet in year 2 and 3, respectively.
Annualized monetized costs: 3% PV.	103.7	97.4	110.3	2022	3	10	
Annualized monetized costs: 7% PV.	110.9	101.1	121.70	2022	7	10	
Annualized quantified, but non-monetized, costs.	N/A	N/A	N/A	N/A	N/A	N/A	
Unquantified costs	<p><i>Equipage Requirements</i>—The SFAR imposes equipage requirements which would add costs for entities manufacturing and/or operating powered-lift. These costs could include, but are not necessarily limited to, the purchase and installation of equipment, the decrease of aircraft performance due to added weight of required equipment, and the cost to perform required maintenance and repairs of equipment. The equipage requirements being imposed generally affect powered-lift with 6 or more seats for which 2 pilots are required, or for powered-lift with 10 or more seats. At present, there is only one powered-lift undergoing type certification that meets these requirements.</p> <p><i>Advanced Qualification Program</i>—The FAA determined that the same safety standard imposed in § 135.3(b) for commuter operations involving airplanes for which two pilots are required by type certification should apply to powered-lift requiring two pilots by type certification. The safety standard requires these kinds of operations to comply with subparts N and O of part 121, which are multiengine specific. At this time, the FAA is not revising part 121 to accommodate powered-lift as part 121 operations are not anticipated during the period of the SFAR. Thus, for these operations, the FAA will require certificate holders to comply with subpart Y of part 121. At present, there is only one powered-lift undergoing type certification that meets these requirements.</p>						The costs imposed by the finalized rule provide for the integration of powered-lift into the NAS expeditiously without compromising safety. Generally, the rule mirrors requirements that are applicable to operators of airplanes and rotorcraft.
Transfers							
Annualized transfers From whom to whom?	Not Applicable.						
Miscellaneous							
Effects on State, local, or Tribal Govt.	None.						
Effects on small businesses.	Generally, entities affected by the rule are small, and the FAA does not anticipate that they will be negatively impacted by this rule. The introduction of powered-lift operations into the NAS is an emerging market, and the number of entities that will be impacted by this rule is uncertain.						
Effects on wages	None.						
Effects on growth	The rule puts a regulatory framework in place for the safe integration of powered-lift in the National Airspace System. A certain degree of operational growth is dependent on industry readiness.						

A. Summary of the Regulatory Impact Analysis

1. Data and Assumptions

This Special Federal Aviation Regulation finalizes alternate eligibility requirements to safely certificate initial groups of powered-lift pilots, as well as determine which operating rules to apply to powered-lift on a temporary basis. This will enable the FAA to gather additional information to determine the most appropriate permanent rulemaking path for these aircraft. The analysis for the regulatory evaluation is based on the following assumptions and data sources.

- The FAA uses a 10-year time period of analysis.⁴⁷⁷ The analysis uses 2022 constant dollars. Year 1 of the period of analysis, which would correlate with the effective date of the final, is used as the base year.
- The analysis provides a range of costs from low to high. The FAA considers the primary estimate of costs to be the base scenario.
- It is estimated that it would cost an individual approximately \$22,124 to accomplish the training and testing required for a type rating.⁴⁷⁸ The FAA believes that in many circumstances this training and testing would be at the expense of entities utilizing powered-lift in its operations.
- To forecast the number of pilots required to operate the powered-lift fleet, the FAA used a model published by the NBAA. The model estimates the number of pilots required to operate a fleet of aircraft.⁴⁷⁹ To account for pilot turnover, a rate of 8.9 percent, annually, is used.⁴⁸⁰

- The estimated battery life for an eVTOL is 1,600 hours.⁴⁸¹ The cost per battery is \$60,000.⁴⁸²
- It is estimated that 20 dual-control aircraft and 60 full flight simulators will be required for the provision of training at a cost of \$3.9 million per dual-control aircraft and \$10 million per full flight simulator.⁴⁸³
- Operational and maintenance rules under parts 43, 91, 97, 135, and 136 that are applicable to aircraft continue to be applicable to powered-lift because powered-lift meet the definition of an aircraft in § 1.1. Unless otherwise stipulated in this final rule, either the more conservative airplane-specific operational rules or those for rotorcraft/helicopters will apply to powered-lift. Additionally, in some instances, performance-based alternatives and deviation provisions provide additional flexibility in the operational rules for powered-lift.
- The FAA uses a two percent, three percent, and seven percent discount rate to quantify present value costs and cost savings.⁴⁸⁴

2. Summary of Individual Proposed and Finalized Regulatory Impacts

The powered-lift currently undergoing the type certification process are comparatively different compared to the powered-lift proposed during the 1990s. Currently, manufacturers are proposing aircraft and operations that were not conceptualized in the 1997 rulemaking that introduced the powered-lift category of aircraft into the airmen certification rules. When airmen certification rules were introduced, it

was the FAA’s intention to initiate further rulemakings to develop operational rules for powered-lift. However, these intentions never came to fruition. Without this rulemaking, civilian pilots will be unable to obtain powered-lift ratings necessary for industry to scale operations intended for these new and novel aircraft. Should type-certificated powered-lift become available before this rule is finalized, individuals holding an airman certificate with a powered-lift category rating would be permitted to act as PIC of powered-lift operations.

Furthermore, if powered-lift were available for civil operations today, they would not be subject to operating rules that are specific to an aircraft category or class. Instead, the only rules that would apply are the part 91 and 135 rules that are specific to “aircraft.” Through this SFAR, the FAA provides operating rules applicable to powered-lift and a pathway for pilots to obtain powered-lift ratings through alternate aeronautical experience requirements and expanded logging provisions. The regulatory evaluation portion of this SFAR evaluates the economic impact of the amendments.

The tables below provide an evaluation of the economic impact of the proposed rule and the final rule. The first table of the two replicates the amendments as proposed, and the second table summarizes only those amendments that have either been added or revised for the final rule. The tables are designed to quickly inform the reader of the changes and their resulting impacts.

TABLE 11—SFAR—PROPOSED AMENDMENTS

Section	Proposed amendment	Impact
Part 43—Maintenance, Preventive Maintenance, Rebuilding, & Alterations.	<p>§ 43.3(h) <i>Persons authorized to perform maintenance, preventive maintenance, rebuilding, and alterations.</i></p> <p>§ 43.15(b) <i>Additional performance rules for inspections.</i></p>	<p>Provides relief to operators of powered-lift on a scale that is equivalent to the relief provided to operators of rotorcraft.</p> <p>Imposes a regulatory burden on operators conducting powered-lift operations on a scale no greater than that imposed on like operators conducting operations with rotorcraft.</p>
Part 91—General Operating and Flight Rules.	<p>§ 91.9(a)(b) <i>Civil Aircraft Flight Manual.</i></p> <p>§ 91.103(b)(1) <i>Preflight action.</i></p> <p>§ 91.109 <i>Flight instruction; Simulated instrument flight.</i></p> <p>§ 91.151 <i>Fuel requirements for flight in VFR conditions.</i></p>	<p>Imposes costs on operators of powered-lift on a scale equivalent to costs imposed on operators of airplanes or rotorcraft.</p>

⁴⁷⁷ In addition, the FAA acknowledges uncertainty in estimating incremental impacts of this proposed rule since the FAA has yet to type certificate a powered-lift.

⁴⁷⁸ The estimated cost for this provision is detailed in the regulatory impact analysis prepared for this SFAR.

⁴⁷⁹ 2016–01–nbba–management–guide PDF (nbba.org). See Figure 1.5 on page 1–18.

⁴⁸⁰ www.nts.gov/news/events/Documents/aviation_pro-Lovelace-NTSB-Professionalism-Forum.pdf.

⁴⁸¹ www.sciencedirect.com/science/article/pii/S2542435121002051.

⁴⁸² aerospaceamerica.aiaa.org/features/faith-in-batteries/.

⁴⁸³ Source: NERA Economic Consulting—Expert Report of Christian M. Dippon, Ph.D. on behalf of

Supernal. August 14, 2023. This report estimates 50 dual-control aircraft will be required for the provision of training over the ten-year period of the SFAR www.regulations.gov/comment/FAA-2023-1275-0062.

⁴⁸⁴ OMB Circular A–4, Regulatory Analysis (2003), www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/circulars/A4/a-4.pdf.

TABLE 11—SFAR—PROPOSED AMENDMENTS—Continued

Section	Proposed amendment	Impact
	<p>§ 91.167 Fuel requirements for flight in IFR conditions. § 91.205(b)(11) Anti-collision lights. § 91.205(b)(14) Shoulder harness, restraint system. § 91.207 Emergency locator transmitters. § 91.215 ATC transponder and altitude reporting equipment and use. § 91.219 Altitude alerting system or device. § 91.223 Terrain awareness and warning. § 91.313 Shoulder harness, restraint system. § 91.409 Inspection programs. § 91.411 Altimeter system and altitude reporting. § 91.501 Applicability. § 91.503 Flying equipment and operating information. § 91.505 Aircraft Flight Manual. § 91.507 Equipment required for over-the-top or night VFR ops. § 91.509 Survival equipment. § 91.511 Communications and navigation. § 91.513 Emergency equipment. § 91.517 Passenger information, seatbelts/non-smoking. § 91.519 Oral briefing. § 91.521 Safety equipment requirements. § 91.523 Requirements for storage of carry-on baggage. § 91.525 Requirements for storage of cargo. § 91.527 Requirements for operating in icing conditions. § 91.529 Flight engineer requirements. § 91.531 Second-in-command requirements. § 91.533 Flight attendant requirements. § 91.603 Aural speed warning device. § 91.605 Transport category civil airplane weight limitations. § 91.609 Flight data recorders and cockpit voice recorders. § 91.613 Materials for compartment interiors. § 91.1041 Proving and validation tests. § 91.1045 HTAWS and thunderstorm detection equipment. § 91.1065 Initial and recurrent pilot testing requirements.</p>	
Part 91—General Operating and Flight Rules.	<p>§ 91.107(a)(3) Use of restraint systems. § 91.205(d)(3) U.S. airworthiness certificates: Instrument and equipment requirements.</p>	Provides relief to operators of powered-lift on a scale equivalent to the relief provided to operators of airplanes or rotorcraft.
Part 91—General Operating and Flight Rules.	<p>§ 91.213 Inoperative instruments and equipment. § 91.113(d)(2) and (3) Right-of-way rules. § 91.126(b)(1) and (2) Operating in Class G: Direction of turns. § 91.129 Operations in Class D airspace—approaches. § 91.131 Operations in Class B airspace. § 91.155 Basic VFR weather minimums. § 91.157 Special VFR weather minimums. § 91.169 IFR flight plan: Information required. § 91.175 Takeoff and landing under IFR. § 91.515 Rules for appropriate flight altitudes. § 91.611 Authorization for ferry flight with one engine—not allowed by SFAR. § 91.1037 Limitations; destination and alternate airports. § 91.1039 IFR takeoff, approach, and landing minimums. § 91.1055 Pilot operating limitations and pairing requirement.</p>	Imposes costs on operators of powered-lift on a scale equivalent to costs imposed on operators of airplanes or rotorcraft.
Part 91—General Operating and Flight Rules.	<p>§ 91.126(c) Operating in Class G airspace—flap settings. § 91.129 Operations in Class D airspace—minimum altitudes. § 91.129 Operations in Class D airspace—departures. § 91.129 Operations in Class D airspace—noise abatement.</p>	Imposes a regulatory burden on operators conducting powered-lift operations on a scale no greater than that imposed on like operators conducting operations with airplanes or rotorcraft.
Part 97—Standard Instrument Procedures.	<p>§ 97.3. Copter procedures.</p>	Enabling.
Part 135—Operating Requirements Commuter and On-Demand Operations and Rules Governing Persons on Board Such Aircraft.	<p>§ 135.4 Applicability of rules for eligible on-demand operations. § 135.23(r)(7) Manual contents. § 135.93 Minimum altitudes for use of autopilot. § 135.100 Flight crewmember cuties. § 135.159(a)(2)(3) Helicopter exceptions are not allowed. § 135.181 Aircraft operated over-the-top or in IFR conditions. § 135.183 Land aircraft operated over water. § 135.203 VFR: Minimum altitudes. § 135.205 VFR: Visibility requirements. § 135.207 VFR: Helicopter surface reference requirements. § 135.221 Alternate airport weather minimums. § 135.361 Applicability. § 135.363 General. § 135.379 Large transport category airplanes. Turbine engine powered: Takeoff limitations. § 135.381 Large transport category airplanes. Turbine engine powered: En-route limitations: One engine inoperative.</p>	Imposes a regulatory burden on operators conducting powered-lift operations on a scale no greater than that imposed on like operators conducting operations with airplanes or rotorcraft.

TABLE 11—SFAR—PROPOSED AMENDMENTS—Continued

Section	Proposed amendment	Impact
Part 135—Operating Requirements Commuter and On-Demand Operations and Rules Governing Persons on Board Such Aircraft.	<p>§ 135.383 Large transport category airplanes. Turbine engine powered: En-route limitations: Two engines inoperative.</p> <p>§ 135.385 Large transport category airplanes. Turbine engine powered: En-route limitations: Landing limitations.</p> <p>§ 135.387 Large transport category airplanes. Turbine engine powered: En-route limitations: Landing limitations: Alternate airports.</p> <p>§ 135.389 Large non-transport category airplanes: Takeoff limitations.</p> <p>§ 135.391 Large non-transport category airplanes. En-route limitations: One engine inoperative.</p> <p>§ 135.393 Large non-transport category airplanes. Landing limitations: En-route limitations: Destination airports.</p> <p>§ 135.395 Large non-transport category airplanes. Landing limitations: En-route limitations: Alternate airports.</p> <p>§ 135.397 Small transport category airplanes performance operating limitations.</p> <p>§ 135.1(a)(9) Conducting operations in accordance with subpart L (Helicopter Air Ambulance Equipment, Operations, and Training Requirements).</p> <p>§ 135.117(a)(9) Briefing of passengers before flight.</p> <p>§ 135.145 Aircraft proving and validation tests.</p> <p>§ 135.150 Public address and crewmember interphone systems.</p> <p>§ 135.151 Cockpit voice Recorders.</p> <p>§ 135.152 Flight data recorders.</p> <p>§ 135.154 Terrain awareness warning systems.</p> <p>§ 135.158 Pitot heat indication systems.</p> <p>§ 135.160 Radio altimeters for rotorcraft operations.</p> <p>§ 135.165 Communication and navigation equipment.</p> <p>§ 135.168 Emergency equipment.</p> <p>§ 135.169 Additional airworthiness requirements.</p> <p>§ 135.170 Materials for compartment interiors.</p> <p>§ 135.173 Airborne thunderstorm equipment requirements.</p> <p>§ 135.178 Additional emergency equipment.</p> <p>§ 135.180 Traffic alert and collision avoidance system.</p> <p>§ 135.209 VFR: Fuel supply.</p> <p>§ 135.223 IFR: Alternate airport requirements.</p> <p>§ 135.227 Icing conditions: Operating limitations.</p> <p>§ 135.271 Helicopter hospital emergency medical evacuation services (HEMES).</p>	Imposes costs on operators of powered-lift on a scale equivalent to costs imposed on operators of airplanes or rotorcraft.
Part 135—Operating Requirements Commuter and On-Demand Operations and Rules Governing Persons on Board Such Aircraft.	<p>§ 135.128 Use of safety belts, child restraint systems.</p> <p>§ 135.159(a)(1) Gyroscopic rate of turn indicator.</p> <p>§ 135.163(g) Exception for helicopters is allowed.</p> <p>§ 135.229 Airport requirements.</p> <p>§ 135.429(d) Required inspection personnel.</p>	Provides flexibility or relief to operators of powered-lift on a scale equivalent to the flexibility or relief provided to operators of airplanes or rotorcraft.
Part 61—Certification: Pilots, Flight Instructors, and Ground Instructors.	<p>§ 61.31(a) Type rating requirements, additional training, and authorization reqts.</p> <p>§ 61.109(e)(5) Aeronautical experience.</p>	Imposes a regulatory burden on individuals seeking airmen certification in powered-lift on a scale no greater than that imposed on individuals accomplishing airmen certification in other aircraft categories.
Part 61—Certification: Pilots, Flight Instructors, and Ground Instructors.	<p>Addressing:</p> <p>§ 61.1(b) Applicability and definitions: Cross-country time definition (paragraph (ii)).</p> <p>§ 61.3 Req't for certificates, ratings, and authorizations: Flt instructor certificate.</p> <p>§ 61.45 Requirement for certificates, ratings, and authorizations: Practical tests: Required aircraft and equipment.</p> <p>§ 61.51 Requirement for certificates, ratings, and authorizations: Pilot logbooks.</p> <p>§ 61.55 Requirement for certificates, ratings, and authorizations: SIC.</p> <p>§ 61.63(d)(3) Additional aircraft ratings (other than for ratings at the airline transport pilot certification level). Proposed eligibility requirements</p> <p>§ 61.65 Instrument rating requirements.</p> <p>§ 61.107 Flight proficiency.</p> <p>§ 61.109(e)(2)(i), (e)(5)(ii) Aeronautical experience.</p> <p>§ 61.127 Flight proficiency (commercial pilots).</p> <p>§ 61.129 Aeronautical experience: Alternate experience and logging reqts.</p> <p>§ 61.167 Airline transport pilot privileges and limitations.</p> <p>§ 61.195 Flight instructor limitations and qualifications.</p>	Relieving. No additional regulatory costs.
Part 61—Certification: Pilots, Flight Instructors, and Ground Instructors.	<p>Addressing:</p> <p>§ 61.64 Use of a flight simulator and flight training device—SFAR—removes three of four available alternative requirements that enable a person to accomplish a practical test for a powered-lift type rating in a simulator.</p>	Imposes a regulatory burden on individuals accomplishing a powered-lift type rating in an FFS on a scale no greater than that imposed on individuals accomplishing a type rating in an FFS for airplanes or helicopters.
Part 135—Operating Requirements Commuter and On-Demand Operations and Rules Governing Persons on Board Such Aircraft.	SFAR temporarily allow the completion of certain part 135 tests and checks to meet the flight proficiency requirements for the addition of a powered-lift category rating, an instrument-powered-lift rating, and powered-lift type rating to a commercial certificate.	Relieving.

TABLE 11—SFAR—PROPOSED AMENDMENTS—Continued

Section	Proposed amendment	Impact
Part 135—Operating Requirements Commuter and On-Demand Operations and Rules Governing Persons on Board Such Aircraft.	<p>§ 135.3 Rules applicable to operations subject to this part—FAA proposes certificate holders comply with subpart Y of part 121 (Advanced Qualification Program (AQP)).</p> <p>§ 135.243 Pilot in command qualifications.</p> <p>§ 135.244 Operating experience.</p> <p>§ 135.245 Second in command qualifications.</p> <p>§ 135.293 Initial and recurrent pilot testing requirements.</p> <p>§ 135.297 Pilot in command: Instrument proficiency check requirements.</p> <p>§ 135.340 Initial and transition training and checking: Check airmen (aircraft), check airmen (simulator).</p> <p>§ 135.345(b)(6)(iv) Pilots: Initial, transition, and upgrade ground training.</p>	Imposes costs on operators of powered-lift on a scale equivalent to costs imposed on operators of airplanes or rotorcraft.
Part 111—Pilot Records Database	<p>§ 111.1 Applicability.</p>	Imposes costs on operators of powered-lift on a scale equivalent to costs imposed on operators of airplanes or rotorcraft.
Part 136—Commercial Air Tours and National Parks Air Tour Management.	<p>§ 136.1 Suitable landing area for helicopters.</p> <p>§ 136.9 Life preservers for over water.</p> <p>§ 136.11(c) Helicopter floats for over water.</p> <p>§ 136.13(a) Helicopter performance plan and operations Appendix A Special Operating Rules for Air Tour Operators in the State of Hawaii.</p>	Imposes costs on operators of powered-lift on the same scale as costs imposed on operators of airplanes or rotorcraft.
Part 141—Flight Schools	<p>§ 141.35 Chief instructor qualifications.</p> <p>§ 141.36 Assistant chief instructor qualifications.</p> <p>§ 141.37 Check instructor qualifications.</p>	Relieving—no additional regulatory costs.
Part 142—Training Centers	<p>§ 142.47(a), (c) Training center instructor eligibility requirements.</p> <p>§ 142.53 Training center instructor training and testing requirements.</p>	Imposes a regulatory burden on part 142 training centers conducting powered-lift training on a scale no greater than that imposed on like training centers conducting training with airplanes or rotorcraft.
Part 142—Training Centers	§ 142.11 Application for issuance or amendment.	Provides relief to part 142 training centers conducting powered-lift training to allow instructors to meet the experience requirements of part 61 or hold the certificate. This allows lower hours to obtain certificate through the SFAR.
Part 142—Training Centers	§ 142.57 Aircraft requirements.	Enabling. No additional regulatory costs unless a part 142 training center chooses conduct training with powered-lift flight simulators and flight training devices.
Part 142—Training Centers		Provides relief to part 142 training centers conducting powered-lift training on a scale equivalent to that provided to training centers conducting training with airplanes or rotorcraft.

The table below identifies only those amendments added or changed from the proposed SFAR to the final SFAR. The first column of the table identifies the affected part; the second column provides the section affected and a description of the change from the proposed rule to the final rule; lastly,

the third column identifies the economic impact of the change. If a provision from the proposal is not listed in the table below, then the provision was finalized as proposed.

In many instances, the finalized SFAR applies operating rules for helicopters in place of the more conservative airplane

rules proposed by the SFAR for powered-lift as long as the powered-lift can meet the performance-based criteria outlined in the rule. This largely means that amendments as finalized by the SFAR still impose a burden to the various entities affected; however, the burden will be to a lesser degree.

TABLE 12—SFAR—TABLE OF AMENDMENTS CHANGED FROM PROPOSED RULE TO FINAL RULE

Section	Changes to provisions as proposed	Impact
Part 1—Definitions and Abbreviations	<p>§ 1.1 General definitions.</p> <p>Revises the definition of autorotation to include powered-lift. Definition is as follows: Autorotation means a rotorcraft or powered-lift flight condition in which the lifting rotor is driven entirely by action of the air when the rotorcraft or powered-lift is in motion.</p>	No economic impact.
Part 91—General Operating and Flight Rules.	<p>§ 91.113 Right-of-way-rules: Except water operations.</p> <p>Permanent amendment that was originally proposed as a temporary change for the duration of the SFAR. The language is updated to change the term “engine-driven aircraft” to “powered aircraft.”</p> <p>Powered-lift to use right-of-way rules designated for other powered aircraft (e.g., airplanes and rotorcraft).</p>	Imposes a regulatory burden on operators of powered-lift on a scale equivalent to costs imposed on operators of airplanes or rotorcraft.
Part 91—General Operating and Flight Rules.	<p>§ 91.903 Policy and procedures.</p> <p>Adds any rule listed subpart J of part 91 as modified by subpart C of part 194 to those that the Administrator may issue a certificate of waiver authorizing the operation of aircraft in deviation from those rules</p>	Provides relief from provisions proposed by SFAR.
Part 135—Operating Requirements: Commuter and on Demand Operations and Rules Governing Persons on Board Such Aircraft.	<p>§ 135.100 Flight crewmember duties.</p> <p>Permanent technical amendment to provide the definition of “taxi” for purposes of § 135.100.</p>	No economic impact.

TABLE 12—SFAR—TABLE OF AMENDMENTS CHANGED FROM PROPOSED RULE TO FINAL RULE—Continued

Section	Changes to provisions as proposed	Impact
Part 135—Operating Requirements: Commuter and on Demand Operations and Rules Governing Persons on Board Such Aircraft.	<p>§ 135.165(d) <i>Communication and navigation equipment: Extended over-water or IFR operations.</i> Permanent amendment to reflect the current location of the definition for “commuter operation” (reference to the definition is updated from part 119 to part 110).⁴⁸⁵</p>	No economic impact.
Part 135—Operating Requirements: Commuter and on Demand Operations and Rules Governing Persons on Board Such Aircraft.	<p>§ 135.339(e) <i>Initial and transition training and checking: Check airmen (aircraft), check airmen (simulator).</i> § 135.340(e) <i>Initial and transition training and checking: Flight instructors (aircraft), flight instructors (simulator).</i> Permanent amendment to allow for training in powered-lift that are not equipped with dual controls.</p>	Provides relief from proposed SFAR.
Part 136—Commercial Air Tours and National Pars Air Tour Management.	<p>§ 136.75(a) <i>Equipment and requirements.</i> Permanent technical amendment to add the term “single-engine” in front of “rotorcraft.” FAA did not intend for this rule to apply to all rotorcraft.</p>	In the Update to Air Carrier Definitions rule, when appendix A was moved to subpart D “single-engine” was inadvertently omitted. As a result, the applicability of required flotation equipment was mistakenly expanded to all rotorcraft, instead of only single-engine rotorcraft.
Part 142—Training Centers	<p>§ 142.47 <i>Training center instructor eligibility requirements.</i> Certain provisions of § 142.47(a)(5) requires an instructor to meet specific aeronautical experience set forth in § 61.129 or §§ 61.159, 61.161, 61.163, as applicable. This final rule adds the qualification option of simply holding a commercial pilot certificate with the appropriate ratings or an unrestricted ATP with the appropriate ratings to account for those pilots who hold a certificate but may not meet the specific aeronautical experience requirements of part 61 due to decreased minimum experience requirements in part 141 and part 194. The FAA emphasizes that meeting the aeronautical experience requirements as currently required remains an option without holding the certificate itself, as well. Additionally, the final SFAR designates that the aeronautical experience requirements are applicable only to powered-lift weighing greater than 12,500 pounds or turbojet powered. (In the proposed SFAR, the aeronautical experience requirements were applicable powered-lift of all weight classes.</p>	Provides relief from existing regulations allowing aeronautical experience or a commercial certificate in place of aeronautical experierencer set forth in § 61.129 or §§ 61.159, 61.161, 61.163.
Part 194	<p>§ 194.103 <i>Definitions.</i> Amends § 194.103 to add the following definitions: Aviation safety inspector; FAA test pilot; vertical-lift flight mode, and wing-borne flight mode.</p>	No economic impact.
Part 194	<p>§ 194.203 <i>Alternate qualification requirements for certain flight instructors.</i> Amended to add FAA safety inspectors and FAA test pilots to the initial cadre of individuals eligible to receive training from an instructor pilot at a powered-lift manufacturer that does not hold a flight instructor certificate under part 61.</p>	Provides relief from provisions proposed by SFAR.
Part 194	<p>§ 194.209 <i>Additional qualification requirements for certain pilots serving as second-in-command.</i> Amended to allows for an applicant receiving training under §§ 194.221, 194.223, 194.229, and 194.231 to serve as second-in-command in a powered-lift type certificated for more than one required pilot flight crewmember while not otherwise meeting the requirements of § 61.55(a)(1) (a)(2) and (b)(2). (e.g., airplanes and rotorcraft).</p>	Provides relief from provisions proposed by SFAR.
Part 194	<p>§ 194.213 <i>Alternate endorsement requirements for certain persons seeking a powered-lift rating.</i> Adds instructor pilots for manufacturers of experimental powered-lift, FAA test pilots, and FAA aviation safety inspectors to those persons that may provide the required logbook or training record endorsements under parts 61 and 194 for a commercial pilot certificate with a powered-lift category, instrument, or type rating, or for a flight instructor certificate with powered-lift rating.</p>	Provides relief from provisions proposed by SFAR.
Part 194	<p><i>New § 194.216 Alternate aeronautical experience pilot-in-command flight time in a powered-lift for a commercial pilot certificate with a powered-lift category rating.</i> This new amendment allows all pilots to use the FFS credit (not just those pilots training under an approved training program) as provided for in the proposal for this rulemaking.</p>	Provides relief from provisions proposed by SFAR.
Part 194	<p>§ 194.217 <i>Test pilots, FAA test pilots, or aviation safety inspectors: Alternate aeronautical experience and logging requirements for a commercial pilot certificate with a powered-lift category rating.</i> Adds FAA test pilots and FAA aviation safety inspectors to those applicants that may use alternate aeronautical experience and logging requirements for a commercial pilot certificate with a powered-lift ratings.</p>	Provides relief from provisions proposed by SFAR.
Part 194	<p>§ 194.219 <i>Instructor pilots: Alternate aeronautical experience and logging requirements for a commercial pilot certificate with a powered-lift category rating.</i> Adds FAA test pilots and FAA safety inspectors to those persons that can receive the manufacturer’s training curriculum from instructor pilots for experimental powered-lift manufacturers. Adds FAA test pilots and FAA safety inspectors to the group of individuals that allow an instructor pilot to log PIC time in an experimental powered-lift.</p>	Provides relief from provisions proposed by SFAR.

TABLE 12—SFAR—TABLE OF AMENDMENTS CHANGED FROM PROPOSED RULE TO FINAL RULE—Continued

Section	Changes to provisions as proposed	Impact
Part 194	<p><i>§ 194.221 Initial cadre of instructors: Alternate aeronautical experience and logging requirements for a commercial pilot certificate with a powered-lift category rating.</i></p> <p>Reduces the number of hours an applicant for a commercial pilot certificate with a powered-lift category rating is required to log as pilot-in-command for the purpose of satisfying aeronautical experience requirements from 40 hours to 25 hours when the pilot is the sole manipulator of the controls of a powered-lift for which the pilot is not rated, provided:</p> <p>(1) The applicant is manipulating the controls of the powered-lift with a person onboard who serves as an instructor pilot for the manufacturer; (2) The applicant is performing the duties of pilot-in-command; and (3) The flight is conducted in accordance with the manufacturer's powered-lift training curriculum.</p>	Provides relief from provisions proposed by SFAR.
Part 194	<p><i>§ 194.223 Pilots receiving training under an approved training program: Alternate requirements for a commercial pilot certificate with a powered-lift category rating.</i></p> <p>Reduces the number of hours an applicant for a commercial pilot certificate with a powered-lift category rating is required to log as pilot-in-command time toward § 61.129(e)(2)(i) from 40 hours to 25 hours when the applicant is the sole manipulator of the controls of a powered-lift for which the pilot is not rated.</p>	Provides relief from provisions proposed by SFAR. Also, a technical Amendment. Inadvertent missing word. (Changes powered-lift category to powered-lift category rating.). No impact.
Part 194	<p><i>§ 194.225 Test pilots, FAA test pilots, and aviation safety inspectors: Alternate aeronautical experience and logging requirements for an instrument powered-lift rating.</i></p> <p>Adds FAA test pilots and FAA aviation safety inspectors to those eligible for relief with regard to alternate aeronautical experience and logging requirements for an instrument powered-lift rating.</p>	Provides relief from provisions proposed by SFAR.
Part 194	<p><i>New § 194.238 Alternate aeronautical experience: Airline transport pilot certificate with a powered-lift category rating.</i></p> <p>Provides for alternative aeronautical experience requirements for an airline transport pilot certificate with a powered-lift category rating given certain conditions.</p>	Provides relief from provisions proposed by SFAR.
Part 194	<p><i>New § 194.243 Pilot certification through completion of training, testing, and checking part 135 of this chapter.</i></p> <p>Provides retraining and endorsement requirements for instances when a pilot fails a part 135 competency or proficiency check (.293/.297) also being to add commercial/instrument/ATP/Type certification concurrently with the check.</p>	Technical amendment. No economic impact.
Part 194	<p><i>New § 194.253 Alternate requirements for powered-lift without fully functional dual controls used in flight training.</i></p> <p>Allows powered-lift without fully functional dual controls to be used for flight training provided the primary flight controls are instantly accessible by both the applicant and the instructor. Additionally, a person may apply for a powered-lift category rating, type rating, and instrument powered-lift rating for a powered-lift with single controls under an approved part 135, 141, or 142 training program by meeting the part 61 requirements or corresponding alternate requirement set forth by part 194.</p>	Provides relief from provisions proposed by SFAR.
Part 194	<p><i>§ 194.301 Applicability.</i></p> <p>Provides clarification that sections or paragraphs within sections under parts 91 and 135 that refer to specific categories of aircraft, and that are not referenced in the SFAR tables to § 194.302 or § 194.306, do not apply to powered-lift.</p>	Technical amendment. No economic impact.
§ 194.302 (con't)—Provisions under part 91 of this chapter applicable to powered-lift.	<p><i>§ 91.119 Minimum safe altitudes: General.</i></p> <p>Provides for a performance-based rule allowing powered-lift to operate at an altitude lower than airplanes.</p>	Provides relief from provisions proposed by SFAR.
194.302 (con't)—Provisions under part 91 of this chapter applicable to powered-lift.	<p><i>Adds § 91.151(b).</i></p> <p>Allows for powered-lift operating in a vertical-lift flight mode to adhere to a less restrictive fuel requirement when flying VFR.</p>	Provides relief from provisions proposed by SFAR.
194.302 (con't)—Provisions under part 91 of this chapter applicable to powered-lift.	<p><i>§ 91.155.</i></p> <p>Allows for powered-lift to use helicopter flight visibility requirements when being operated in the vertical-lift flight mode of flight.</p>	Provides relief from provisions proposed by SFAR.
194.302 (con't)—Provisions under part 91 of this chapter applicable to powered-lift.	<p><i>Adds § 91.157(b)(3), (b)(4), and (c).</i></p> <p>Allows helicopter exceptions to be applied to powered-lift operating in vertical-lift flight mode when those aircraft are operated at a speed that allows the pilot to see any other traffic or obstructions in time to avoid a collision.</p>	Provides relief from provisions proposed by SFAR.
194.302 (con't)—Provisions under part 91 of this chapter applicable to powered-lift.	<p><i>Adds §§ 91.167(a)(3) and (b)(2)(i), and 91.169(b)(2)(ii) and (c)(1)(ii).</i></p> <p>Allows powered-lift authorized to conduct copter procedures and can land in the vertical-lift flight mode to use fuel (§ 91.167) or weather minimums (§ 91.169) established for helicopters.</p>	Provides relief from provisions proposed by SFAR.
194.302 (con't)—Provisions under part 91 of this chapter applicable to powered-lift.	<p><i>Adds § 91.175(f)(2)(iii).</i></p> <p>Allows powered-lift authorized to use copter procedures and can land in the vertical-lift flight mode to use takeoff minimums established for helicopters.</p>	Provides relief from provisions proposed by SFAR.
194.306—Provisions under part 135 of this chapter applicable to powered-lift.	<p><i>Amends § 135.93(c)(1).</i></p> <p>Provides a performance-based alternative to enroute requirements specified in § 135.93.</p>	Provides relief from provisions proposed by SFAR.

TABLE 12—SFAR—TABLE OF AMENDMENTS CHANGED FROM PROPOSED RULE TO FINAL RULE—Continued

Section	Changes to provisions as proposed	Impact
194.306 (con't)—Provisions under part 135 of this chapter applicable to powered-lift.	§ 135.158 Amending the proposed regulatory text for § 194.307(r). Allows for the indication system in powered-lift to be something other than an amber light when a pitot system is not operating.	Provides relief from provisions proposed by SFAR.
194.306 (con't)—Provisions under part 135 of this chapter applicable to powered-lift.	Adds § 135.168(b)(1). For the final rule, the life preserver required by § 135.168(b)(1) need not be worn but must be readily available for its intended use and easily accessible to each occupant when the powered-lift is a multiengine aircraft operated at a weight that will allow it to climb, with the critical engine inoperative or while experiencing a critical change of thrust, at least 50 feet a minute, at an altitude of 1,000 feet above the surface.	Provides relief from provisions proposed by SFAR.
194.306 (con't)—Provisions under part 135 of this chapter applicable to powered-lift.	Added § 135.181(a)(2) and § 135.181(b). Provides clarification that performance requirements for aircraft operated over-the-top or in IFR conditions applies to those powered-lift that do not have a critical engine but can experience a critical change of thrust.	Clarifying amendment. No economic impact.
194.306 (con't)—Provisions under part 135 of this chapter applicable to powered-lift.	Amends § 135.183(c). Revised to add the term “critical change of thrust” to the performance requirements for multiengine land aircraft carrying passengers as follows: aircraft operated at a weight that will allow it to climb with the critical engine inoperative, or while experiencing a critical change of thrust, at least 50 feet a minute, at an altitude of 1,000 feet above the surface.	Clarifying amendment. No economic impact.
194.306 (con't)—Provisions under part 135 of this chapter applicable to powered-lift.	Amends § 135.203(a) and (b). Amended to create a performance-based rule allowing powered-lift to use an altitude lower than specified for airplanes. This provision is adopted when operating in the vertical-lift flight mode. Or, when operating in the wing-borne mode. Also, incorporates helicopter minimums contained in § 135.203(b).	Provides relief from provisions proposed by SFAR.
194.306 (con't)—Provisions under part 135 of this chapter applicable to powered-lift.	Amends § 135.205(b) and Creates a performance-based rule allowing powered-lift to use visibility requirements lower than specified for airplanes. This provision is adopted when operating in the vertical-lift flight mode.	Provides relief from provisions proposed by SFAR.
194.306 (con't)—Provisions under part 135 of this chapter applicable to powered-lift.	Amends § 135.209(a). Allows for deviations from VFR Fuel Supply for specific routes with one or more predetermined suitable landing areas if the FAA finds the operation can be conducted safely.	Provides relief from provisions proposed by SFAR.
194.306 (con't)—Provisions under part 135 of this chapter applicable to powered-lift.	Adds § 135.209(b). Makes 20-minute minimum for VFR fuel requirement applicable to powered-lift with the performance capability, as provided in the Aircraft Flight Manual. (Deviations allowed).	
194.306 (con't)—Provisions under part 135 of this chapter applicable to powered-lift.	Amends § 135.221(b). The alternate airport weather minimums authorized for helicopters may be used by powered-lift if they are authorized to conduct copter procedures and can land in the vertical-lift flight mode.	Provides relief from provisions proposed by SFAR.
194.306 (con't)—Provisions under part 135 of this chapter applicable to powered-lift.	Applies § 135.223(a)(3) IFR Alternate airport requirements. Powered-lift may use the 30-minute fuel requirements specified for helicopters in § 135.223(a)(3) if the powered-lift is authorized to conduct copter procedures and can conduct a landing in the vertical-lift flight mode for the entire flight.	Provides relief from provisions proposed by SFAR.
194.306 (con't)—Provisions under part 135 of this chapter applicable to powered-lift.	Applies § 135.227(d). The FAA corrected cross-references pertaining to this SFAR section and removed a reference to “critical surfaces” because it is no longer required.	Technical Amendment.
194.306 (con't)—Provisions under part 135 of this chapter applicable to powered-lift.	Adds § 135.229(b)(2)(ii). Allows powered-lift taking off or landing in vertical-lift flight mode and equipped with landing lights oriented in a direction that enables the pilot to see an area to be used for landing or takeoff marked by reflective material. Otherwise powered-lift must take off or land at an airport with boundary or runway marker lights. The FAA clarified that the intent of this section is to apply in both the takeoff and landing context.	Technical Amendment.
194.306 (con't)—Provisions under part 135 of this chapter applicable to powered-lift.	Revises § 135.609 VFR ceiling and visibility minimums for Class G Airspace when conducting VFR helicopter air ambulance. Airplane minimums will be applied when the powered-lift is operated in wing-borne flight mode. Helicopter minimums will be applied when the powered-lift is operating in vertical-lift flight mode.	Provides relief from provisions proposed by SFAR.
194.306 (con't)—Provisions under part 135 of this chapter applicable to powered-lift.	Revises § 135.613 Approach/departure IFR transitions. § 135.613(a)(2) revised and § 135.613(b) added to allow powered-lift that are operating in the vertical-lift flight mode to use helicopter minimums.	Provides relief from provisions proposed by SFAR.
194.306 (con't)—Provisions under part 135 of this chapter applicable to powered-lift.	Relieving. Adds § 135.615(b) VFR flight planning. Allow powered-lift operated in the vertical-lift flight mode during enroute operations to use the terrain and obstacle clearance requirements minimums described in § 135.615(b).	Provides relief from provisions proposed by SFAR.
194.308—Applicability of national air tour safety standards under part 136 of this chapter to powered-lift.	Amends §§ 136.9(b)(3), 136.11(a)(2), and 136.75(c). Adds the term “critical change of thrust” to ensure those novel aircraft that may not have a critical engine be required to demonstrate the same performance requirements as those stipulated for aircraft with a critical engine.	Clarifying amendment. No economic impact.

TABLE 12—SFAR—TABLE OF AMENDMENTS CHANGED FROM PROPOSED RULE TO FINAL RULE—Continued

Section	Changes to provisions as proposed	Impact
194.308— <i>Applicability of national air tour safety standards under part 136 of this chapter to powered-lift.</i>	Adds § 136.11(a)(1). Requires floats for single-engine powered-lift. Revises § 136.11(b)(2). Requires flotation system to be armed when the powered-lift is over water beyond the shoreline whether operating in vertical-lift flight mode or wing-borne flight mode.	Imposes a burden on operators of powered-lift on a scale no greater than the burden placed on operators of helicopters.
194—New Appendix A	New Appendix A. Prescribes the minimum requirements to apply for a pilot training program leading to a powered-lift category rating; a powered-lift type rating; and an instrument powered-lift rating using powered-lift with one set of controls.	Provides relief from provisions proposed by SFAR.

3. Benefits Summary

Operations with powered-lift are anticipated to offer benefits over traditional airplanes and rotorcraft. A report published by the U.S. Government Accountability Office stated that many of these newer category of aircraft may be easier to design, simpler to construct, less complicated to maneuver, quieter to fly, and more economical to operate compared to traditional aircraft.⁴⁸⁶ Many use cases for these aircraft are anticipated. Below is a description of just a few of the use cases.

It is envisioned smaller versions of these aircraft may reduce travel times in congested areas for passengers by allowing for more efficient transportation compared to existing ground transportation methods. To do so, these aircraft would use vertiports located on top of buildings, at parking facilities, or in other open areas.⁴⁸⁷ Such transportation could occur from these locations and then proceed at speeds and ranges similar to turboprops. Some powered-lift could also be capable of transporting heavier loads at higher altitudes and faster cruise speeds than a traditional rotorcraft. Such capability may increase efficiency in transporting crew and material to remote locations such as offshore oilrigs. Other use cases may involve medical response, disaster relief, rescue operations, border patrol, and last-mile logistics.

This final rule is a step toward enabling the ecosystem for this industry to develop. It applies the appropriate set of rules for a range of certificate-holder operations conducted with powered-lift, and for certification of the pilots that

would fly them. It was deliberated with the intent of mitigating risk to the NAS while maintaining its current level of safety.

4. Costs Summary

While operators choosing to conduct operations with powered-lift would incur costs to comply with regulations in this SFAR, these costs would be on a scale incurred by operators choosing to conduct operations with airplanes or rotorcraft under similar regulations. Likewise, costs imposed on individuals that choose to accomplish the required training and testing required to hold an airman’s certificate with a type rating in the powered-lift category would be on a scale no greater than those incurred by individuals accomplishing training and testing to hold an airman’s certificate with a type rating in the airplane or rotorcraft category. In other words, the costs imposed on operators and individuals that choose to comply with regulations in this rule would be no more burdensome than the costs incurred by entities and individuals complying with analogous airplane and rotorcraft regulations.

However, to address the significant operational differences between each powered-lift, the FAA is amending regulations to require the PIC of a powered-lift to hold a type rating for the aircraft flown. The FAA has determined that requiring persons to hold type ratings for powered-lift establishes the appropriate level of safety. This ensures persons receive adequate training and are tested on the unique design and operating characteristics of each powered-lift flown. As a result, airmen choosing to operate powered-lift and manufacturers providing dual-control aircraft and full flight simulators for training will incur incremental costs. Airmen will incur the incremental costs to achieve a type rating for each powered-lift flown.

In the preliminary regulatory impact analysis for the SFAR, the FAA solicited comments for data to update the final analysis. The FAA received comments

to the analysis including supporting data related to costs. Consequently, the final regulatory impact analysis has been revised to incorporate some of the information received during the comment period. As a result, the number of individuals required to operate the fleet of aircraft anticipated to enter the fleet over the period of the SFAR has been adjusted upward. Additionally, the analysis is updated to include a cost for the provision of dual-control aircraft and full flight simulators for training, and a cost for decreased battery life due to a minimum fuel reserve requirement.

The following table presents a summary of the primary estimates of the monetized costs of this rule, as well as estimates for the pessimistic and optimistic scenarios. The monetized costs include those that would require individuals to hold an airman’s certificate with a type rating for the powered-lift flown, costs for the provision of dual-control aircraft and full flight simulators for training, and incremental costs for the minimum fuel reserve requirement. For the primary estimate, over a 10-year period of analysis, this rule would result in present value costs of about \$914.2 million at a two percent discount rate with annualized costs of about \$101.8 million. At a three percent present value discount rate, present value costs are about \$884.2 million with annualized costs of about \$103.7million. At a seven percent discount rate, the present value costs are about \$779.2 million with annualized costs of \$110.9 million.⁴⁸⁸

⁴⁸⁸ The appendix to the RIA presents tables of monetized costs on an annual basis for years 1–10, the time horizon for which costs for the rule are estimated. Monetized costs for the rule stem from the cadence of aircraft deliveries. In the optimistic scenario, aircraft deliveries are forecast to begin in year 1 and continue through year 10. Aircraft deliveries for the base scenario are forecast to occur during years 2–10, and in the pessimistic scenario during years 3–10. As a result, costs for the optimistic scenario accumulate over a period of 10 years versus the base and pessimistic scenarios, over which costs accumulate for a period of 9 years and 8 years, respectively.

⁴⁸⁵ 76 FR 7482 (Feb. 10, 2011).

⁴⁸⁶ Transforming Aviation: Stakeholders Identified Issues to Address for ‘Advanced Air Mobility’ √ U.S. GAO.

⁴⁸⁷ Vertiport Assessment and Mobility Operations System (VAMOS!) | T2 Portal (nasa.gov) A vertiport refers to a physical structure for the departure, arrival, and parking/storage of advanced air mobility vehicles. Evaluation factors for vertiports include zoning, land use, transit stations, fire stations, noise, and time-varying factors like congestion and demand.

TABLE 13—MONETIZED COSTS OF FINAL SFAR
[Millions \$]*

Forecast scenario	10-Year present value (2%)	Annualized (2%)
Base—Primary Estimate	\$914.2	\$101.8
Pessimistic	865.5	96.4
Optimistic	966.1	107.6

* **Table notes:** Columns may not sum to total due to rounding. Discount rates are provided per Office of Management and Budget (OMB) guidance.

Please see the regulatory impact analysis for this SFAR available in the docket for more details.

B. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) of 1980, (5 U.S.C. 601–612), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (Pub. L. 104–121) and the Small Business Jobs Act of 2010 (Pub. L. 111–240), requires Federal agencies to consider the effects of the regulatory action on small business and other small entities and to minimize any significant economic impact. The term “small entities” comprises small businesses and 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 FAA published an Initial Regulatory Flexibility Analysis (IRFA) in the proposed rule to aid the public in commenting on the potential impacts to small entities. The FAA considered the public comments in developing the final rule and this Final Regulatory Flexibility Analysis (FRFA). A FRFA must contain the following:

- (1) A statement of the need for, and objectives of, the rule;
- (2) A statement of the significant issues raised by the public comments in response to the IRFA, a statement of the assessment of the agency of such issues, and a statement of any changes made in the proposed rule as a result of such comments;
- (3) The response of the agency to any comments filed by the Chief Counsel for Advocacy of the Small Business Administration (SBA) in response to the proposed rule, and a detailed statement of any change made to the proposed rule in the final rule as a result of the comments;
- (4) A description of and an estimate of the number of small entities to which the rule will apply or an explanation of why no such estimate is available;
- (5) A description of the projected reporting, recordkeeping, and other compliance requirements of the

proposed rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;

(6) A description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each of the other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected.

1. A Statement of the Need for, and Objectives of, the Rule

This rule establishes the requirements for the certification and operation of powered-lift. Powered-lift is defined in 14 CFR part 1 as a heavier-than-air aircraft capable of vertical takeoff, vertical landing, and low speed flight that depends principally on engine-driven lift devices or engine thrust for lift during these flight regimes and on nonrotating airfoil(s) for lift during horizontal flight.

The powered-lift that are coming to the civilian market have unique design, flight, and handling characteristics with varying degrees of automation. The FAA does not anticipate that the initial powered-lift that obtain type certification will be broadly available for basic airman certification and training at the private pilot level. Rather, manufacturers intend to produce powered-lift for commercial purposes, meaning the initial pilots will be required to hold at least commercial pilot certificates to act as required flightcrew members (*i.e.*, PIC or SIC) for compensation or hire.

The FAA lacks sufficient information at this time regarding emerging operations to implement permanent regulations. The FAA has found the use of an SFAR has been an effective way to gain such experience while enabling some degree of operations. The SFAR will establish a regulatory structure that

leverages existing rules, removes operational barriers, and mitigates safety risks for powered-lift. Utilizing the SFAR will allow the FAA to observe operations and subsequently make any requisite safety improvements in a later permanent change to the regulations.

2. Significant Issues Raised in Public Comments in Response to the Initial Regulatory Flexibility Act

The FAA did not receive public comments in response to the Initial Regulatory Flexibility Act for the proposed SFAR.

3. A Response to SBA Comments

The FAA did not receive comments from the SBA in response to the Initial Regulatory Flexibility Act provided in the proposed SFAR.

4. Small Entities to Which the Rule Will Apply

The rule affects operators of powered-lift under parts 91, 135, and 136, as well as part 141 flight schools and part 142 training centers. Part 91 operators conduct operations for non-commercial purposes. Part 135 operators conduct on-demand operations, which may include a limited number of scheduled operations, or commuter operations, and allows an unlimited number of scheduled operations as well as on-demand operations.⁴⁸⁹ There are specific limitations associated with these operations depending on whether they are on-demand or commuter. These limitations include the number of passenger seats installed on the aircraft, maximum payload limits, and whether turbo-jet aircraft can be used in the operation. Part 136 operators conduct commercial air tours.

There are five North American Industry Classification System (NAICS) codes for air transportation services based on by type of activity conducted. Four of these codes identify a small entity as one with 1,500 or fewer employees. The exception is NAICS code 481219, which includes “other

⁴⁸⁹ www.faa.gov/licenses_certificates/airline_certification/135_certification/general_info.

nonscheduled air transportation.” Entities falling within this code are identified as small if revenues are \$22 million or less.⁴⁹⁰ At the time of this rule, there were approximately 1,700 part 135 operators, and 900 part 91 operators. A vast majority of these operators are small, and the FAA does not anticipate that they will be impacted by this rule. Due to this being an emerging market, the number of entities that will be impacted by this rule is uncertain.

Flight training is available through part 141 flight schools or part 142 flight centers. Part 141 flight schools train with actual aircraft while part 142 flight centers train with flight simulators. The FAA notes that NAICS code for flight training is in Sector 61—Education Services. Specifically, flight training schools are identified by code 611512. The Small Business Administration identifies entities in this code as small based on revenues of \$30 million or less.

There are currently 525 part 141 flight schools and 45 part 142 training centers. FAA conducted research on the internet to determine revenues for these entities. While some of the part 141 flight schools are part of a curriculum offered at an institution of higher learning, most appear to be private entities, and thus revenues were not publicly available. Of the 45 part 142 training centers, 10 have revenues greater than \$30 million and 22 were identified as having revenues less than \$30 million. Revenue information for the remaining 13 part 142 training centers was not readily available. Based on this information, it is believed that a majority of flight schools under parts 141 and 142 are small entities.

5. Projected Reporting, Recordkeeping, and Other Compliance Requirements

Powered-lift manufacturers, air carriers, pilots, and instructors have important roles in the development of this sector of the aviation industry. The FAA prescribes regulations and minimum standards for practices, methods, and procedures necessary for safety in air commerce, including airman certificates, type certificates, and air operating certificates, as well as the authority to examine and rate civilian schools and prescribe regulations to ensure the competency of instructors.

The reporting and recordkeeping requirements imposed by this SFAR

already exist for manufacturers and operators of airplanes and rotorcraft. These requirements will now be applicable to like entities that choose to operate powered-lift. These requirements are described below.

First, each operator which seeks to obtain, or is in possession of, an air carrier or FAA operating certificate is mandated to comply with the requirements of part 135 to determine if the carrier is operating in accordance with minimum safety standards. This burden results in reporting, recordkeeping, and disclosure requirements. All reporting provisions and approval processes can be accomplished electronically, including operations and maintenance manuals, crewmember and aircraft dispatcher records, maintenance records, and minimum equipment lists. However, certain documents, such as passenger briefing cards, must be available in paper form for safety reasons. The burden imposed on operators by this reporting requirement is proportionate to the size of its operation.⁴⁹¹

Next, repair stations certificated under part 145 and passenger-carrying operators certificated under part 135 are required to submit Malfunction or Defect Reports, or Service Difficulty Reports. This data identifies mechanical failures, malfunctions, and defects that may be a hazard to the operation of an aircraft. When defects are reported that are likely to exist on other products of the same or similar design, the FAA may disseminate safety information to a particular section of the aviation community. These reports are submitted occasionally. The submission of information for this requirement is accomplished electronically. The FAA has found that this submission of data does not have a significant impact on a substantial number of small businesses.

Lastly, the *Application for Pilot School Certification* is necessary for the FAA to collect information to ensure flight schools will meet the minimum acceptable training standards as prescribed by part 141. The FAA approves course curricula, training facilities, the chief instructor, and any assistant chief instructors, if applicable, for each course, and ensures oversight of flight instructors that provide training under part 141. Completion of the

required items is of minimal burden to the respondent due to the simplistic format of the document.

6. Significant Alternatives Considered

One alternative the FAA considered was to engage in a permanent rulemaking to address the introduction of powered-lift in civilian operations. However, to date, the FAA lacks sufficient information regarding emerging operations to implement permanent regulations. Instead, the FAA finds the use of a SFAR to be the most viable option. Utilizing the SFAR will allow the FAA to observe operations and subsequently make any requisite safety improvements in a later permanent change to the regulations.

Another alternative considered was the number of years the SFAR would remain in effect. After contemplating several options, the FAA determined ten years to be an appropriate length of time. In selecting ten years as the appropriate duration for this SFAR, the FAA considered a number of factors, including the length of time it will take to initiate operations after the adoption of this rule considering the type certification status of the powered-lift that are commercially viable. The FAA also considered ten years to be the appropriate length of time to collect operational data necessary to complete a subsequent rulemaking to implement permanent regulations.

C. International Trade Impact Assessment

The Trade Agreements Act of 1979 (Pub. L. 96–39), as amended by the Uruguay Round Agreements Act (Pub. L. 103–465), prohibits Federal agencies from establishing standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. Pursuant to these Acts, the establishment of standards is not considered an unnecessary obstacle to the foreign commerce of the United States, so long as the standard has a legitimate domestic objective, such as the protection of safety and does not operate in a manner that excludes imports that meet this objective. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards. The FAA has assessed the potential effect of this final SFAR and determined that it ensures the safety of the American public and does not exclude imports that meet this objective. As a result, the FAA does not consider this rule as creating an unnecessary obstacle to foreign commerce.

⁴⁹⁰ NAICS code 481111—Scheduled Passenger Air Transportation; 481112—Scheduled Freight Air Transportation; 481211—Nonscheduled Passenger Air Transportation; 481212—Nonscheduled Freight Air Transportation; 481219—Other Nonscheduled Air Transportation.

⁴⁹¹ For example, single pilot operations are not required to prepare an operations manual or training program which significantly reduces the burden. The number of records and required reports are proportional to the number of pilots and aircraft used by the operator. Further, in several cases, such as for passenger briefings or aircraft checklists, commercially produced products are available from the aircraft manufacturer.

D. Unfunded Mandates Assessment

The Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1531–1538) governs the issuance of Federal regulations that require unfunded mandates. An unfunded mandate is a regulation that requires a State, local, or Tribal government or the private sector to incur direct costs in excess of the inflation-adjusted statutory threshold of \$183 million without the Federal Government having first provided the funds to pay those costs. The FAA determined that this rule will not result in the expenditure of \$183 million or more by State, local, or Tribal governments, in the aggregate, or the private sector, in any one year.

E. Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)) requires that the FAA consider the impact of paperwork and other information collection burdens imposed on the public. According to the 1995 amendments to the Paperwork Reduction Act (5 CFR 1320.8(b)(2)(vi)), an agency may not collect or sponsor the collection of information, nor may it impose an information collection requirement unless it displays a currently valid Office of Management and Budget (OMB) control number.

This action contains the following amendments to the existing information

collection requirements previously approved under OMB Control Numbers 2120–0009, 2120–0021, 2120–0039, 2120–0600, 2120–0607, and 2120–0663. In the Powered-lift NPRM, the FAA included the AQP burden in a revision to information collection 2120–0039, Part 135—Operating Requirements: Commuter and On-Demand Operations and Rules Governing Persons on Board such Aircraft, and the FAA discussed the use of AQP throughout the NPRM. However, in publishing the NPRM, the FAA failed to include those revisions to information collection 2120–0701, Advanced Qualification Program (AQP) Subpart Y to part 121. However, given the extensive discussion of the use of AQP and the fact that the burden had been discussed in the context of information collection 2120–0039, the FAA believes that the public had sufficient notice of this burden revision, and therefore the FAA is revising the burden for information collection 2120–0701 in this final rule. As required by the Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)), the FAA has submitted these information collection amendments to OMB for its review.

1. Revision of Existing Information Collection 2120–0701: Advanced Qualification Program (AQP) Subpart Y of 14 CFR 121

Abstract: Certificated air carriers, as well as training centers they employ

may voluntarily respond to this collection in order obtain the benefit of a regulatory alternative for training, checking, qualifying, and certifying crewmembers subject to the requirements of parts 121 and 135. However, for those part 135 operators conducting powered-lift operations with aircraft requiring two pilots by type certification the information collection is mandatory.

Air carriers submit de-identified performance and proficiency data that represents the results of an individual’s ability to successfully demonstrate the performance objectives of each curriculum. This information is captured during validation and evaluation gates as a crewmember progresses through an AQP curriculum. In general, the information is used to provide an improved basis for curriculum approval and monitoring, as well as agency decisions concerning air carrier training regulation and policy. This collection has reporting elements and is reported to the FAA monthly. The FAA has estimated the increase in the existing burden for this collection based on one part 135 operator being required to adhere to an AQP curriculum.

Summary (annual)	Reporting	Total cost (\$99.93/hour)
# of Respondents	1	.....
# of Responses per respondent	12	.....
Time per Response	7 Hours	.....
Total burden	84 Hours	\$8,394

2. Revision of Existing Information Collection 2120–0039: Operating Requirements: Commuter and On-Demand Operation⁴⁹²

Abstract: Each operator which seeks to obtain, or is in possession of, an air carrier or FAA operating certificate is mandated to comply with the requirements of part 135 to maintain

data which is used to determine if the carrier is operating in accordance with minimum safety standards. Air carrier and commercial operator certification is completed in accordance with part 119. Part 135 contains operations and maintenance requirements. The burden associated with part 135 is associated with reporting, record keeping and disclosure.

The FAA has estimated the increase in the existing burden for this collection based on four part 119 certificate holders beginning powered-lift operations by the end of the third year following finalization of this SFAR. Note that not all information collection requirements have a burden increase as a result of revisions to this information collection.

⁴⁹² Official FAA forecasts related to the operation of powered-lift in the NAS have yet to be developed. Thus, forecasts for operators of part 135 aircraft and fleet were prepared solely for the

purpose of estimating the cost of the information collections affiliated with this rule and developed using publicly available data related to orders and options for powered-lift. Using the fleet forecast and

an assumption for utilization (*i.e.*, hours flown), forecasts for arrivals and departures were also developed to estimate incremental costs of the paperwork burden.

TABLE 14—THREE-YEAR INCREMENTAL BURDEN FOR 2120–0039 OPERATING REQUIREMENTS: COMMUTER AND ON-DEMAND OPERATIONS

Section	Section title	Number of respondents	Number of responses	Total responses	Hours-JobCat (1)	Hours-JobCat (2)	Hours-JobCat (3)	Hours-JobCat (4)	Hours-JobCat (5)	Total burden (hours)	Total burden (cost)
135.21	Manual requirements	4	5	20	0.5	.....	2.0	.....	.....	50.0	\$2,097
135.63	Recordkeeping requirements—aircraft available for use.	2	2	4	.....	.....	1.0	.....	.....	4.0	185
	Pilot records	259	4	1,036	0.1	.....	.....	.....	.....	103.6	2,539
	Pilot flight & duty	259	200	51,800	0.1	.....	.....	.....	.....	5,180	126,962
	Load manifest	292,273	1	292,273	0.1	.....	.....	.....	.....	29,227	716,36
135.64	Retention of contracts and amendments written.	6	13	78	.....	0.5	.....	.....	.....	39.0	1,514
	Retention of contracts and amendments oral.	6	2	12	0.5	.....	.....	.....	.....	6.0	147
135.65	Reporting manual irregularities	6	75	450	.....	.....	.....	.....	0.3	112.5	7,611
135.79	Flight locating requirements	2	1	2	.....	.....	0.5	.....	.....	1.0	46
135.117	Briefing of passengers before flight.	292,273	1	292,273	.....	.....	.....	.....	0.03	8,768.2	593,16
135.179	Inoperable instruments and equipment.	6	1	6	3.0	.....	20.0	.....	.....	138.0	5,996
135.227	Icing limitations	6	1	6	5.0	.....	20.0	.....	.....	150.0	6,290
135.325	Training program and revision	6	1	6	5.0	.....	15.0	.....	.....	120.0	4,901
135.415	Mechanical reliability reports	131	1	131	.....	.....	.....	1.0	.....	131.0	6,119
135.417	Mechanical interruption summary report.	6	12	72	.....	.....	.....	1.0	.....	72.0	3,363
135.419	Approved aircraft inspection program.	6	1	6	0.5	.....	.....	1.0	.....	9.0	354
135.431	Continuing analysis and surveillance.	6	1	6	.....	.....	.....	70.0	.....	420.0	19,618
	Incremental burden .....	.....	.....	.....	.....	.....	.....	.....	.....	44,531	1,497,27

Note: Row and column totals may not sum due to rounding.

3. Revision of Existing Information Collection 2120–0600: Training and Qualification Requirements for Check Airmen and Flight Instructors⁴⁹³

Abstract: The reporting requirements are to ensure the check pilots and instructors are adequately trained and checked/evaluated to ensure they are capable and competent to perform the duties and responsibilities required by the air carrier to meet the regulations. Experienced pilots who would otherwise qualify as flight instructors or

check airmen, but who are not medically eligible to hold the requisite medical certificate are mandated to keep records that may be inspected by the FAA to certify eligibility to perform flight instructor or check airmen functions. This information is inspected on occasion and will be used by the FAA to determine and to assure that check airmen and instructors maintain the high qualification standards (training and experience) required to perform their safety functions.

The FAA has estimated the increase in the existing burden for this collection based on the percentage of instructors that are not medically eligible to hold the requisite medical certificate and are mandated to keep records that may be inspected by the FAA to certify eligibility to perform flight instructor or check airmen functions. The table below shows the incremental burden by the end of the third year following finalization of the SFAR for this recordkeeping requirement.

TABLE 15—THREE-YEAR BURDEN ESTIMATE FOR INFORMATION COLLECTION 2120–0600⁴⁹⁴ TRAINING AND QUALIFICATION REQUIREMENTS FOR CHECK AIRMEN AND FLIGHT INSTRUCTORS

	Total burden
Respondents	66
Responses per Respondent	1
Time per response—15 seconds (in minutes)	0.25
Total incremental time (in minutes)	16.44
Total incremental time (in hours)	0.27
Cost per hour (Check airman wage plus benefits—per hour)	\$87.63
Total incremental cost	\$24.54

Note: Row and column totals may not sum due to rounding.

⁴⁹³ See footnote for Revision of Existing Information Collection 2120–0039: Operating Requirements: Commuter and On-Demand Operation.

⁴⁹⁴ The current collection identifies 15,925 respondents performing recordkeeping

requirements. The 2021 Civil Airmen Statistics (source: www.faa.gov/data_research/aviation_data_statistics/civil_airmen_statistics) shows there are 121,270 active flight instructors, thus 13.1 percent of the flight instructor population (15,925 ÷ 121,270 = .131) perform this recordkeeping requirement.

Additionally, FAA records show 251 active airmen holding a flight instructor certificate with a powered-lift rating; thus, it is estimated that 13.1 percent of these airmen are affected by the recordkeeping requirement (for a total of 33 airmen).

4. Revision of Existing Information Collection 2120–0663: Service Difficulty Report ⁴⁹⁵

Abstract: Service Difficulty Reports (SDRs) may be used by the air carrier industry and repair stations to submit mandated reporting of occurrences or detection of failures, malfunctions, or defects and can be submitted in an electronic format. Repair stations certificated under part 145 and passenger-carrying operators certificated under part 135 are required to submit

Malfunction or Defect Reports, or Service Difficulty Reports. Report information is collected and collated by the FAA and used to determine service performance of aeronautical products. When defects are reported which are likely to exist on other products of the same or similar design, the FAA may disseminate safety information to a particular section of the aviation community. The FAA also may adopt new regulations or issue Airworthiness Directives (ADs) to address a specific problem.⁴⁹⁶ The regulations enhance air

carrier safety by collecting additional and timelier data pertinent to critical aircraft components. This data identifies mechanical failures, malfunctions, and defects that may be a hazard to the operation of an aircraft. Reports are submitted on occasion.

The FAA has estimated the increase in the existing burden for this collection based on four part 119 certificate holders beginning powered-lift operations under part 135 by the end of the third year following finalization of this SFAR.

TABLE 16—THREE-YEAR BURDEN ESTIMATE FOR INFORMATION COLLECTION 2120–0663 SERVICE DIFFICULTY REPORT

Summary (three years)	Reporting	Recordkeeping	Disclosure
Number of Respondents	4	.....	.....
Number of Responses per respondent	1	.....	.....
Time per Response	0.667	.....	.....
Total Number of responses	4	.....	.....
Total Burden (hours)	2.7	.....	.....
Total Burden (cost) ⁴⁹⁷	\$95.8	.....	.....

Note: Row and column totals may not sum due to rounding.

5. Revision of Existing Information Collection 2120–0009: Application for Pilot School Certification

Abstract: This information is reported and recorded by part 141 certificated pilot schools seeking to maintain their Air Agency Certification. Uncertificated pilot schools seeking certification as a part 141 pilot school are also required

by part 141 to report information to the FAA and keep specific records. Part 141 pilot schools train private, commercial, flight instructor, and ATPs, along with training for associated ratings in various types of aircraft. The information collected becomes a part of the FAA’s official records and is only used by the FAA for certification, compliance, enforcement, and for accidents,

incidents, reports of noncompliance, safety programs, or other circumstances requiring reference to records. The requirements of part 141 include reporting and recordkeeping. The FAA has estimated the increase in the existing burden for this collection based on one new applicant per year for part 141 certification and one renewal.

TABLE 17—THREE-YEAR BURDEN ESTIMATE FOR INFORMATION COLLECTION 2120–0009 ⁴⁹⁸ APPLICATION FOR PILOT SCHOOL CERTIFICATION

Section	Burden type	Time/response (hours)	Responses	Total time (hours)	Labor cost (\$35.84/hr)
§ 141.13, Application	Reporting	0.5	4	2.0	\$72
§ 141.53, Training course outline	Reporting	25.0	3	75.0	2,688
§ 141.63, Application for examining authority.	Reporting	20.0	3	60.0	2,150
§ 141.87, Change of chief instructor	Reporting	0.1	3	0.3	11
§ 141.110, Training records	Record-keeping	50	3	150	5,376
Total .....	.....	.....	.....	287.3	10,297

Note: Row and column totals may not sum due to rounding.

6. Revision of Existing Information Collection 2120–0021: Airman Certificate and/or Rating Application

Abstract: The Airman certificate and/or Rating Application form and the

required records, logbooks and statements required by part 61 are submitted to Federal Aviation Administration (FAA) Flight Standards District Offices or its representatives to determine qualifications of the

applicant for issuance of a pilot or instructor certificate, or rating or authorization. If the information collection was not conducted, the FAA would be unable to issue the appropriate certificates and ratings. The

⁴⁹⁵ See footnote for Revision of Existing Information Collection 2120–0039: Operating Requirements: Commuter and On-Demand Operation.

⁴⁹⁶ ADs are mandatory repair or modifications essential for the prevention of accidents.

⁴⁹⁷ Costs are based upon a private industry hourly wage of \$25.18. The fully-burdened wage is \$35.90 and includes employee compensation related to benefits that is estimated to be 30.0 percent of the fully-burdened wage. (Source: Bureau of Labor Statistics, Employer Costs for Employee Compensation www.bls.gov/news.release/pdf/cec.pdf by month).

⁴⁹⁸ The FAA believes that the responses to this information collection will be performed by flight instructors and similar personnel at certificated pilot schools. The median hourly wage for these occupations is \$27.38. The FAA multiplied this base hourly rate by 1.309, representing a load factor of 30.9%, and a fully loaded wage of \$35.84.

information collected becomes a part of the FAA’s official records and is only used by the FAA for certification, compliance, enforcement, and for accidents, incidents, reports of noncompliance, safety programs, or other circumstances requiring reference to records. The requirements of part 61 include reporting and recordkeeping.

TABLE 18—THREE-YEAR BURDEN ESTIMATE FOR INFORMATION COLLECTION 2120–0021 ⁴⁹⁹ AIRMAN CERTIFICATE AND/OR RATING APPLICATION

Section	Time per response (hours)	Responses	Reporting (hours)	Recordkeeping (hours)	Total cost (15.40/hr)
61.13	0.10	171	17.1	.....	\$263
61.39	0.05	171	8.6	.....	132
61.49	0.05	1	0.1	.....	1
61.51	1.00	44	.....	44.4	684
61.56(a)	0.10	44	4.4	.....	68
61.57	0.10	171	.....	17.1	263
61.87	0.05	171	.....	8.6	132
61.93	0.10	171	.....	17.1	263
61.185	0.10	29	.....	2.9	44
61.189	1.00	29	.....	28.8	443
61.197	0.10	29	2.9	.....	44
Totals .....	.....	1,031	33	119	2,339

F. International Compatibility

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to conform to International Civil Aviation Organization (ICAO) Standards and Recommended Practices to the maximum extent practicable. As discussed in the preamble of this SFAR, the FAA intends to follow ICAO standards for powered-lift where practicable. However, the FAA’s initial approach has differences to the ICAO published Standards and Recommended Practices, including the transitional measures outlined by ICAO in Annex 1, Section 2.1.1.4. As documented throughout the preamble, the SFAR provides an equivalent level of safety which meets or exceeds the ICAO Standards. Any identified differences to current or future ICAO standards will be documented and published in accordance with the FAA ICAO Difference procedures.

G. Environmental Analysis

FAA Order 1050.1F identifies FAA actions that are categorically excluded

⁴⁹⁹ To calculate the economic burden on respondents, the FAA uses an hourly rate of \$15.40. This is an all-purpose travel-time rate, which is appropriate for this ICR because respondents represent a wide array of occupations and are often performing their reporting or recordkeeping activities on their own time. The travel-time rate is derived from Department of Transportation guidance (www.faa.gov/regulations_policies/policy_guidance/benefit_cost/), modified by a Consumer Price Index for all Urban Consumers (CPI-U) value calculated by the Minneapolis Fed (www.faa.gov/regulations_policies/policy_guidance/benefit_cost/). The FAA is not applying a load factor for overhead or benefits, because, as noted, these activities are typically not performed as part of a respondent’s job or occupation.

from preparation of an environmental assessment or environmental impact statement under the National Environmental Policy Act (NEPA) in the absence of extraordinary circumstances. The FAA has determined this rulemaking action qualifies for the categorical exclusion identified in paragraph 5–6.6f for regulations and involves no extraordinary circumstances.

H. Regulations Affecting Intrastate Aviation in Alaska

Section 1205 of the FAA Reauthorization Act of 1996 (110 Stat. 3213) requires the Administrator, when modifying 14 CFR regulations in a manner affecting intrastate aviation in Alaska, to consider the extent to which Alaska is not served by transportation modes other than aviation, and to establish appropriate regulatory distinctions. Because this final rule will apply to operations of powered-lift that could occur throughout the territorial airspace of the United States, it could, if adopted, affect intrastate aviation in Alaska.

I. Congressional Review Act

As required by 5 U.S.C. 801, FAA will report to Congress on the promulgation of this rule prior to its effective date. The report will state that it has been determined that the rule is a “major rule” as defined by 5 U.S.C. 804(2).

XIX. Executive Order Determinations

A. Executive Order 14036, Promoting Competition in the United States Economy

The FAA has analyzed this rule under the principles and criteria of Executive

Order 14036, Promoting Competition in the United States Economy. The FAA finds that this action promotes competition by enabling powered-lift to enter the market. The FAA anticipates that powered-lift will compete with surface transportation modes in congested intra-city areas for those passengers that want the benefits of convenient and shorter travel times compared to traditional intra-city travel modes that are currently available.

Additionally, the integration of powered-lift into the NAS will foster competition between powered-lift, airplanes, and helicopters with respect to passenger-carrying operations and cargo operations, which will benefit American travelers, consumers, and businesses. By enabling the safe integration of powered-lift into the NAS, the rule facilitates innovations that foster United States market leadership and airspace access to promote competition and economic opportunity, while also ensuring safety and safety oversight.

B. Executive Order 13985, Advancing Racial Equity and Support for Underserved Communities Through the Federal Government

The FAA has analyzed this rule under the principles and criteria of Executive Order 13985, Advancing Racial Equity and Support for Underserved Communities Through the Federal Government. The FAA sought comment on advancing equity and supporting underserved communities. A number of comments related to such underserved communities benefiting from AAM more broadly, with powered-lift being mentioned as potentially providing

greater opportunities for air transportation to rural, remote, and underserved communities. These commenters supported the integration of powered-lift as they believe powered-lift would enhance connectivity, increase the coverage of affordable and efficient transportation, provide economic stimulation, and improve access to emergency services for these communities and regions. Additionally, commenters supported allowing military pilots to obtain a rating for a powered-lift they have operated in the military. Commenters said this provision will support diversity in the workforce and increase the share of powered-lift operations to which the civilian market has access. Consistent with Executive Order 13985, the FAA has analyzed this rule to assess whether, and to what extent, it may perpetuate systemic barriers to opportunities and benefits for underserved communities and their members. The FAA finds that the rule to enable the certification of powered-lift pilots and safe powered-lift operations could advance equity for historically disadvantaged communities by expanding their access to goods and services.

C. Executive Order 13132, Federalism

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

D. Executive Order 13175, Consultation and Coordination With Indian Tribal Governments

Consistent with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments,⁵⁰⁰ and FAA Order 1210.20, American Indian and Alaska Native Tribal Consultation Policy and Procedures,⁵⁰¹ the FAA ensures that Federally Recognized Tribes (Tribes) are given the opportunity to provide meaningful and timely input regarding proposed Federal actions that have the potential to have substantial direct effects on one or more Indian Tribes, on the relationship between the Federal government and Indian Tribes, or on the distribution of power and

responsibilities between the Federal government and Indian Tribes; or to affect uniquely or significantly their respective Tribes. The FAA has not identified any unique or significant effects, environmental or otherwise, on Tribes resulting from this final rule.

E. Executive Order 13211, Regulations That Significantly Affect Energy Supply, Distribution, or Use

The FAA analyzed this final rule under Executive Order 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use. The FAA has determined that it is not a “significant energy action” under the executive order and is not likely to have a significant adverse effect on the supply, distribution, or use of energy.

F. Executive Order 13609, Promoting International Regulatory Cooperation

Executive Order 13609, Promoting International Regulatory Cooperation, promotes international regulatory cooperation to meet shared challenges involving health, safety, labor, security, environmental, and other issues and to reduce, eliminate, or prevent unnecessary differences in regulatory requirements. The FAA has analyzed this action under the policies and agency responsibilities of Executive Order 13609 and has determined that this action would have no effect on international regulatory cooperation.

XX. Additional Information

A. Electronic Access and Filing

A copy of the NPRM, all comments received, this final rule, and all background material may be viewed online at www.regulations.gov using the docket number listed above. A copy of this final rule will be placed in the docket. Electronic retrieval help and guidelines are available on the website. It is available 24 hours each day, 365 days each year. An electronic copy of this document may also be downloaded from the Office of the Federal Register’s website at www.federalregister.gov and the Government Publishing Office’s website at www.govinfo.gov. A copy may also be found at the FAA’s Regulations and Policies website at www.faa.gov/regulations_policies.

Copies may also be obtained by sending a request to the Federal Aviation Administration, Office of Rulemaking, ARM-1, 800 Independence Avenue SW, Washington, DC 20591, or by calling (202) 267-9677. Commenters must identify the docket or notice number of this rulemaking.

All documents the FAA considered in developing this final rule, including

economic analyses and technical reports, may be accessed in the electronic docket for this rulemaking.

B. Small Business Regulatory Enforcement Fairness Act

The Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 requires the FAA to comply with small entity requests for information or advice about compliance with statutes and regulations within its jurisdiction. A small entity with questions regarding this document may contact its local FAA official, or the person listed under the **FOR FURTHER INFORMATION CONTACT** heading at the beginning of the preamble. To find out more about SBREFA on the internet, visit www.faa.gov/regulations_policies/rulemaking/sbre_act/.

List of Subjects

14 CFR Part 1

Air transportation.

14 CFR Part 11

Administrative practice and procedure, Reporting and recordkeeping requirements.

14 CFR Part 43

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

14 CFR Part 60

Airmen, Aviation safety, Reporting and recordkeeping requirements.

14 CFR Part 61

Aircraft, Airmen, Aviation safety, Recreation and recreation areas, Reporting and recordkeeping requirements, Security measures, Teachers.

14 CFR Part 91

Agriculture, Air carriers, Air taxi, Air traffic control, Air transportation, Aircraft, Airmen, Airports, Aviation safety, Charter flights, Freight, Reporting and recordkeeping requirements, Security measures, Transportation.

14 CFR Part 97

Air traffic control, Airports, Navigation (air), Weather.

14 CFR Part 111

Administrative practice and procedure, Air carriers, Air transportation, Air taxi, Aircraft, Airmen, Alcohol abuse, Aviation safety, Charter flights, Drug abuse, Reporting and recordkeeping requirements.

14 CFR Part 135

Air carriers, Air taxi, Air transportation, Aircraft, Airmen,

⁵⁰⁰ 65 FR 67249 (Nov. 6, 2000).

⁵⁰¹ FAA Order No. 1210.20 (Jan. 28, 2004), available at www.faa.gov/documentLibrary/media/1210.pdf.

Aviation safety, Reporting and recordkeeping requirements.

14 CFR Part 136

Air transportation, Aircraft, Aviation safety, National parks, Recreation and recreation areas, Reporting and recordkeeping requirements.

14 CFR Part 141

Airmen, Educational facilities, Reporting and recordkeeping requirements, Schools.

14 CFR Part 142

Airmen, Educational facilities, Reporting and recordkeeping requirements, Schools, Teachers.

14 CFR Part 194

Air carriers, Air traffic control, Air transportation, Aircraft, Airmen, Airports, Aviation safety, Charter flights, Freight, Incorporation by reference, Navigation (air), Recreation and recreation areas, Reporting and recordkeeping requirements, Teachers, Schools.

The Amendment

For the reasons discussed in the preamble, the Federal Aviation

Administration amends 14 CFR chapter I of title 14, Code of Federal Regulations as follows:

PART 1—DEFINITIONS AND ABBREVIATIONS

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

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

- 2. Amend § 1.1 by revising the introductory text and the definition of “Autorotation” to read as follows:

§ 1.1 General definitions.

As used in this chapter, unless the context requires otherwise:

* * * * *

Autorotation means a rotorcraft or powered-lift flight condition in which the lifting rotor is driven entirely by action of the air when the rotorcraft or powered-lift is in motion.

* * * * *

- 3. Amend § 1.2 by revising the introductory text to read as follows:

§ 1.2 Abbreviations and symbols.

In this chapter:

* * * * *

- 4. Amend § 1.3 by revising paragraphs (a) introductory text and (b) introductory text to read as follows:

§ 1.3 Rules of construction.

(a) In this chapter, unless the context requires otherwise:

* * * * *

(b) In this chapter, the word:

* * * * *

PART 11—GENERAL RULEMAKING PROCEDURES

- 5. The authority citation for part 11 continues to read as follows:

Authority: 49 U.S.C. 106(f), 40101, 40103, 40105, 40109, 40113, 44110, 44502, 44701–44702, 44711, 46102, and 51 U.S.C. 50901–50923.

- 6. In § 11.201 amend the table in paragraph (b) by adding the entry “Part 194” in numerical order to read as follows:

§ 11.201 Office of Management and Budget (OMB) control numbers assigned under the Paperwork Reduction Act.

* * * * *

(b) * * *

14 CFR part or section identified and described	Current OMB control No.
Part 194	2120–0009, 2120–0021, 2120–0039, 2120–0600, 2120–0607, 2120–0663, 2120–0701.

PART 43—MAINTENANCE, PREVENTIVE MAINTENANCE, REBUILDING, AND ALTERATION

- 7. The authority citation for part 43 continues to read as follows:

Authority: 42 U.S.C. 7572; 49 U.S.C. 106(f), 106(g), 40105, 40113, 44701–44702, 44704, 44707, 44709, 44711, 44713, 44715, 45303.

- 8. Amend § 43.1 by adding paragraph (e) to read as follows:

§ 43.1 Applicability.

* * * * *

(e) Additional applicability of maintenance provisions for powered-lift is set forth in part 194 of this chapter.

PART 60—FLIGHT SIMULATION TRAINING DEVICE INITIAL AND CONTINUING QUALIFICATION AND USE

- 9. The authority citation for part 60 continues to read as follows:

Authority: 49 U.S.C. 106(f), 106(g), 40113, and 44701; Pub. L. 111–216, 124 Stat. 2348 (49 U.S.C. 44701 note).

- 10. Amend § 60.1 by revising paragraph (a) to read as follows:

§ 60.1 Applicability.

(a) This part prescribes the rules governing the initial and continuing qualification and use of all aircraft flight simulation training devices (FSTD) used for meeting training, evaluation, or flight experience requirements of this chapter for flight crewmember certification or qualification. Additional requirements for FSTD representing powered-lift are set forth in part 194 of this chapter.

* * * * *

PART 61—CERTIFICATION: PILOTS, FLIGHT INSTRUCTORS, AND GROUND INSTRUCTORS

- 11. The authority citation for part 61 continues to read as follows:

Authority: 49 U.S.C. 106(f), 40113, 44701–44703, 44707, 44709–44711, 44729, 44903,

45102–45103, 45301–45302; sec. 2307, Pub. L. 114–190, 130 Stat. 615 (49 U.S.C. 44703 note); and sec. 318, Pub. L. 115–254, 132 Stat. 3186 (49 U.S.C. 44703 note).

PART 61 [AMENDED]

- 12. In part 61, revise all references to “cross-country flight time” to read “cross-country time”.

- 13. Amend § 61.1 by:

- a. Revising paragraph (a); and
- b. In paragraph (b) in the definition of “Cross-country time”, revising paragraph (i) introductory text.

The revisions read as follows:

§ 61.1 Applicability and definitions.

(a) Except as provided in parts 107 and 194 of this chapter, this part prescribes:

(1) The requirements for issuing pilot, flight instructor, and ground instructor certificates and ratings; the conditions under which those certificates and ratings are necessary; and the privileges and limitations of those certificates and ratings.

(2) The requirements for issuing pilot, flight instructor, and ground instructor authorizations; the conditions under which those authorizations are necessary; and the privileges and limitations of those authorizations.

(3) The requirements for issuing pilot, flight instructor, and ground instructor certificates and ratings for persons who have taken courses approved by the Administrator under other parts of this chapter.

(b) * * *

Cross-country time * * *

(i) Except as provided in paragraphs (ii) through (vii) of this definition, time acquired during flight—

* * * * *

■ 14. Amend § 61.3 by revising paragraphs (e)(1) and (2), (f)(2)(i) and (ii), and (g)(2)(i) and (ii) to read as follows:

§ 61.3 Requirement for certificates, ratings, and authorizations.

* * * * *

(e) * * *

(1) The appropriate aircraft category, class, type (if a class or type rating is required), and instrument rating on that person's pilot certificate for any airplane, helicopter, or powered-lift being flown;

(2) An airline transport pilot certificate with the appropriate aircraft category, class, and type rating (if a class or type rating is required) for the aircraft being flown;

* * * * *

(f) * * *

(2) * * *

(i) Holds a pilot certificate with category and class ratings (if a class rating is required) for that aircraft and an instrument rating for that category aircraft;

(ii) Holds an airline transport pilot certificate with category and class ratings (if a class rating is required) for that aircraft; or

* * * * *

(g) * * *

(2) * * *

(i) Holds a pilot certificate with category and class ratings (if a class rating is required) for that aircraft and an instrument rating for that category aircraft;

(ii) Holds an airline transport pilot certificate with category and class ratings (if a class rating is required) for that aircraft; or

* * * * *

■ 15. Amend § 61.5 by:

■ a. Redesignating paragraphs (b)(7)(iii) and (iv) as paragraphs (b)(7)(iv) and (b)(9), respectively; and

■ b. Adding new paragraph (b)(7)(iii).

The addition reads as follows:

§ 61.5 Certificates and ratings issued under this part.

* * * * *

(b) * * *

(7) * * *

(iii) Powered-lift.

* * * * *

■ 16. Amend § 61.31 by:

■ a. Redesignating paragraph (a)(3) as paragraph (a)(4);

■ b. Adding new paragraph (a)(3); and

■ c. Revising paragraph (l)(1).

The revisions and addition read as follows:

§ 61.31 Type rating requirements, additional training, and authorization requirements.

(a) * * *

(3) Powered-lift.

* * * * *

(l) * * *

(1) This section does not require a pilot to hold category and class ratings for an aircraft that is not identified by category or class under § 61.5(b).

* * * * *

■ 17. Amend § 61.39 by revising paragraph (a)(3) to read as follows:

§ 61.39 Prerequisites for practical tests.

(a) * * *

(3) Have satisfactorily accomplished the required training and obtained the aeronautical experience prescribed by this part for the certificate or rating sought, and:

(i) If applying for the practical test with flight time accomplished under § 61.159(c), present a copy of the records required by § 135.63(a)(4)(vi) and (x) of this chapter; or

(ii) If applying for a practical test for the issuance of an initial category and class rating (if a class rating is required) at the private, commercial, or airline transport pilot certificate level in an aircraft that requires a type rating or a flight simulator or flight training device that represents an aircraft that requires a type rating, meet the eligibility requirements for the type rating or already hold the type rating on their pilot certificate;

* * * * *

■ 18. Amend § 61.43 by adding paragraph (g) to read as follows:

§ 61.43 Practical tests: General procedures.

* * * * *

(g) A practical test for an airline transport pilot certificate with category and class rating (if a class rating is required) in an aircraft that requires a type rating or in a flight simulation

training device that represents an aircraft that requires a type rating includes the same tasks and maneuvers as a practical test for a type rating.

■ 19. Amend § 61.45 by revising paragraphs (a)(1)(i) and (a)(2)(ii) to read as follows:

§ 61.45 Practical tests: Required aircraft and equipment.

(a) * * *

(1) * * *

(i) Is of the category, class, and type (if a class or type rating is required) for which the applicant is applying for a certificate or rating; and

* * * * *

(2) * * *

(ii) An aircraft of the same category, class, and type (if a class or type rating is required) of foreign registry that is properly certificated by the country of registry; or

* * * * *

■ 20. Amend § 61.47 by revising the section heading and adding paragraph (d) to read as follows:

§ 61.47 Status and responsibilities of an examiner who is authorized by the Administrator to conduct practical tests.

* * * * *

(d) An examiner may not conduct a practical test for the issuance of an initial category and class rating (if a class rating is required) at the private, commercial, or airline transport pilot certificate level in an aircraft that requires a type rating or a flight simulator or flight training device that represents an aircraft that requires a type rating unless:

(1) The applicant meets the eligibility requirements for a type rating in that aircraft or already holds that type rating on their certificate; and

(2) The practical test contains the tasks and maneuvers for a type rating specified in the areas of operation at the airline transport pilot certification level.

■ 21. Amend § 61.51 by revising paragraph (f)(2) to read as follows:

§ 61.51 Pilot logbooks.

* * * * *

(f) * * *

(2) Holds the appropriate category, class, and instrument rating (if a class or instrument rating is required for the flight) for the aircraft being flown, and more than one pilot is required under the type certification of the aircraft or the regulations under which the flight is being conducted; or

* * * * *

■ 22. Amend § 61.55 by revising paragraph (a) to read as follows:

§ 61.55 Second-in-command qualifications.

(a) A person may serve as a second-in-command of an aircraft type certificated for more than one required pilot flight crewmember or in operations requiring a second-in-command pilot flight crewmember only if that person meets the following requirements:

(1) Holds at least a private pilot certificate with the appropriate category and class rating;

(2) Holds an instrument rating or privilege that applies to the aircraft being flown if the flight is under IFR;

(3) Holds at least a pilot type rating for the aircraft being flown unless the flight will be conducted as domestic flight operations within the United States airspace; and

(4) If serving as second-in-command of a powered-lift, satisfies the requirements specified in § 194.209 of this chapter.

* * * * *

■ 23. Amend § 61.57 by revising paragraphs (a)(1)(ii), (b)(1)(ii), and (g)(1) and (4) to read as follows:

§ 61.57 Recent flight experience: Pilot in command.

(a) * * *

(1) * * *

(ii) The required takeoffs and landings were performed in an aircraft of the same category, class, and type (if a class or type rating is required), and, if the aircraft to be flown is an airplane with a tailwheel, the takeoffs and landings must have been made to a full stop in an airplane with a tailwheel.

* * * * *

(b) * * *

(1) * * *

(ii) The required takeoffs and landings were performed in an aircraft of the same category, class, and type (if a class or type rating is required).

* * * * *

(g) * * *

(1) An Examiner who is qualified to perform night vision goggle operations in that same aircraft category and class (if a class rating is required);

* * * * *

(4) An authorized flight instructor who is qualified to perform night vision goggle operations in that same aircraft category and class (if a class rating is required);

* * * * *

§ 61.63 [Amended]

■ 24. Amend § 61.63 by removing and reserving paragraph (h).

■ 25. Amend § 61.64 by revising paragraphs (a)(1) and (e), (f) introductory text, and (g)(1) to read as follows:

§ 61.64 Use of a flight simulator and flight training device.

(a) * * *

(1) Must represent the category, class, and type (if a class or type rating is applicable) for the rating sought; and

* * * * *

(e) Except as provided in paragraph (f) of this section, if a powered-lift is not used during the practical test for a type rating in a powered-lift (except for preflight inspection), an applicant must accomplish the entire practical test in a Level C or higher flight simulator and have 500 hours of flight time in the type of powered-lift for which the rating is sought.

(f) If the applicant does not meet one of the experience requirements of paragraphs (b)(1) through (5), paragraphs (c)(1) through (5), paragraphs (d)(1) through (4), or paragraph (e) of this section, as appropriate to the type rating sought, then—

* * * * *

(g) * * *

(1) Performs 25 hours of flight time in an aircraft of the appropriate category, class (if a class rating is required), and type for which the limitation applies under the direct observation of the pilot in command who holds a category, class (if a class rating is required), and type rating, without limitations, for the aircraft;

* * * * *

■ 26. Amend § 61.109 by revising paragraph (e)(5) introductory text to read as follows:

§ 61.109 Aeronautical experience.

* * * * *

(e) * * *

(5) 10 hours of solo flight time in a powered-lift consisting of at least—

* * * * *

■ 27. Amend § 61.163 by adding paragraphs (c), (d), and (e) to read as follows:

§ 61.163 Aeronautical experience: Powered-lift category rating.

* * * * *

(c) Flight time logged under § 61.159(c) may be counted toward the 1,500 hours of total time as a pilot required by paragraph (a) of this section and the flight time requirements of paragraphs (a)(1), (2), and (4) of this section.

(d) An applicant who credits time under paragraph (c) of this section is issued an airline transport pilot certificate with the limitation “Holder does not meet the pilot in command aeronautical experience requirements of ICAO,” as prescribed under Article 39

of the Convention on International Civil Aviation.

(e) An applicant is entitled to an airline transport pilot certificate without the ICAO limitation specified under paragraph (d) of this section when the applicant presents satisfactory evidence of having met the ICAO requirements under paragraph (d) of this section and otherwise meets the aeronautical experience requirements of this section.

§ 61.165 [Amended]

■ 28. Amend § 61.165 by removing paragraph (g).

■ 29. Amend § 61.167 by revising the introductory text of paragraph (a)(2) to read as follows:

§ 61.167 Airline transport pilot privileges and limitations.

(a) * * *

(2) A person who holds an airline transport pilot certificate and has met the aeronautical experience requirements of § 61.159, 61.161, or 61.163, and the age requirements of § 61.153(a)(1) may instruct—

* * * * *

PART 91—GENERAL OPERATING AND FLIGHT RULES

■ 30. The authority citation for part 91 continues to read as follows:

Authority: 49 U.S.C. 106(f), 40101, 40103, 40105, 40113, 40120, 44101, 44111, 44701, 44704, 44709, 44711, 44712, 44715, 44716, 44717, 44722, 46306, 46315, 46316, 46504, 46506–46507, 47122, 47508, 47528–47531, 47534, Pub. L. 114–190, 130 Stat. 615 (49 U.S.C. 44703 note); articles 12 and 29 of the Convention on International Civil Aviation (61 Stat. 1180), (126 Stat. 11).

■ 31. Amend § 91.1 by revising paragraph (d) and adding paragraph (g) to read as follows:

§ 91.1 Applicability.

* * * * *

(d) This part also establishes requirements for operators to take actions to support the continued airworthiness of each aircraft.

* * * * *

(g) Additional requirements for powered-lift operations are set forth in part 194 of this chapter.

■ 32. Amend § 91.113 by revising paragraph (d) to read as follows:

§ 91.113 Right-of-way rules: Except water operations.

* * * * *

(d) Converging. When aircraft of the same category are converging at approximately the same altitude (except head-on, or nearly so), the aircraft to the other’s right has the right-of-way. If the aircraft are of different categories—

- (1) A balloon has the right-of-way over any other category of aircraft;
- (2) A glider has the right-of-way over an airship, powered parachute, weight-shift-control aircraft, airplane, powered-lift, or rotorcraft.
- (3) An airship has the right-of-way over a powered parachute, weight-shift-control aircraft, airplane, powered-lift, or rotorcraft.
- (4) An aircraft towing or refueling other aircraft has the right-of-way over all other engine-driven aircraft.

§ 91.205 [Amended]

- 33. Amend § 91.205 in the section headings and paragraph (a) by removing the phrase “standard category” and adding in its place the word “standard”.
- 34. Amend § 91.903 by revising paragraph (a) to read as follows:

§ 91.903 Policy and procedures.

(a) The Administrator may issue a certificate of waiver authorizing the operation of aircraft in deviation from any rule listed in this subpart or any rule listed in this subpart as modified by subpart C of part 194 of this chapter if the Administrator finds that the proposed operation can be safely conducted under the terms of that certificate of waiver.

- 35. Amend § 91.1053 by revising paragraph (a)(2)(i) to read as follows:

§ 91.1053 Crewmember experience.

- (a) * * *
- (2) * * *

(i) Pilot in command—Airline transport pilot and applicable type ratings not limited to VFR only.

§ 91.1115 [Amended]

- 36. Amend § 91.1115(b)(1) by removing the word “airplane” and adding in its place the word “aircraft”.

PART 97—STANDARD INSTRUMENT PROCEDURES

- 37. The authority citation for part 97 continues to read as follows:

Authority: 49 U.S.C. 106(f), 106(g), 40103, 40106, 40113, 40114, 40120, 44502, 44514, 44701, 44719, and 44721–44722.

- 38. Amend § 97.1 by adding paragraph (c) to read as follows:

§ 97.1 Applicability.

(c) Additional applicability of copter procedures for powered-lift is set forth in part 194 of this chapter.

PART 111—PILOT RECORDS DATABASE

- 39. The authority citation for part 111 continues to read as follows:

Authority: 49 U.S.C. 106(f), 106(g), 40101, 40113, 44701, 44703, 44711, 46105, 46301.

- 40. Amend § 111.1 by revising paragraph (b)(4) introductory text and adding paragraph (b)(4)(iii) to read as follows:

§ 111.1 Applicability.

(b) * * *

(4) Each operator that operates two or more aircraft described in paragraph (b)(4)(i), (ii), or (iii) of this section, in furtherance of or incidental to a business, solely pursuant to the general operating and flight rules in part 91 of this chapter, or that operates aircraft pursuant to a Letter of Deviation Authority issued under § 125.3 of this chapter.

(iii) Large powered-lift.

PART 135—OPERATING REQUIREMENTS: COMMUTER AND ON DEMAND OPERATIONS AND RULES GOVERNING PERSONS ON BOARD SUCH AIRCRAFT

- 41. The authority citation for part 135 continues to read as follows:

Authority: 49 U.S.C. 106(f), 40113, 41706, 44701–44702, 44705, 44709, 44711–44713, 44715–44717, 44722, 44730, 45101–45105; Pub. L. 112–95, 126 Stat. 58 (49 U.S.C. 44730).

- 42. Amend § 135.1 by adding paragraph (d) to read as follows:

§ 135.1 Applicability.

(d) Additional requirements for powered-lift operations, training, checking, and testing, are set forth in part 194 of this chapter.

- 43. Amend § 135.100 by:
 - a. Adding paragraph (d); and
 - b. Removing the note at the end of the section.

The addition reads as follows:

§ 135.100 Flight crewmember duties.

(d) For the purposes of this section, taxi is defined as movement of an aircraft under its own power on the surface of an airport and includes hover taxi which is movement of a helicopter or any vertical takeoff and landing aircraft conducted above the surface and in ground effect at airspeeds less than approximately 20 knots, and air taxi which is movement of a helicopter or

any vertical takeoff and landing aircraft conducted above the surface but normally not above 100 feet AGL.

- 44. Amend § 135.152 by revising paragraph (j) to read as follows:

§ 135.152 Flight data recorders.

(j) For all turbine-engine-powered airplanes with a seating configuration, excluding any required crewmember seat, of 10 to 30 passenger seats, that are manufactured after August 19, 2002, the parameters listed in paragraphs (h)(1) through (8) of this section must be recorded within the ranges, accuracies, resolutions, and recording intervals specified in appendix F to this part.

§ 135.165 [Amended]

- 45. Amend § 135.165 by removing the reference “part 119” in the introductory text of paragraph (d) and adding in its place the reference “part 110”.

- 46. Amend § 135.179 by revising paragraph (b)(1) to read as follows:

§ 135.179 Inoperable instruments and equipment.

(1) Instruments and equipment that are either specifically or otherwise required by the airworthiness requirements under which the aircraft is type certificated and which are essential for safe operations under all operating conditions.

- 47. Amend § 135.243 by revising and republishing paragraphs (a) through (c) to read as follows:

§ 135.243 Pilot in command qualifications.

(a) No certificate holder may use a person, nor may any person serve, as pilot in command in passenger-carrying operations—

(1) Of a turbojet airplane, of an airplane having a passenger-seat configuration, excluding each crewmember seat, of 10 seats or more, or of a multiengine airplane in a commuter operation as defined in part 110 of this chapter, unless that person holds an airline transport pilot certificate with appropriate category and class ratings and, if required, an appropriate type rating for that airplane.

(2) Of a helicopter in a scheduled interstate air transportation operation by an air carrier within the 48 contiguous states unless that person holds an airline transport pilot certificate, appropriate type ratings, and an instrument rating.

(3) Of a turbojet-powered powered-lift, of a powered-lift having a

passenger-seat configuration, excluding each crewmember seat, of 10 seats or more, or of a powered-lift in a commuter operation as defined in part 110 of this chapter, unless that person holds an airline transport pilot certificate with appropriate category rating, and appropriate type rating not limited to VFR for that powered-lift.

(b) Except as provided in paragraph (a) of this section, no certificate holder may use a person, nor may any person serve, as pilot in command of an aircraft under VFR unless that person-

(1) Holds at least a commercial pilot certificate with appropriate category and class ratings; an appropriate type rating for that aircraft, if required; and for a powered-lift, a type rating for that aircraft not limited to VFR; and

(2) Has had at least 500 hours' time as a pilot, including at least 100 hours of cross-country flight time, at least 25 hours of which were at night; and

(3) For an airplane, holds an instrument rating or an airline transport pilot certificate with an airplane category rating; or

(4) For helicopter operations conducted VFR over-the-top, holds a helicopter instrument rating, or an airline transport pilot certificate with a category and class rating for that aircraft, not limited to VFR; or

(5) For a powered-lift, holds an instrument-powered-lift rating or an airline transport pilot certificate with a powered-lift category rating.

(c) Except as provided in paragraph (a) of this section, no certificate holder may use a person, nor may any person serve, as pilot in command of an aircraft under IFR unless that person-

(1) Holds at least a commercial pilot certificate with appropriate category and class ratings, and if required, an appropriate type rating for that aircraft (the type rating for powered-lift may not be limited to VFR); and

(2) Has had at least 1,200 hours of flight time as a pilot, including 500 hours of cross country flight time, 100 hours of night flight time, and 75 hours of actual or simulated instrument time at least 50 hours of which were in actual flight; and

(3) For an airplane, holds an instrument rating or an airline transport pilot certificate with an airplane category rating; or

(4) For a helicopter, holds a helicopter instrument rating, or an airline transport pilot certificate with a category and class rating for that aircraft, not limited to VFR; or

(5) For a powered-lift, holds an instrument-powered-lift rating or an

airline transport pilot certificate with a powered-lift category rating.

* * * * *

§ 135.244 [Amended]

■ 48. Amend § 135.244 by removing the reference "part 119" in the introductory text of paragraph (a) and adding in its place the reference "part 110".

■ 49. Amend § 135.245 by revising the introductory text of paragraph (c)(1) to read as follows:

§ 135.245 Second in command qualifications.

* * * * *

(c) * * *

(1) *Use of an airplane, powered-lift, or helicopter for maintaining instrument experience.* Within the 6 calendar months preceding the month of the flight, that person performed and logged at least the following tasks and iterations in-flight in an airplane, powered-lift, or helicopter, as appropriate, in actual weather conditions, or under simulated instrument conditions using a view-limiting device:

* * * * *

■ 50. Amend § 135.293 by:

■ a. Revising paragraphs (a)(9), (b), and (c); and

■ b. Removing and reserving paragraph (h).

The revisions read as follows:

§ 135.293 Initial and recurrent pilot testing requirements.

(a) * * *

(9) For rotorcraft and powered-lift pilots, procedures for aircraft handling in flat-light, whiteout, and brownout conditions, including methods for recognizing and avoiding those conditions.

(b) No certificate holder may use a pilot, nor may any person serve as a pilot, in any aircraft unless, since the beginning of the 12th calendar month before that service, that pilot has passed a competency check given by the Administrator or an authorized check pilot in that class of aircraft, if single-engine airplane other than turbojet, or that type of aircraft, if helicopter, multiengine airplane, turbojet airplane, or powered-lift to determine the pilot's competence in practical skills and techniques in that aircraft or class of aircraft. The extent of the competency check shall be determined by the Administrator or authorized check pilot conducting the competency check. The competency check may include any of the maneuvers and procedures currently required for the original issuance of the particular pilot certificate required for

the operations authorized and appropriate to the category, class and type of aircraft involved. For the purposes of this paragraph (b), type, as to an airplane means any one of a group of airplanes determined by the Administrator to have a similar means of propulsion, the same manufacturer, and no significantly different handling or flight characteristics. For the purposes of this paragraph (b), type, as to a helicopter, means a basic make and model.

(c) Each competency check given in a rotorcraft or powered-lift must include a demonstration of the pilot's ability to maneuver the rotorcraft or powered-lift solely by reference to instruments. The check must determine the pilot's ability to safely maneuver the rotorcraft or powered-lift into visual meteorological conditions following an inadvertent encounter with instrument meteorological conditions. For competency checks in non-IFR-certified rotorcraft or powered-lift, the pilot must perform such maneuvers as are appropriate to the rotorcraft's or powered-lift's installed equipment, the certificate holder's operations specifications, and the operating environment.

* * * * *

■ 51. Amend § 135.297 by revising paragraphs (c)(1)(i) and (ii) and (g)(3) to read as follows:

§ 135.297 Pilot in command: Instrument proficiency check requirements.

* * * * *

(c) * * *

(1) * * *

(i) For a pilot in command of an aircraft under § 135.243(a), include the procedures and maneuvers for an airline transport pilot certificate in the particular type of aircraft, if appropriate; and

(ii) For a pilot in command of an aircraft under § 135.243(c), include the procedures and maneuvers for a commercial pilot certificate with an instrument rating and, if required, for the appropriate type rating.

* * * * *

(g) * * *

(3) Each pilot taking the autopilot check must show that, while using the autopilot:

(i) The airplane or powered-lift can be operated as proficiently as it would be if a second in command were present to handle air-ground communications and air traffic control instructions. The autopilot check need only be demonstrated once every 12 calendar months during the instrument proficiency check required under paragraph (a) of this section.

(ii) On and after July 21, 2025, rotorcraft can be operated as proficiently as it would be if a second in command were present to handle air-ground communications and air traffic control instructions. The autopilot check need only be demonstrated once every 12 calendar months during the instrument proficiency check required under paragraph (a) of this section.

■ 52. Effective July 21, 2025, further amend § 135.297 by revising paragraph (g)(3) to read as follows:

§ 135.297 Pilot in command: Instrument proficiency check requirements.

* * * * *

(g) * * *

(3) Each pilot taking the autopilot check must show that, while using the autopilot, the aircraft can be operated as proficiently as it would be if a second in command were present to handle air-ground communications and air traffic control instructions. The autopilot check need only be demonstrated once every 12 calendar months during the instrument proficiency check required under paragraph (a) of this section.

■ 53. Amend § 135.339 by revising paragraphs (e)(3) and (4) to read as follows:

§ 135.339 Initial and transition training and checking: Check airmen (aircraft), check airmen (simulator).

* * * * *

(e) * * *

(3) Training and practice in conducting flight checks from the left and right pilot seats, or in the case of powered-lift with one pilot seat from that seat as well as providing training and instruction from an observation seat, in the required normal, abnormal, and emergency procedures to ensure competence to conduct the pilot flight checks required by this part; and

(4) The safety measures to be taken from either pilot seat, or in the case of powered-lift with one pilot seat from that seat as well as providing training and instruction from an observation seat, for emergency situations that are likely to develop during checking.

* * * * *

■ 54. Amend § 135.340 by revising paragraphs (e)(3) and (4) to read as follows:

§ 135.340 Initial and transition training and checking: Flight instructors (aircraft), flight instructors (simulator).

* * * * *

(e) * * *

(3) Training and practice from the left and right pilot seats, or in the case of powered-lift with one pilot seat from that seat as well as providing training

and instruction from an observation seat, in the required normal, abnormal, and emergency maneuvers to ensure competence to conduct the flight instruction required by this part; and

(4) The safety measures to be taken from either the left or right pilot seat, or in the case of powered-lift with one pilot seat from that seat as well as providing training and instruction from an observation seat, for emergency situations that are likely to develop during instruction.

* * * * *

PART 136—COMMERCIAL AIR TOURS AND NATIONAL PARKS AIR TOUR MANAGEMENT

■ 55. The authority citation for part 136 continues to read as follows:

Authority: 49 U.S.C. 106(f), 40113, 40119, 44101, 44701–44702, 44705, 44709–44711, 44713, 44716–44717, 44722, 44901, 44903–44904, 44912, 46105.

■ 56. Amend § 136.1 by adding paragraph (f) to read as follows:

§ 136.1 Applicability and definitions.

* * * * *

(f) Additional requirements for powered-lift operations are set forth in part 194 of this chapter.

■ 57. Amend § 136.75 by revising paragraph (a) introductory text to read as follows:

§ 136.75 Equipment and requirements.

(a) Flotation equipment. No person may conduct an air tour in Hawaii in a single-engine rotorcraft beyond the shore of any island, regardless of whether the rotorcraft is within gliding distance of the shore, unless:

* * * * *

PART 141—PILOT SCHOOLS

■ 58. The authority citation for part 141 continues to read as follows:

Authority: 49 U.S.C. 106(f), 40113, 44701–44703, 44707, 44709, 44711, 45102–45103, 45301–45302.

■ 59. Revise § 141.1 to read as follows:

§ 141.1 Applicability.

This part prescribes the requirements for issuing pilot school certificates, provisional pilot school certificates, and associated ratings, and the general operating rules applicable to a holder of a certificate or rating issued under this part. Additional requirements for pilot schools seeking to provide training courses for powered-lift certification and ratings are set forth in part 194 of this chapter.

■ 60. Amend § 141.37 by revising paragraph (a)(3)(ii) to read as follows:

§ 141.37 Check Instructor Qualifications.

* * * * *

(a) * * *

(3) * * *

(ii) Except for a course of training for a lighter-than-air rating, hold either a current flight instructor certificate with the appropriate category and class of aircraft, or ground instructor certificate with appropriate ratings, to be used in the course of training; and

* * * * *

PART 142—TRAINING CENTERS

■ 61. The authority citation for part 142 continues to read as follows:

Authority: 49 U.S.C. 106(f), 106(g), 40113, 40119, 44101, 44701–44703, 44705, 44707, 44709–44711, 45102–45103, 45301–45302.

■ 62. Amend § 142.1 by adding paragraph (d) to read as follows:

§ 142.1 Applicability.

* * * * *

(d) Additional requirements for training centers seeking to provide curriculums for powered-lift certification and ratings are set forth in part 194 of this chapter.

■ 63. Amend § 142.11 by revising paragraph (d)(2)(iii) to read as follows:

§ 142.11 Application for issuance or amendment.

* * * * *

(d) * * *

(2) * * *

(iii) For each flight simulator or flight training device, the make model, and series of aircraft or the set of aircraft being simulated and the qualification level assigned;

* * * * *

■ 64. Amend § 142.47 by revising paragraphs (a)(5) and (c)(2)(ii) to read as follows:

§ 142.47 Training center instructor eligibility requirements.

(a) * * *

(5) Meets at least one of the requirements in paragraphs (a)(5)(i) through (iv) of this section:

(i) Except as allowed by paragraph (a)(5)(ii) of this section, meets the aeronautical experience requirements of § 61.129(a), (b), (c), or (e) of this chapter, as applicable, excluding the required hours of instruction in preparation for the commercial pilot practical test, or holds a commercial pilot certificate with the appropriate ratings;

(ii) Meets the aeronautical experience requirements of § 61.159, § 61.161, or § 61.163 of this chapter, as applicable, or holds an unrestricted airline transport pilot certificate with the appropriate ratings, if instructing;

(A) In a flight simulation training device that represents an airplane or rotorcraft requiring a type rating, a powered-lift over 12,500 pounds, or a turbojet powered powered-lift, except as provided in paragraph (a)(5)(iv) of this section, or

(B) In a curriculum leading to the issuance of an airline transport pilot certificate or an added rating to an airline transport pilot certificate.

(iii) Is employed as a flight simulator instructor or a flight training device instructor for a training center providing instruction and testing to meet the requirements of part 61 of this chapter on August 1, 1996.

(iv) A person employed as an instructor and providing training in an FSTD that represents a rotorcraft requiring a type rating is not required to meet the aeronautical experience requirements of paragraph (a)(5)(ii) of this section and may instead meet the experience requirements of paragraph (a)(i) of this section if:

(A) The person meets the experience requirements of paragraph (a)(5)(i) of this section;

(B) The person is not providing training in a curriculum leading to the issuance of an airline transport pilot certificate or an added rating to an airline transport pilot certificate, and

(C) The person was employed and met the remaining requirements of this section on March 21, 2025.

* * * * *

(c) * * *

(2) * * *

(ii) That is accepted by the Administrator as being of equivalent difficulty, complexity, and scope as the tests provided by the Administrator for the applicable flight instructor and instrument flight instructor knowledge tests to the aircraft category in which they are instructing.

§ 142.53 [Amended]

■ 65. Amend § 142.53 in paragraphs (b)(2)(i) and (b)(3)(i) by removing the word “airplane” and adding in its place the word “aircraft”.

§ 142.57 [Amended]

■ 66. Amend § 142.57(c) by removing the word “Airplanes” and adding in its place the word “Aircraft”.

■ 67. Under the authority of 49 U.S.C. 106(f), add subchapter L, consisting of part 194, to read as follows:

SUBCHAPTER L—OTHER SPECIAL FEDERAL AVIATION REGULATIONS

PART 194—SPECIAL FEDERAL AVIATION REGULATION NO. 120—POWERED-LIFT: PILOT CERTIFICATION AND TRAINING; OPERATIONS REQUIREMENTS

Sec.

Subpart A—General

- 194.101 Applicability.
- 194.103 Definitions.
- 194.105 Qualification of powered-Lift FSTDs.
- 194.107 Expiration.
- 194.109 Incorporation by reference.

Subpart B—Certification, Training, and Qualification Requirements for Pilots and Flight Instructors

- 194.201 Alternate definition of cross-country time.
- 194.203 Alternate qualification requirements for certain flight instructors.
- 194.205 Limitations on flight training privileges for holders of airline transport pilot certificates under a part 135 of this chapter approved training program.
- 194.207 Alternate requirement for practical tests and training in a powered-lift.
- 194.209 Additional qualification requirements for certain pilots serving as second-in-command.
- 194.211 Alternate eligibility requirements for a person seeking a powered-lift type rating.
- 194.213 Alternate endorsement requirements for certain persons seeking a powered-lift rating.
- 194.215 Applicability of alternate aeronautical experience and logging requirements for commercial pilot certification and a powered-lift instrument rating.
- 194.216 Alternate aeronautical experience: Pilot-in-command flight time in a powered-lift for a commercial pilot certificate with a powered-lift category rating
- 194.217 Test pilots, FAA test pilots, or aviation safety inspectors: Alternate aeronautical experience and logging requirements for a commercial pilot certificate with a powered-lift category rating.
- 194.219 Instructor pilots: Alternate aeronautical experience and logging requirements for a commercial pilot certificate with a powered-lift category rating.
- 194.221 Initial cadre of instructors: Alternate aeronautical experience and logging requirements for a commercial pilot certificate with a powered-lift category rating.
- 194.223 Pilots receiving training under an approved training program: Alternate requirements for a commercial pilot certificate with a powered-lift category rating.
- 194.225 Test pilots, FAA test pilots, or aviation safety inspectors: Alternate aeronautical experience and logging

- requirements for an instrument-powered-lift rating.
 - 194.227 Instructor pilots: Alternate aeronautical experience and logging requirements for an instrument-powered-lift rating.
 - 194.229 Initial cadre of instructors: Alternate aeronautical experience and logging requirements for an instrument-powered-lift rating.
 - 194.231 Pilots receiving training under an approved training program: Alternate requirements for an instrument-powered-lift rating.
 - 194.233 Alternate means to satisfy the cross-country aeronautical experience requirements for a commercial pilot certificate with a powered-lift category rating.
 - 194.235 Alternate means to satisfy the cross-country aeronautical experience requirements for an instrument-powered-lift rating.
 - 194.237 Alternate means to satisfy the cross-country aeronautical experience requirements for a private pilot certificate with a powered-lift category rating.
 - 194.239 Alternate means to satisfy minimum curriculum content in certain appendices to part 141 of this chapter.
 - 194.241 Alternate qualification requirements for chief instructors, assistant chief instructors, and check instructors.
 - 194.243 Pilot certification through completion of training, testing, and checking under part 135 of this chapter.
 - 194.245 Pilot qualification and program management requirements to operate powered-lift under subpart K to part 91 of this chapter.
 - 194.247 Pilot qualification requirements to operate powered-lift under part 135 of this chapter.
 - 194.249 References to class in parts 135, 141, and 142 of this chapter.
 - 194.251 Alternate means to satisfy minimum curriculum content in training courses under part 142 of this chapter.
 - 194.253 Alternate requirements for powered-lift without fully functional dual controls used in flight training.
 - 194.255 Alternate requirements for powered-lift without fully functioning dual controls used in supervised operating experience when adding a type rating.
- Subpart C—Requirements for Persons Operating Powered-Lift**
- 194.301 Applicability.
 - 194.302 Provisions under part 91 of this chapter applicable to powered-lift.
 - 194.303 IFR takeoff, approach, and landing minimums.
 - 194.304 ATC transponder and altitude reporting equipment and use.
 - 194.305 Applicability of copter procedures under part 97 of this chapter to powered-lift.
 - 194.306 Provisions under part 135 of this chapter applicable to powered-lift.
 - 194.307 Applicability of rules for eligible on-demand operations.

- 194.308 Applicability of national air tour safety standards under part 136 of this chapter to powered-lift.
- 194.309 Applicability of flight instruction; Simulated instrument flight.
- 194.310 Powered-lift in vertical-lift flight mode, flight recorder specifications under part 91 of this chapter.
- 194.311 Powered-lift in wing-borne flight mode, flight recorder specifications under part 91 of this chapter.
- 194.312 Powered-lift in vertical-lift flight mode, flight recorder specifications under part 135 of this chapter.
- 194.313 Powered-lift in wing-borne flight mode, flight recorder specification under part 135 of this chapter.

Subpart D—Maintenance, Preventive Maintenance, Rebuilding, and Alteration Requirements for Powered-Lift Under Part 43 of This Chapter

- 194.401 Applicability.
- 194.402 Maintenance provisions.
- Appendix A to Part 194. Minimum requirements for a pilot training program in a powered-lift originally type certificated or seeking type certification with one set of controls and a single pilot station.

Authority: 42 U.S.C. 7572; 49 U.S.C. 106(f), 40113, 44701–44705, 44707, 44712, 44713, 44715, 44716, and 44722; Sec. 955 of Pub. L. 118–63.

Subpart A—General

§ 194.101 Applicability.

(a) The Special Federal Aviation Regulation (SFAR) in this part prescribes:

(1) Certain requirements that may be satisfied in lieu of the requirements of part 61 of this chapter for persons seeking a powered-lift pilot certificate and rating, the conditions under which those certificates and ratings are necessary, and the privileges and limitations of those certificates and ratings;

(2) The general operating rules applicable to all persons operating powered-lift, including those an operator must meet to conduct powered-lift operations under parts 91, 135, and 136 of this chapter;

(3) The requirements for persons conducting training, testing, and checking utilizing a powered-lift or flight simulation training device (FSTD) representing a powered-lift under parts 135, 141, and 142 of this chapter; and

(4) The requirements for persons conducting maintenance, preventative maintenance, rebuilds, alterations, or inspections on powered-lift pursuant to part 43 of this chapter.

(b) In addition to the requirements in this part, the following parts continue to apply to those persons described in paragraph (a) of this section unless otherwise specified in this part: parts

43, 60, 61, 91, 97, 135, 136, 141, and 142 of this chapter.

§ 194.103 Definitions.

For the purpose of this part:

Aviation Safety Inspector means a pilot employed by the FAA to conduct operations of a powered-lift for the purpose of establishing a type rating in that particular powered-lift under part 21 of this chapter, as appropriate.

Extended over-water operation means a powered-lift operation over water at a horizontal distance of more than 50 nautical miles from the nearest shoreline and more than 50 nautical miles from an off-shore heliport structure under part 91 or 135 of this chapter.

FAA test pilot means a pilot employed by the FAA to conduct operations of a powered-lift for the purpose of FAA examination or inspection of a type design for which an application for type certification has been submitted under part 21 of this chapter.

Heliport means an area of land, water, or structure used or intended to be used for the landing and takeoff of helicopters and powered-lift.

Instructor pilot means a pilot employed or used by a manufacturer of a powered-lift to conduct operations of the powered-lift for the purpose of developing a proposed training curriculum and providing crew training.

Manufacturer means any person who holds, or is an applicant for, a type or production certificate for an aircraft. An amateur builder under § 21.191(g) of this chapter, builder of a kit aircraft under § 21.191(h) of this chapter, or the holder of a restricted category type certificate are not considered manufacturers for the purpose of this part.

Test pilot means a pilot employed or used by a manufacturer of a powered-lift to conduct operations of the powered-lift for the purpose of research and development and showing compliance with this chapter.

Vertical-lift flight mode means a mode of flight where a powered-lift:

(1) Is in a configuration that allows vertical takeoff, vertical landing, and low-speed flight; and

(2) Depends principally on engine-driven lift devices or engine thrust for lift.

Wing-borne flight mode means a mode of flight where a powered-lift is not operating in the vertical-lift flight mode as defined and depends exclusively or partially on nonrotating airfoil(s) for lift during takeoff, landing, or horizontal flight.

§ 194.105 Qualification of powered-lift FSTDs.

(a) For flight simulation training devices (FSTDs) representing powered-lift for which qualification standards have not been issued under part 60 of this chapter, the applicable requirements will be the portions of the flight simulation training device qualification performance standards contained in appendices A through D to part 60 of this chapter that are found by the Administrator to be appropriate for the powered-lift and applicable to a specific type design, or such FSTD qualification criteria as the Administrator may find provide an equivalent level of safety to those FSTD qualification standards.

(b) Proposed qualification performance standards as set forth by paragraph (a) of this section will be published in the **Federal Register** for comment, except when the FAA considers public notice to be unnecessary because previous opportunities to comment on substantially identical proposed qualification performance standards have been provided. In these instances, FAA will provide personal notice and opportunity for comment.

§ 194.107 Expiration.

This part, consisting of Special Federal Aviation Regulation (SFAR) No. 120, will remain in effect until January 21, 2035.

§ 194.109 Incorporation by reference.

Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved incorporation by reference (IBR) material is available for inspection at the FAA and at the National Archives and Records Administration (NARA). Contact the FAA's Office of Rulemaking, 800 Independence Avenue SW, Washington, DC 20590; phone: (202) 267–9677. For information on the availability of this material at NARA, visit www.archives.gov/federal-register/cfr/ibr-locations.html or email fr.inspection@nara.gov. The material may be obtained from the sources in the following paragraphs:

(a) RTCA, Inc., 1150 18th St. NW, Suite 910, Washington, DC 20036; phone: (202) 833–9339; website: www.rtca.org/products.

(1) Section 2 of RTCA DO–309, Minimum Operational Performance Standards (MOPS) for Helicopter Terrain Awareness and Warning System (HTAWS) Airborne Equipment (Mar. 13, 2008); into §§ 194.302; 194.306.

(2) [Reserved]

(b) U.S. Department of Transportation, Subsequent Distribution Office, DOT Warehouse M30, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785; phone (301) 322-5377; website: www.faa.gov/aircraft/air_cert/design_approvals/tso/ (select the link "Search Technical Standard Orders").

(1) TSO-C194, Technical Standard Order: Helicopter Terrain Awareness and Warning System, effective Dec. 17, 2008; into §§ 194.302; 194.306.

(2) [Reserved]

Subpart B—Certification, Training, and Qualification Requirements for Pilots and Flight Instructors

§ 194.201 Alternate definition of cross-country time.

Notwithstanding the cross-country time definitions in § 61.1(b) of this chapter, a person may log flight time in a powered-lift as cross-country time provided the time was acquired during a flight—

(a) That includes a point of landing that was at least a straight-line distance of more than 25 nautical miles from the original point of departure; and

(b) That involves the use of dead reckoning, pilotage, electronic navigation aids, radio aids, or other navigation systems to navigate to the landing point.

§ 194.203 Alternate qualification requirements for certain flight instructors.

(a) *Instructor pilots at a manufacturer.* In addition to the provisions specified in § 61.3(d)(3) of this chapter, a flight instructor certificate issued under part 61 of this chapter is not necessary to conduct flight training if the training is given by an instructor pilot in a powered-lift at the manufacturer, provided the training is conducted in accordance with the manufacturer's training curriculum and is given to either—

(1) A test pilot;

(2) A person authorized by the Administrator to serve as an initial check pilot, chief instructor, assistant chief instructor, or training center evaluator for the purpose of initiating training in a powered-lift under an approved training program under part 135, 141, or 142 of this chapter, as appropriate; or

(3) An FAA test pilot or aviation safety inspector.

(b) *Flight instructors under part 135 of this chapter.* Notwithstanding the requirement in § 61.3(d)(3)(ii) of this chapter, a person must hold a flight instructor certificate with the appropriate powered-lift ratings to

conduct training in accordance with a training curriculum approved to meet the requirements of § 194.243(a)(1).

§ 194.205 Limitations on flight training privileges for holders of airline transport pilot certificates under a part 135 of this chapter approved training program.

Notwithstanding the privileges in § 61.167(a)(2) of this chapter, a person who holds an airline transport pilot certificate with powered-lift ratings must hold a flight instructor certificate with the appropriate powered-lift ratings to instruct pilots in accordance with a training curriculum approved to meet the requirements of § 194.243(a)(1).

§ 194.207 Alternate requirement for practical tests and training in a powered-lift.

(a) *Required equipment for the practical test.* Notwithstanding the equipment requirement in § 61.45(b)(1)(ii) of this chapter and the limitation specified in § 61.45(b)(2) of this chapter, an applicant for a certificate or rating may use a powered-lift that is precluded from performing all of the tasks required for the practical test without receiving a limitation on the applicant's certificate or rating, as appropriate.

(b) *Waiver authority for a practical test conducted in a powered-lift.* An Examiner who conducts a practical test in a powered-lift may waive any task for which the FAA has provided waiver authority.

(c) *Flight training on waived tasks.* Notwithstanding the requirements in §§ 61.107(a) and 61.127(a) of this chapter for training to include the areas of operation listed in § 61.107(b)(5) or § 61.127(b)(5) of this chapter, as applicable, an applicant seeking a private pilot certificate or commercial pilot certificate with a powered-lift category rating concurrently with a powered-lift type rating is not required to receive and log flight training on a task specified in an area of operation if the powered-lift is not capable of performing the task, provided the FAA has issued waiver authority for that task in accordance with paragraph (b) of this section.

§ 194.209 Additional qualification requirements for certain pilots serving as second-in-command.

(a) A person who obtains at least a private pilot certificate with a powered-lift category rating by satisfactorily completing the practical test in a powered-lift that is precluded from performing each task required by § 61.43(a)(1) of this chapter may not serve as second-in-command of a powered-lift that is capable of

performing the tasks that were waived on the person's practical test until the person has—

(1) Received and logged ground and flight training from an authorized instructor on the specific tasks that were waived on the person's practical test; and

(2) Received a logbook or training record endorsement from an authorized instructor certifying the person has satisfactorily demonstrated proficiency of those tasks.

(b) The training and endorsement required by paragraph (a) of this section are not required if, prior to serving as second-in-command, a person meets one of the following requirements—

(1) Successfully completes the practical test for a powered-lift type rating, and the practical test includes each task required by § 61.43(a)(1) of this chapter; or

(2) Has received ground and flight training under an approved training program and has satisfactorily completed a competency check under § 135.293 or § 91.1065 of this chapter in a powered-lift, and the approved training and checking include each task that was previously waived in accordance with § 194.207(b).

(c) An applicant receiving flight training under § 194.221, § 194.223, § 194.229, or § 194.231 may serve as second-in-command in a powered-lift type certificated for more than one required pilot flight crewmember without meeting the requirements of § 61.55(a)(1), (a)(2), and (b)(2) of this chapter.

§ 194.211 Alternate eligibility requirements for a person seeking a powered-lift type rating.

(a) *General applicability.* The requirements specified in paragraphs (b) and (c) of this section apply only to persons seeking a type rating in a powered-lift that is capable of performing instrument maneuvers and procedures.

(b) *Obtaining an initial powered-lift type rating without concurrently obtaining the instrument-powered-lift rating.* (1) Notwithstanding the requirement to hold or concurrently obtain an appropriate instrument rating in § 61.63(d)(1) of this chapter, a person who applies for an initial powered-lift type rating to be completed concurrently with a powered-lift category rating may apply for the type rating without holding or concurrently obtaining a powered-lift instrument rating, but the type rating will be limited to "visual flight rules (VFR) only."

(2) Notwithstanding the requirement in § 61.63(d)(4) of this chapter, a person who applies for a powered-lift type rating pursuant to paragraph (b)(1) of this section is not required to perform the type rating practical test in actual or simulated instrument conditions.

(3) Except as specified in paragraph (b)(6) of this section, a person who obtains a powered-lift type rating with a “VFR only” limitation pursuant to paragraph (b)(1) of this section must remove the limitation in accordance with paragraph (b)(4) of this section within 2 calendar months from the month in which the person passes the type rating practical test.

(4) The “VFR only” limitation may be removed after the person—

(i) Passes an instrument rating practical test in a powered-lift in actual or simulated instrument conditions; and

(ii) Passes a practical test in the powered-lift type for which the “VFR only” limitation applies on the appropriate areas of operation listed in § 61.157(e)(3) of this chapter that consist of performing instrument maneuvers and procedures in actual or simulated instrument conditions.

(5) Except as specified in paragraph (b)(6) of this section, if a person who obtains a powered-lift type rating with a “VFR only” limitation pursuant to paragraph (b)(1) of this section does not remove the limitation within 2 calendar months from the month in which the person completed the type rating practical test, the powered-lift type rating for which the “VFR only” limitation applies will become invalid for use until the person removes the limitation in accordance with paragraph (b)(4) of this section.

(6) A person holding a private pilot certificate is not required to remove the “VFR only” limitation if the limitation applies to a powered-lift type that is not a large aircraft or turbojet-powered.

(c) *Obtaining an additional powered-lift type rating with a “VFR Only” limitation.* (1) Notwithstanding the requirement to hold or concurrently obtain an appropriate instrument rating in § 61.63(d)(1) of this chapter, a person holding a private pilot certificate may apply for a powered-lift type rating for a powered-lift that is not a large aircraft or turbojet-powered without holding or concurrently obtaining a powered-lift instrument rating, but the type rating will be limited to “VFR only.”

(2) Notwithstanding the requirement in § 61.63(d)(4) of this chapter, a person who applies for a powered-lift type rating pursuant to paragraph (c)(1) of this section is not required to perform the type rating practical test in actual or simulated instrument conditions.

(3) A person who obtains a powered-lift type rating with a “VFR only” limitation pursuant to paragraph (c)(1) of this section may remove the “VFR only” limitation for that powered-lift type as specified in paragraph (b)(4) of this section.

(d) *Concurrent practical tests for removal of “VFR only” limitation.* If a task required for the practical test specified in paragraph (b)(4)(i) of this section overlaps with a task required for the practical test specified in paragraph (b)(4)(ii) of this section, a person may perform the task a single time provided the task is performed to the highest standard required for the task.

§ 194.213 Alternate endorsement requirements for certain persons seeking a powered-lift rating.

(a) Notwithstanding the requirements in part 61 of this chapter for an authorized instructor to provide endorsements for certificates and ratings, including endorsements for solo flight, the following persons may provide the required logbook or training record endorsements under part 61 of this chapter and this part for a commercial pilot certificate with a powered-lift category rating, an instrument-powered-lift rating, a powered-lift type rating, or a flight instructor certificate with powered-lift ratings—

(1) An instructor pilot, provided the applicant is either—

(i) A test pilot or instructor pilot for the manufacturer seeking type certification of an experimental powered-lift;

(ii) A person authorized by the Administrator to serve as an initial check pilot, chief instructor, assistant chief instructor, or training center evaluator for the purpose of initiating training in a powered-lift under an approved training program under part 135, 141, or 142 of this chapter, as appropriate; or

(iii) An FAA test pilot or aviation safety inspector; or

(2) A management official within the manufacturer’s organization, provided the applicant is an instructor pilot for the manufacturer of an experimental powered-lift.

(b) The endorsements for training time under this section must include a description of the training given, length of training lesson, and the endorsement provider’s signature and identifying information, including certificate number and expiration date, if applicable.

§ 194.215 Applicability of alternate aeronautical experience and logging requirements for commercial pilot certification and a powered-lift instrument rating.

(a) The alternate requirements set forth in §§ 194.216 through 194.231 apply only to persons who hold at least a commercial pilot certificate with the following ratings:

(1) An airplane category rating with a single-engine or multi-engine class rating and an instrument-airplane rating; or

(2) A rotorcraft category rating with a helicopter class rating and an instrument-helicopter rating.

(b) If no alternate aeronautical experience or logging requirement is provided under this part, the person must meet the applicable requirements under part 61 of this chapter, as appropriate.

§ 194.216 Alternate aeronautical experience: Pilot-in-command flight time in a powered-lift for a commercial pilot certificate with a powered-lift category rating.

(a) *Pilot-in-command flight time in a powered-lift.* Notwithstanding the eligibility requirement specified in § 61.123(f) of this chapter, an applicant for a commercial pilot certificate with a powered-lift category rating under § 194.217, § 194.219, § 194.221, or § 194.223 may log 35 hours of pilot-in-command flight time in a powered-lift in lieu of the aeronautical experience requirement of § 61.129(e)(2)(i) of this chapter.

(b) *Use of full flight simulators.* In addition to the permitted credit for use of a full flight simulator in § 61.129(i) of this chapter, an applicant for a commercial pilot certificate with a powered-lift category rating may credit a maximum of 15 hours toward the 35 hours of pilot-in-command flight time requirement in paragraph (a) of this section, provided—

(1) The aeronautical experience was obtained performing the duties of pilot-in-command in a Level C or higher full flight simulator that represents the powered-lift category; and

(2) The full flight simulator sessions are conducted in accordance with:

(i) For test pilots, instructor pilots, FAA test pilots, or FAA aviation safety inspectors under § 194.217 or § 194.219, as applicable, the manufacturer’s proposed training curriculum;

(ii) For the initial cadre of instructors under § 194.221, the manufacturer’s training curriculum; or

(iii) For pilots under § 194.223, an approved training program under part 135, 141, or 142 of this chapter.

§ 194.217 Test pilots, FAA test pilots, or aviation safety inspectors: Alternate aeronautical experience and logging requirements for a commercial pilot certificate with a powered-lift category rating.

(a) *General applicability.* An applicant for a commercial pilot certificate with a powered-lift category rating who is a test pilot for the manufacturer of an experimental powered-lift, an FAA test pilot, or an aviation safety inspector may satisfy the alternate aeronautical experience and logging requirements set forth in paragraphs (b) and (c) of this section, provided—

(1) The flights are conducted in an experimental powered-lift at the manufacturer;

(2) The applicant is authorized by the Administrator to act as pilot in command of the experimental powered-lift.

(b) *Alternate aeronautical experience requirements.* Notwithstanding the eligibility requirement specified in § 61.123(f) of this chapter, a test pilot, FAA test pilot, or aviation safety inspector may meet the requirements in paragraphs (b)(1) through (4) of this section in lieu of the aeronautical experience requirements of § 61.129(e)(3) and (4) of this chapter.

(1) A test pilot, FAA test pilot, or aviation safety inspector may receive 20 hours of flight training on the areas of operation listed in § 61.127(b)(5) of this chapter from an instructor pilot for the manufacturer of an experimental powered-lift in lieu of an authorized instructor, provided—

(i) The training is conducted in accordance with the manufacturer's proposed training curriculum in the experimental powered-lift; and

(ii) The test pilot, FAA test pilot, or aviation safety inspector receives a logbook or training record endorsement from the instructor pilot certifying that the test pilot satisfactorily completed the training curriculum specified in paragraph (b)(1)(i) of this section.

(2) A test pilot, FAA test pilot, or aviation safety inspector may accomplish the practical test preparation requirements in § 61.129(e)(3)(iv) of this chapter with a pilot who serves as an instructor pilot for the manufacturer of the experimental powered-lift.

(3) A test pilot, FAA test pilot, or aviation safety inspector may satisfy the aeronautical experience requirement in § 61.129(e)(4) of this chapter by logging at least 10 hours of solo flight time under an endorsement from an instructor pilot or performing the duties of pilot-in-command in an experimental powered-lift with one of the following

individuals onboard (which may be credited towards the flight time requirement in §§ 61.129(e)(2), and (e)(2)(ii) of this chapter and 194.216(a))—

(i) A test pilot for the manufacturer of the powered-lift who is authorized by the Administrator to act as pilot-in-command of the experimental powered-lift; or

(ii) An instructor pilot for the manufacturer of the powered-lift who is authorized by the Administrator to act as pilot-in-command of the experimental powered-lift.

(4) A test pilot, FAA test pilot, or aviation safety inspector may satisfy the alternate requirements in § 194.233 in lieu of the cross-country aeronautical experience requirements specified in § 61.129(e)(3)(ii) and (iii) and (e)(4)(i) of this chapter.

(c) *Alternate logging requirement.* Notwithstanding the logging requirements in § 61.51(e)(1) of this chapter, an applicant for a commercial pilot certificate with a powered-lift category rating may log pilot-in-command flight time for the purpose of satisfying the aeronautical experience requirements in §§ 61.129(e)(2)(ii) and 194.216(a) of this chapter for flights when the pilot is the sole manipulator of the controls of an experimental powered-lift for which the pilot is not rated, provided—

(1) The test pilot, FAA test pilot, or aviation safety inspector is acting as pilot-in-command of the experimental powered-lift in accordance with a letter of authorization issued by the Administrator; and

(2) The flight is conducted for the purpose of research and development or showing compliance with the regulations in this chapter in accordance with the experimental certificate issued to the powered-lift pursuant to § 21.191 of this chapter.

§ 194.219 Instructor pilots: Alternate aeronautical experience and logging requirements for a commercial pilot certificate with a powered-lift category rating.

(a) *General applicability.* An applicant for a commercial pilot certificate with a powered-lift category rating who is an instructor pilot for the manufacturer of an experimental powered-lift may satisfy the alternate aeronautical experience and logging requirements set forth in paragraphs (b) and (c) of this section, provided—

(1) The flights are conducted in an experimental powered-lift at the manufacturer; and

(2) The applicant is authorized by the Administrator to act as pilot-in-

command of the experimental powered-lift.

(b) *Alternate aeronautical experience requirements.* Notwithstanding the eligibility requirement specified in § 61.123(f) of this chapter, an instructor pilot may meet the requirements in paragraphs (b)(1) through (4) of this section in lieu of the aeronautical experience requirements of § 61.129(e)(3) and (4) of this chapter.

(1) An instructor pilot may meet the requirements of paragraphs (b)(1)(i) and (ii) of this section in lieu of the 20 hours of training with an authorized instructor required by § 61.129(e)(3) of this chapter.

(i) The instructor pilot provided the manufacturer's proposed training curriculum to a test pilot, FAA test pilot, or aviation safety inspector in the experimental powered-lift, which includes 20 hours of training on the areas of operation listed in § 61.127(b)(5) of this chapter; and

(ii) The instructor pilot receives a logbook or training record endorsement from a management official within the manufacturer's organization certifying that the instructor pilot provided the training specified in paragraph (b)(1)(i) of this section.

(2) An instructor pilot may accomplish the practical test preparation requirements in § 61.129(e)(3)(iv) of this chapter with a pilot who serves as an instructor pilot for the manufacturer of the experimental powered-lift.

(3) An instructor pilot may satisfy the aeronautical experience requirement in § 61.129(e)(4) of this chapter by logging at least 10 hours of solo flight time under an endorsement from another instructor pilot or performing the duties of pilot-in-command in an experimental powered-lift with one of the following individuals onboard (which may be credited towards the flight time requirement in §§ 61.129(e)(2), and (e)(2)(ii) of this chapter and 194.216(a))—

(i) A test pilot for the manufacturer of the powered-lift who is authorized by the Administrator to act as pilot-in-command of the experimental powered-lift;

(ii) Another instructor pilot for the manufacturer of the powered-lift who is authorized by the Administrator to act as pilot-in-command of the experimental powered-lift; or

(iii) An FAA test pilot or aviation safety inspector.

(4) An instructor pilot may satisfy the alternate requirements in § 194.233 in lieu of the cross-country aeronautical experience requirements specified in

§ 61.129(e)(3)(ii) and (iii) and (e)(4)(i) of this chapter.

(c) *Alternate logging requirement.* Notwithstanding the logging requirements in § 61.51(e)(3) of this chapter, an applicant for a commercial pilot certificate with a powered-lift category rating may log pilot-in-command flight time for the purpose of satisfying the aeronautical experience requirements in §§ 61.129(e)(2)(ii) of this chapter and 194.216(a) for flights when the pilot is serving as an instructor pilot for the manufacturer of an experimental powered-lift for which the pilot is not rated, provided—

(1) The pilot is acting as pilot-in-command of the experimental powered-lift in accordance with a letter of authorization issued by the Administrator; and

(2) The flight is conducted for the purpose of crew training in accordance with the experimental certificate issued to the powered-lift pursuant to § 21.191 of this chapter.

§ 194.221 Initial cadre of instructors: Alternate aeronautical experience and logging requirements for a commercial pilot certificate with a powered-lift category rating.

(a) *General applicability.* An applicant for a commercial pilot certificate with a powered-lift category rating may satisfy the alternate aeronautical experience and logging requirements set forth in paragraphs (b) and (c) of this section, provided—

(1) The applicant is authorized by the Administrator to serve as an initial check pilot, chief instructor, assistant chief instructor, or training center evaluator for the purpose of initiating training in a powered-lift under an approved training program under part 135, 141, or 142 of this chapter, as appropriate; and

(2) The flights are conducted in type-certificated powered-lift at the manufacturer.

(b) *Alternate aeronautical experience requirements.* Notwithstanding the eligibility requirement specified in § 61.123(f) of this chapter, an applicant may meet the requirements in paragraphs (b)(1) through (4) of this section in lieu of the aeronautical experience requirements of § 61.129(e)(3) and (4) of this chapter.

(1) An applicant may receive 20 hours of flight training on the areas of operation listed in § 61.127(b)(5) of this chapter from an instructor pilot for the manufacturer of the powered-lift in lieu of an authorized instructor, provided—

(i) The training is conducted in accordance with the manufacturer's training curriculum in the powered-lift; and

(ii) The applicant receives a logbook or training record endorsement from the instructor pilot certifying that the test pilot satisfactorily completed the training curriculum specified in paragraph (b)(1)(i) of this section.

(2) An applicant may accomplish the practical test preparation requirements in § 61.129(e)(3)(iv) of this chapter with a pilot who serves as an instructor pilot for the manufacturer of the powered-lift.

(3) An applicant may satisfy the aeronautical experience requirement in § 61.129(e)(4) of this chapter by logging at least 10 hours of solo flight time in a powered-lift under an endorsement from an instructor pilot or performing the duties of pilot-in-command in a powered-lift with a person onboard who serves as an instructor pilot for the manufacturer of the powered-lift (which may be credited towards the flight time requirement in § 61.129(e)(2) and (e)(2)(ii) of this chapter and 194.216(a)).

(4) An applicant may satisfy the alternate requirements in § 194.233 in lieu of the cross-country aeronautical experience requirements specified in § 61.129(e)(3)(ii) and (iii) and (e)(4)(i) of this chapter.

(c) *Alternate logging requirements.* Notwithstanding the logging requirements in § 61.51(e)(1) of this chapter, an applicant for a commercial pilot certificate with a powered-lift category rating may log up to 25 hours of pilot-in-command flight time for the purpose of satisfying the aeronautical experience requirements in §§ 61.129(e)(2)(ii) of this chapter and 194.216(a) for flights when the pilot is the sole manipulator of the controls of a powered-lift for which the pilot is not rated, provided—

(1) The applicant is manipulating the controls of the powered-lift with a person onboard who serves as an instructor pilot for the manufacturer;

(2) The applicant is performing the duties of pilot-in-command; and

(3) The flight is conducted in accordance with the manufacturer's training curriculum for the powered-lift.

§ 194.223 Pilots receiving training under an approved training program: Alternate requirements for a commercial pilot certificate with a powered-lift category rating.

(a) *General applicability.* An applicant for a commercial pilot certificate with a powered-lift category rating may satisfy the alternate requirements set forth in paragraphs (b) through (d) of this section, provided the applicant is receiving training under an approved training program under part 135, 141, or 142 of this chapter for the purpose of obtaining a powered-lift category rating.

(b) *Alternate aeronautical experience requirements.* An applicant may satisfy the alternate requirements in § 194.233 in lieu of the cross-country aeronautical experience requirements specified in § 61.129(e)(3)(ii) and (iii) and (e)(4)(i) of this chapter.

(c) *Alternate logging requirement.* Notwithstanding the logging requirements in § 61.51(e)(1) of this chapter, an applicant for a commercial pilot certificate with a powered-lift category rating may log up to 25 hours of pilot-in-command time towards the aeronautical experience requirement in § 194.216(a) for flights when the applicant is the sole manipulator of the controls of a powered-lift for which the pilot is not rated, provided—

(1) The applicant is manipulating the controls of the powered-lift with an authorized instructor onboard;

(2) The applicant is performing the duties of pilot-in-command; and

(3) The flight is conducted in accordance with an approved training program under part 135, 141, or 142 of this chapter.

§ 194.225 Test pilots, FAA test pilots, and aviation safety inspectors: Alternate aeronautical experience and logging requirements for an instrument-powered-lift rating.

(a) *General applicability.* An applicant for an instrument-powered-lift rating who is test pilot for the manufacturer of an experimental powered-lift, an FAA test pilot, or aviation safety inspector may satisfy the alternate aeronautical experience and logging requirements set forth in paragraphs (b) and (c) of this section, provided—

(1) The flights are conducted in an experimental powered-lift at the manufacturer; and

(2) The applicant is authorized by the Administrator to act as pilot-in-command of the experimental powered-lift.

(b) *Alternate aeronautical experience requirements.* A test pilot, FAA test pilot, or aviation safety inspector may meet the aeronautical experience requirements of paragraphs (b)(1) through (4) of this section in lieu of the aeronautical experience requirements of § 61.65(f)(2) of this chapter.

(1) Notwithstanding the eligibility requirement in § 61.65(a)(5) of this chapter, a test pilot, FAA test pilot, or aviation safety inspector may receive 15 hours of instrument training on the areas of operation listed in § 61.65(c) of this chapter from an instructor pilot for the manufacturer of an experimental powered-lift in lieu of an authorized instructor, provided—

(i) The training is conducted in accordance with the manufacturer's

proposed training curriculum in the experimental powered-lift; and

(ii) The test pilot, FAA test pilot, or aviation safety inspector receives a logbook or training record endorsement from the instructor pilot certifying that the applicant satisfactorily completed the training curriculum specified in paragraph (b)(1)(i) of this section.

(2) A test pilot, FAA test pilot, or aviation safety inspector may accomplish the practical test preparation requirements in § 61.65(f)(2)(i) of this chapter with an instructor pilot for the manufacturer of the experimental powered-lift.

(3) A test pilot, FAA test pilot, or aviation safety inspector may accomplish the cross-country flight specified in § 61.65(f)(2)(ii) of this chapter for an instrument-powered-lift rating without an authorized instructor, provided the test pilot, FAA test pilot, or aviation safety inspector—

(i) Completes the cross-country flight specified in § 61.65(f)(2)(ii) of this chapter with a pilot who serves as an instructor pilot for the manufacturer of the experimental powered-lift; and

(ii) Obtains a logbook or training record endorsement from the instructor pilot certifying that the person completed the cross-country flight.

(4) A test pilot, FAA test pilot, or aviation safety inspector may satisfy the alternate requirements in § 194.235 in lieu of the cross-country aeronautical experience requirements specified in § 61.65(f)(2)(ii) of this chapter.

(c) *Alternate logging requirement.* Notwithstanding the logging requirements in § 61.51(e)(1) of this chapter, a test pilot, FAA test pilot, or aviation safety inspector may log pilot-in-command flight time for the purpose of satisfying the 10-hour cross-country requirement in § 61.65(f)(1) of this chapter for flights when the pilot is the sole manipulator of the controls of an experimental powered-lift for which the pilot is not rated, provided—

(1) The test pilot, FAA test pilot, or aviation safety inspector is acting as pilot-in-command of the experimental powered-lift in accordance with a letter of authorization issued by the Administrator; and

(2) The flight is conducted for the purpose of research and development or showing compliance with the regulations in this chapter in accordance with the experimental certificate issued to the powered-lift pursuant to § 21.191 of this chapter.

§ 194.227 Instructor pilots: Alternate aeronautical experience and logging requirements for an instrument-powered-lift rating.

(a) *General applicability.* An applicant for an instrument-powered-lift rating who is an instructor pilot for the manufacturer of an experimental powered-lift may satisfy the alternate aeronautical experience and logging requirements set forth in paragraphs (b) and (c) of this section, provided—

(1) The flights are conducted in an experimental powered-lift at the manufacturer; and

(2) The applicant is authorized by the Administrator to act as pilot-in-command of the experimental powered-lift.

(b) *Alternate aeronautical experience requirements.* An instructor pilot may meet the aeronautical experience requirements of paragraphs (b)(1) through (4) of this section in lieu of the aeronautical experience requirements of § 61.65(f)(2) of this chapter.

(1) Notwithstanding the eligibility requirement in § 61.65(a)(5) of this chapter, an instructor pilot may meet the requirements of paragraphs (b)(1)(i) and (ii) of this section in lieu of the 15 hours of training with an authorized instructor required by § 61.65(f)(2) of this chapter.

(i) The instructor pilot provided the manufacturer's proposed training curriculum to a test pilot, FAA test pilot, or aviation safety inspector in the experimental powered-lift, which includes 15 hours of training on the areas of operation listed in § 61.65(c) of this chapter; and

(ii) The instructor pilot receives a logbook or training record endorsement from a management official within the manufacturer's organization certifying that the instructor pilot provided the training specified in paragraph (b)(1)(i) of this section.

(2) An instructor pilot may accomplish the practical test preparation requirements in § 61.65(f)(2)(i) of this chapter with another pilot who serves as an instructor pilot for the manufacturer of the experimental powered-lift.

(3) An instructor pilot may accomplish the cross-country flight specified in § 61.65(f)(2)(ii) of this chapter for an instrument-powered-lift rating without an authorized instructor, provided the instructor pilot—

(i) Completes the cross-country flight specified in § 61.65(f)(2)(ii) of this chapter with another pilot who serves as an instructor pilot for the manufacturer of the experimental powered-lift; and

(ii) Obtains a logbook or training record endorsement from the instructor

pilot certifying that the person completed the cross-country flight.

(4) An instructor pilot may satisfy the alternate requirements in § 194.235 in lieu of the cross-country aeronautical experience requirements specified in § 61.65(f)(2)(ii) of this chapter.

(c) *Alternate logging requirement.* Notwithstanding the logging requirements in § 61.51(e)(3) of this chapter, an instructor pilot may log pilot-in-command flight time for the purpose of satisfying the 10-hour cross-country requirement in § 61.65(f)(1) of this chapter for flights when the pilot is serving as an instructor pilot for the manufacturer of an experimental powered-lift for which the pilot is not rated, provided the pilot—

(1) Is acting as pilot-in-command of the experimental powered-lift in accordance with a letter of authorization issued by the Administrator; and

(2) The flight is conducted for the purpose of crew training in accordance with the experimental certificate issued to the powered-lift pursuant to § 21.191 of this chapter.

§ 194.229 Initial cadre of instructors: Alternate aeronautical experience and logging requirements for an instrument-powered-lift rating.

(a) *General applicability.* An applicant for an instrument-powered-lift rating may satisfy the alternate aeronautical experience and logging requirements set forth in paragraphs (b) and (c) of this section, provided—

(1) The applicant is authorized by the Administrator to serve as an initial check pilot, chief instructor, assistant chief instructor, or training center evaluator for the purpose of initiating training in a powered-lift under an approved training program under part 135, 141, or 142 of this chapter, as appropriate; and

(2) The flights are conducted in type-certificated powered-lift at the manufacturer.

(b) *Alternate aeronautical experience requirements.* Notwithstanding the instrument rating requirements of § 61.65 of this chapter, an applicant may meet the requirements in paragraphs (b)(1) through (4) of this section in lieu of the aeronautical experience requirements of § 61.65(f)(2) of this chapter.

(1) Notwithstanding the eligibility requirement in § 61.65(a)(5) of this chapter, an applicant may receive 15 hours of instrument training on the areas of operation listed in § 61.65(c) of this chapter from an instructor pilot for the manufacturer of a powered-lift in lieu of an authorized instructor, provided—

(i) The training is conducted in accordance with the manufacturer's training curriculum in the powered-lift; and

(ii) The applicant receives a logbook or training record endorsement from the instructor pilot certifying that the applicant satisfactorily completed the training curriculum specified in paragraph (b)(1)(i) of this section.

(2) An applicant may accomplish the practical test preparation requirements in § 61.65(f)(2)(i) of this chapter with a pilot who serves as an instructor pilot for the manufacturer of the powered-lift.

(3) An applicant may accomplish the cross-country flight specified in § 61.65(f)(2)(ii) of this chapter for an instrument-powered-lift rating without an authorized instructor, provided the applicant—

(i) Completes the cross-country flight specified in § 61.65(f)(2)(ii) of this chapter with a pilot who serves as an instructor pilot for the manufacturer of the powered-lift; and

(ii) Obtains a logbook or training record endorsement from the instructor pilot certifying that the person completed the cross-country flight.

(4) An applicant may satisfy the alternate requirements in § 194.235 in lieu of the cross-country aeronautical experience requirements specified in § 61.65(f)(2)(ii) of this chapter.

(c) *Alternate logging requirement.* Notwithstanding the logging requirements in § 61.51(e)(1) of this chapter, an applicant for an instrument-powered-lift rating may log pilot-in-command flight time for the purpose of satisfying the 10-hour cross-country requirement in § 61.65(f)(1) of this chapter for flights when the applicant is the sole manipulator of the controls of a powered-lift for which the pilot is not rated, provided—

(1) The applicant is manipulating the controls of the powered-lift with a person onboard who serves as an instructor pilot for the manufacturer;

(2) The applicant is performing the duties of pilot-in-command; and

(3) The flight is conducted in accordance with the manufacturer's training curriculum for the powered-lift.

§ 194.231 Pilots receiving training under an approved training program: Alternate requirements for an instrument-powered-lift rating.

(a) *General applicability.* An applicant for an instrument-powered-lift rating may satisfy the alternate requirements set forth in paragraphs (b) and (c) of this section, provided the applicant is receiving training under an approved training program under part 135, 141, or 142 of this chapter for the purpose of

obtaining an instrument-powered-lift rating.

(b) *Alternate aeronautical experience requirements.* An applicant may satisfy the alternate requirements in § 194.235 in lieu of the cross-country aeronautical experience requirements specified in § 61.65(f)(2)(ii) of this chapter.

(c) *Use of full flight simulators.* In addition to the permitted credit for use of a full flight simulator in § 61.65(h) of this chapter, an applicant for an instrument-powered-lift rating may credit a maximum of 4 hours toward the aeronautical experience requirement in § 61.65(f)(1) of this chapter that requires 10 hours of cross-country time in a powered-lift, provided—

(1) The aeronautical experience was obtained performing the duties of pilot-in-command during a simulated cross-country flight in a Level C or higher full flight simulator that represents the powered-lift category;

(2) The cross-country flight includes the performance of instrument procedures under simulated instrument conditions; and

(3) The sessions are conducted in accordance with an approved training program under part 135, 141, or 142 of this chapter.

§ 194.233 Alternate means to satisfy the cross-country aeronautical experience requirements for a commercial pilot certificate with a powered-lift category rating.

Notwithstanding the eligibility requirement in § 61.123(f) of this chapter, an applicant who does not meet the cross-country aeronautical experience requirements specified in § 61.129(e) of this chapter will be considered eligible for a commercial pilot certificate with a powered-lift category rating as specified in paragraphs (a) and (b) of this section.

(a) An applicant who does not meet the cross-country aeronautical experience requirements specified in § 61.129(e)(3)(ii) and (iii) of this chapter will be considered eligible for a commercial pilot certificate with a powered-lift category rating, provided the applicant has logged at least three cross-country flights consisting of—

(1) One 2-hour cross-country flight in a powered-lift in daytime conditions that consists of a total straight-line distance of more than 50 nautical miles from the original point of departure;

(2) One 2-hour cross-country flight in a powered-lift in nighttime conditions that consists of a total straight-line distance of more than 50 nautical miles from the original point of departure; and

(3) An additional cross-country flight with landings at a minimum of three

points, with one segment consisting of a straight-line distance of at least 50 nautical miles from the original point of departure. Except for the original point of departure, this additional cross-country flight must include landings at different points than the cross-country flights specified in paragraphs (a)(1) and (2) of this section.

(b) An applicant who does not have the cross-country aeronautical experience specified in § 61.129(e)(4)(i) of this chapter will be considered eligible for a commercial pilot certificate with a powered-lift category, provided the applicant has logged at least two cross-country flights with landings at a minimum of three points, with one segment consisting of a straight-line distance of at least 50 nautical miles from the original point of departure. Except for the original point of departure, the second cross-country flight must include landings at different points than the first cross-country flight.

§ 194.235 Alternate means to satisfy the cross-country aeronautical experience requirements for an instrument-powered-lift rating.

(a) An applicant who does not meet the cross-country aeronautical experience requirements specified in § 61.65(f)(2)(ii) of this chapter will be considered eligible for an instrument-powered-lift rating, provided the applicant has logged instrument time that includes instrument flight training on cross-country flight procedures, including two cross-country flights in a powered-lift, provided each cross-country flight—

(1) Is conducted with either an authorized instructor or an instructor pilot; and

(2) Involves—

(i) A flight of 100 nautical miles along airways or by directed routing from an air traffic control facility;

(ii) An instrument approach at each airport; and

(iii) Three different kinds of approaches with the use of navigation systems.

(b) Notwithstanding the requirements in § 61.65(f)(2)(ii) of this chapter for the cross-country flight in a powered-lift, an applicant for an instrument-powered-lift rating is not required to file a flight plan and perform the cross-country flight under instrument flight rules, provided—

(1) The powered-lift is not certificated for instrument flight; and

(2) The applicant holds one of the following—

(i) An instrument-airplane rating;

(ii) An instrument-helicopter rating;

or

(iii) An airline transport pilot certificate.

§ 194.237 Alternate means to satisfy the cross-country aeronautical experience requirements for a private pilot certificate with a powered-lift category rating.

Notwithstanding the eligibility requirement in § 61.103(g) of this chapter, an applicant who does not meet the cross-country aeronautical experience requirements specified in § 61.109(e) of this chapter will be considered eligible for a private pilot certificate with a powered-lift category rating as specified in paragraphs (a) and (b) of this section.

(a) *Cross-country aeronautical experience at night.* An applicant who does not meet the cross-country aeronautical experience specified in § 61.109(e)(2)(i) of this chapter will be considered eligible for a private pilot certificate with a powered-lift category rating, provided the applicant has received 3 hours of night flight training that includes two cross-country flights that are each over 50 nautical miles total distance.

(b) *Solo cross-country aeronautical experience.* An applicant who does not meet the solo cross-country aeronautical experience specified in § 61.109(e)(5)(ii) of this chapter will be considered eligible for a private pilot certificate with a powered-lift category rating, provided the applicant has completed—

(1) One solo cross-country flight of 100 nautical miles total distance, with landings at three points, and one segment of the flight being a straight-line distance of more than 25 nautical miles between the takeoff and landing locations; and

(2) An additional solo cross-country flight in a powered-lift with landings at a minimum of three points, with one segment consisting of a straight-line distance of at least 50 nautical miles from the original point of departure. Except for the original point of departure, the additional cross-country flight must include landings at different points than the first cross-country flight.

§ 194.239 Alternate means to satisfy minimum curriculum content in certain appendices to part 141 of this chapter.

(a) *Flight training minimum curriculum content.* Notwithstanding the minimum curriculum requirements in § 141.55(a) of this chapter, a training course for which approval is requested is not required to consist of training on a task specified in an area of operation listed in the applicable appendix to part 141, provided—

(1) The training course for which approval is requested is for a powered-lift course;

(2) The powered-lift to be used in the course is not capable of performing the task specified in an area of operation listed in the applicable appendix to part 141; and

(3) The FAA has issued waiver authority for that task in accordance with § 194.207(b).

(b) *Cross-country minimum curriculum content.* Notwithstanding the minimum curriculum requirements in § 141.55(a) of this chapter, a training course for which approval is requested is not required to meet the minimum curriculum content specified in appendices B, C, and D to part 141, provided—

(1) The training course for which approval is requested is for a powered-lift course.

(2) The minimum curriculum content that is not met may consist of the training specified in—

- (i) Appendix B, paragraph 4.(b)(5)(ii)(A);
- (ii) Appendix B, paragraph 5.(e)(1);
- (iii) Appendix C, paragraph 4.(c)(3)(ii);
- (iv) Appendix D, paragraph 4.(b)(5)(ii) and (iii);
- (v) Appendix D, paragraph 5.(e)(2); or
- (vi) Appendix M, paragraphs 4.(b)(4)(ii)(A), 4.(b)(4)(iii)(A), and 5.(d)(1).

(3) For each provision of training specified in paragraph (b)(2) of this section that is not met, the training course must include an additional cross-country flight consistent with the requirements of §§ 194.233, 194.235, and 194.237.

§ 194.241 Alternate qualification requirements for chief instructors, assistant chief instructors, and check instructors.

(a) Notwithstanding the qualification requirements in §§ 141.35(a)(1), 141.36(a)(1), and 141.37(a)(2)(ii) of this chapter, for a course of training under part 141 of this chapter that uses a powered-lift, a person seeking designation as a chief instructor, an assistant chief instructor, or a check instructor for checks and tests that relate to flight training must meet the following requirements—

(1) Hold a commercial pilot certificate or an airline transport pilot certificate with the following ratings—

- (i) A powered-lift category rating;
- (ii) A type rating for the powered-lift used in the course; and
- (iii) An instrument-powered-lift rating or an airline transport pilot certificate with instrument privileges.

(2) Hold a current flight instructor certificate with the following ratings—

- (i) A powered-lift category rating; and

(ii) An instrument-powered-lift rating, if an instrument rating is required for the course.

(b) Notwithstanding the qualification requirements in § 141.37(a)(3)(ii) of this chapter, for a course of training under part 141 of this chapter that uses a powered-lift, a person seeking designation as a check instructor for checks and tests that relate to ground training must hold a current flight instructor certificate with a powered-lift category rating or a ground instructor rating appropriate for the course.

§ 194.243 Pilot certification through completion of training, testing, and checking under part 135 of this chapter.

(a) *Part 135 airman certification training program.* (1) Subject to the requirements in subpart H to part 135 of this chapter, a certificate holder under part 119 of this chapter authorized to conduct part 135 operations may obtain approval under § 135.325 of this chapter to establish and implement a training curriculum to satisfy the following:

(i) Ground training, flight training, and aeronautical experience requirements in § 61.65 of this chapter and § 194.231 for the addition of an instrument-powered-lift rating to a commercial pilot certificate;

(ii) Ground training, flight training, and aeronautical experience requirements in § 61.63(b) of this chapter for the addition of an aircraft category rating to a commercial pilot certificate; and

(iii) Ground and flight training requirements in § 61.63(d) of this chapter to add a type rating to a commercial pilot certificate.

(2) No certificate holder may use a person, nor may any person serve, as an instructor in a training curriculum approved to meet the requirements of paragraph (a)(1) of this section unless, in addition to being qualified under §§ 135.338 and 135.340 of this chapter, the person holds a flight instructor certificate with a powered-lift category rating and instrument-powered-lift rating issued under part 61 of this chapter.

(3) A certificate holder may train a pilot in a training curriculum approved to meet the requirements of paragraph (a)(1) of this section only if the pilot is employed by the certificate holder under part 119 of this chapter and holds at least the certificates and ratings set forth by § 194.215(a).

(4) In addition to § 135.327 of this chapter, any curriculum approved under paragraphs (a)(1)(i) through (iii) of this section must include the applicable aeronautical knowledge areas, areas of operation, and flight

training required by part 61 of this chapter. If an alternative requirement is provided in this part, that alternative may be used.

(b) *Part 135 airman certification and checking.* (1) A pilot who is employed by a certificate holder under part 119 of this chapter authorized to conduct operations under part 135 who completes the approved curricula in paragraphs (a)(1)(i) through (iii) of this section may apply to add a powered-lift category rating concurrently with a powered-lift instrument rating and an initial powered-lift type rating to a commercial pilot certificate if the person meets the following requirements:

(i) Meets the requirements of §§ 61.63(b) and 61.65(f) of this chapter, or if an alternative requirement is provided in this part, that alternative may be used;

(ii) Has a training record endorsement from the certificate holder certifying that the pilot satisfactorily completed the applicable ground and flight training curricula in the approved part 135 airman certification training program; and

(iii) Successfully completes the written or oral testing under § 135.293(a)(2) and (3) of this chapter, a competency check under § 135.293(b) of this chapter, and an instrument proficiency check under § 135.297 of this chapter provided the following conditions are met:

(A) The competency check includes the maneuvers and procedures required for the issuance of a commercial pilot certificate with a powered-lift category rating, for the issuance of an instrument-powered-lift rating and for the issuance of a powered-lift type rating.

(B) The instrument proficiency check meets the requirements of § 135.297 of this chapter as applicable to a pilot in command (PIC) holding a commercial pilot certificate except that the instrument approaches to be included in the check must include all instrument approaches required for the issuance of an instrument-powered-lift rating and not only those for which the pilot is to be authorized to perform in part 135 operations.

(2) Sections 135.293(d) and 135.301(b) of this chapter are not applicable to the competency check and instrument proficiency check required by paragraph (b)(1)(iii) of this section.

(3) A pilot who meets paragraph (b)(1) of this section will be issued a commercial pilot certificate with a powered-lift category rating, an instrument-powered-lift rating, and a powered-lift type rating.

(4) An applicant who fails a check under paragraph (b)(1) of this section may reapply for the check only after the applicant has received:

(i) The necessary training from an authorized instructor or instructor pilot who has determined that the applicant is proficient to pass the test; and

(ii) An endorsement from an authorized instructor or instructor pilot who gave the applicant the additional training.

(c) *Part 135 certification testing and checking personnel.* The testing, competency checks, and instrument proficiency checks required by paragraph (b) of this section must be administered by one of the following:

(1) An FAA Aviation Safety Inspector.

(2) An Aircrew Program Designee who is authorized to perform competency checks and instrument proficiency checks for the certificate holder whose approved ground and flight training curricula has been satisfactorily completed by the pilot applicant.

(3) A Training Center Evaluator with appropriate certification authority who is also authorized to perform competency checks and instrument proficiency checks for the certificate holder whose approved ground and flight training curricula has been satisfactorily completed by the pilot applicant.

§ 194.245 Pilot qualification and program management requirements to operate powered-lift under subpart K to part 91 of this chapter.

(a) Section 91.1055(a) of this chapter applies to powered-lift operating under subpart K to part 91.

(b) Reference to class of aircraft in § 91.1055(b)(2) of this chapter is inapplicable when a powered-lift is used for the operation under subpart K to part 91.

§ 194.247 Pilot qualification requirements to operate powered-lift under part 135 of this chapter.

(a) Unless otherwise directed in this chapter, powered-lift must continue to comply with rules applicable to aircraft specified in part 135.

(b) To comply with § 135.3 of this chapter, each certificate holder that conducts commuter operations under part 135 with powered-lift for which two pilots are required by the type certificate must:

(1) Comply with subpart Y to part 121 of this chapter instead of the requirements of subparts G and H to part 135; and

(2) Include in initial ground training for pilots in command and upgrade ground training, instruction and facilitated discussion on the following:

(i) Leadership and command; and

(ii) Mentoring, including techniques for instilling and reinforcing the highest standards of technical performance, airmanship, and professionalism in newly hired pilots.

(3) Include the training required by paragraph (b)(2)(ii) of this section in recurrent ground training for pilots in command every 36 calendar months.

(4) Include in initial flight training for pilots in command and upgrade flight training, sufficient scenario-based training incorporating crew resource management and leadership and command skills, to ensure the pilot's proficiency as pilot in command.

(c) In lieu of compliance with the operating experience requirements listed in § 135.244(a)(1) through (4) of this chapter, no certificate holder may use a person, nor may any person serve, as pilot in command of a powered-lift unless that person possesses 20 hours of operating experience in each make and basic model of powered-lift to be flown.

(d) To comply with § 135.345 of this chapter, initial, transition, and upgrade ground training for powered-lift pilots must include instruction in § 135.345(b)(6)(iv) of this chapter, as applicable.

§ 194.249 References to class in parts 135, 141, and 142 of this chapter.

(a) References to class of aircraft in §§ 135.4(b)(2), 135.247(a)(1) and (2), and 135.603 of this chapter are inapplicable when a powered-lift is used for the operation under part 135.

(b) Notwithstanding the course content contained in the appendices to part 141, references to a class rating or a class of aircraft in those appendices is inapplicable when a powered-lift is used for the course of training.

(c) References to class of aircraft in §§ 142.11(d)(2)(ii), 142.49(c)(3)(iii), 142.53(b)(1), and 142.65(b)(1) of this chapter are inapplicable when a powered-lift or flight simulation training device representing a powered-lift is used for the operation under part 142.

§ 194.251 Alternate means to satisfy minimum curriculum content in training courses under part 142 of this chapter.

A training course for which approval is requested is not required to consist of training on a task specified in an area of operation if the powered-lift is not capable of performing the task, provided the FAA has issued waiver authority for that task in accordance with § 194.207(b).

§ 194.253 Alternate requirements for powered-lift without fully functional dual controls used in flight training.

(a) *Powered-lift equipped with an instantly accessible single, functioning control.* (1) A person may utilize the alternate requirement provided in paragraph (a)(2) of this section only if the applicant holds at least the certificates and ratings set forth by § 194.215(a) and instruction is provided by:

(i) An instructor pilot for the manufacturer of the powered-lift under the manufacturer's proposed training curriculum, or

(ii) A flight instructor under an approved training curriculum under part 135, 141, or 142 of this chapter, as applicable.

(2) Notwithstanding the requirements of §§ 61.195(g) and 91.109(a) of this chapter, a person may operate a powered-lift that is being used for flight training without fully functioning dual controls provided—

(i) The powered-lift is equipped with a single functioning flight control that is instantly accessible by both the applicant and the instructor;

(ii) The single functioning flight control meets the certification standards for both pilot stations; and

(iii) The instructor has determined that the flight can be conducted safely.

(b) *Full flight simulator training for powered-lift with single functioning controls and a single pilot station.* A person may apply for a powered-lift category rating, an instrument-powered-lift rating, and a powered-lift type rating concurrently for a powered-lift with single controls and a single pilot station under an approved part 135, 141, or 142 training program by meeting the requirements set forth in appendix A to this part.

(c) *Deviation authority.* Notwithstanding the requirements of §§ 61.195(g) and 91.109 of this chapter, the Administrator may authorize a deviation to operate a powered-lift that

is being used for flight training in an approved training program under part 135, 141, or 142 without fully functioning dual controls provided:

(1) The certificate holder demonstrates in a form and manner acceptable to the Administrator that—

(i) The person providing the flight training and the PIC observing any applicable supervised operating experience can take immediate corrective action and full control of the powered-lift;

(ii) The flight training and any applicable supervised operating experience can be effectively conducted in the powered-lift; and

(2) The Administrator determines that the alternate flight training and applicable supervised operating experience set forth by paragraph (c)(1) of this section will not adversely affect safety.

(3) The FAA may cancel or amend a letter of deviation authority at any time if the Administrator determines that the requirements of this section are not met or if such action is necessary in the interest of safety.

§ 194.255 Alternate requirements for powered-lift without fully functioning dual controls used in supervised operating experience when adding a type rating.

(a) Notwithstanding § 61.64(f) of this chapter, a person who holds a powered-lift category, instrument-powered-lift rating, and powered-lift type rating and seeks an additional type rating for a powered-lift with a single functioning control and a single pilot station in accordance with §§ 61.63(d) and 61.64(a) of this chapter, and does not meet requirements of § 61.64(e), will receive a limitation on the certificate restricting the person operating the powered-lift type from carrying any person or property on the aircraft, other than necessary for the purpose of paragraph (b) of this section.

(b) The limitation described in paragraph (a) of this section may be

removed from the rating if the person complies with the following:

(1) Performs 25 hours of flight time in the type of powered-lift for which the limitation applies under the observation of a fully rated pilot without limitations for the aircraft, maintaining full communication with the observing pilot,

(2) Logs each flight and the observing pilot attests in writing to each flight, and

(3) Presents evidence of the supervised operating experience to any examiner or Flight Standards office to have the limitation removed.

(c) The observing pilot must have unobstructed visual sight of the controls and instrumentation.

Subpart C—Requirements for Persons Operating Powered-lift

§ 194.301 Applicability.

Unless otherwise specified by this part, persons operating powered-lift must continue to comply with rules applicable to all aircraft in parts 91, 135, and 136 of this chapter, as applicable to the operation. In addition, any sections or paragraphs within sections under parts 91 and 135 that refer to specific categories of aircraft and that are not referenced in the SFAR table to § 194.302 or § 194.306, do not apply to powered-lift.

§ 194.302 Provisions under part 91 of this chapter applicable to powered-lift.

No person may operate a powered-lift under part 91 of this chapter unless that person complies with the regulations listed in the first column of table 1 to this section, notwithstanding their applicability to airplanes, helicopters, or rotorcraft, subject to the applicability provisions in the second column, and any additional requirements or clarification specified in the third column:

TABLE 1 TO § 194.302

Regulation	Applicability	Additional requirements or clarification
Part 91, Subpart A—General		
(a) Section 91.9 (a) and (b) of this chapter.	Applies to all powered-lift	The requirement for an approved Aircraft Flight Manual is set forth in the airworthiness criteria established under § 21.17(b) of this chapter.
Part 91, Subpart B—Flight Rules		
(b) Section 91.103(b)(1) of this chapter.	Applies to powered-lift for which an approved Aircraft Flight Manual containing takeoff and landing distance data is required.	
(c) Section 91.107(a)(3)(i) through (iii) of this chapter.	Applies to all powered-lift	The exception under § 91.107(a)(3) of this chapter for seaplane and float equipped rotorcraft operations during movement on the surface applies to persons pushing off a powered-lift from the dock or persons mooring the powered-lift at the dock.

TABLE 1 TO § 194.302—Continued

Regulation	Applicability	Additional requirements or clarification
(d) Section 91.119(d) of this chapter.	Applies to powered-lift operating in vertical-lift flight mode	Under § 91.119(d) of this chapter, a powered-lift may be operated in vertical-lift flight mode at less than the minimums prescribed in § 91.119(b) or (c) of this chapter, provided each person operating the powered-lift complies with any routes or altitudes specifically prescribed for powered-lift by the FAA.
(e) Section 91.126(b)(1) of this chapter.	Applies to powered-lift operating in wing-borne flight mode	If the powered-lift is operating in vertical-lift flight mode, see paragraph (f) of this section.
(f) Section 91.126(b)(2) of this chapter.	Applies to powered-lift operating in vertical-lift flight mode	If the powered-lift is operating in wing-borne flight mode, see paragraph (e) of this section.
(g) Section 91.129(e)(1) and (2), (g)(2), and (h) of this chapter.	Applies to large or turbine-powered powered-lift	
(h) Section 91.129(e)(3) of this chapter.	Applies to powered-lift preparing to land in wing-borne flight mode.	
(i) Section 91.129(f)(1) of this chapter.	Applies to powered-lift operating in wing-borne flight mode	(1) If the powered-lift is operating in vertical-lift flight mode, see paragraph (j) of this section. (2) Section 91.129(f)(1) of this chapter does not apply when the operator of a powered-lift is conducting a circling approach under part 97 of this chapter or when otherwise requested by air traffic control (ATC).
(j) Section 91.129(f)(2) of this chapter.	Applies to powered-lift operating in vertical-lift flight mode	(1) If the powered-lift is operating in wing-borne flight mode, see paragraph (i) of this section. (2) Section 91.129(f)(2) does not apply when the operator of a powered-lift is conducting a circling approach under part 97 of this chapter or when otherwise requested by ATC.
(k) Section 91.131(a)(2) of this chapter.	Applies to large powered-lift.	
(l) Section 91.151(a) and (b) of this chapter.	Applies to powered-lift	(1) A powered-lift with the performance capability, as outlined in the Aircraft Flight Manual, to conduct a landing in the vertical-lift flight mode along the entire route of flight may use the VFR fuel requirements outlined in § 91.151(b) of this chapter. (2) Powered-lift unable to meet the requirements of paragraph (l)(1) of this section must use the rule requirements outlined in § 91.151(a) of this chapter.
(m) Section 91.155(a) of this chapter.	The helicopter provision under § 91.155(a) of this chapter applies to powered-lift operating in vertical-lift flight mode and at a speed that allows the pilot to see any other traffic or obstructions in time to avoid a collision.	(1) Except as provided in § 91.155(b) of this chapter, powered-lift that meet the requirements of paragraph (m) of this section may operate under the helicopter VFR visibility minimums outlined under § 91.155(a) of this chapter in class G airspace. (2) Powered-lift unable to meet the requirements of paragraph (m) of this section must use the VFR visibility minimums in § 91.155(a) of this chapter for aircraft other than helicopters.
(n) Section 91.155(b)(1) of this chapter.	Applies to powered-lift operating in the vertical-lift flight mode and at a speed that allows the pilot to see any other traffic or obstructions in time to avoid a collision.	(1) Powered-lift that meet the requirements of paragraph (n) of this section may use the VFR visibility minimums outlined in § 91.155(b)(1) of this chapter in Class G airspace. (2) Powered-lift unable to meet the requirements of paragraph (n) of this section must use the visibility minimums outlined in § 91.155(b)(2) of this chapter.
(o) Section 91.155(b)(2) of this chapter.	Applies to powered-lift	Powered-lift operating in Class G airspace that cannot meet the requirements of paragraph (n) of this section must use the VFR visibility minimums outlined under § 91.155(b)(2) of this chapter.
(p) Section 91.157(b)(3), (b)(4), and (c) of this chapter.	The helicopter exceptions outlined in § 91.157(b)(3), (b)(4), and (c) of this chapter apply to powered-lift operating in vertical-lift flight mode when those aircraft are operated at a speed that allows the pilot to see any other traffic or obstructions in time to avoid a collision.	
(q) Section 91.167(a)(3) and (b)(2)(ii) of this chapter.	The helicopter provisions in § 91.167(a)(3) and (b)(2)(ii) of this chapter apply to powered-lift authorized to conduct copter procedures and that have the performance capability for the entire flight to conduct a landing in the vertical-lift flight mode, as outlined in the Aircraft Flight Manual.	(1) Powered-lift that meet the requirements of paragraph (q) of this section may use the helicopter provisions under § 91.167(a)(3) and (b)(2)(ii) of this chapter. (2) Powered-lift that are unable to meet the requirements outlined in paragraph (q) of this section must use the 45-minute fuel requirement outlined in § 91.167(a)(3) of this chapter and the aircraft requirement outlined in § 91.167(b)(2)(i) of this chapter.
(r) Section 91.169(b)(2)(ii) and (c)(1)(ii) of this chapter.	Applies to powered-lift authorized to conduct copter procedures and that have the performance capability to land in the vertical-lift flight mode, as outlined in the Aircraft Flight Manual.	(1) Powered-lift that meet the requirements of paragraph (r) of this section may use the helicopter provisions specified in § 91.169(b)(2)(ii) and (c)(1)(ii) of this chapter. (2) Powered-lift that are unable to meet the requirements outlined in paragraph (r) of this section must use the requirements for aircraft other than helicopters under § 91.169(b)(2)(i) and (c)(1)(i) of this chapter.
(s) Section 91.175(f)(2)(iii) of this chapter.	Applies to powered-lift with two engines or less, that takeoff in vertical-lift flight mode, and that are authorized to conduct copter procedures.	Powered-lift with two engines or less that are unable to meet the requirements outlined in this paragraph (s) must comply with § 91.175(f)(2)(i) of this chapter.
(t) Section 91.175(f)(4)(i) of this chapter.	Applies to part 135 of this chapter powered-lift operators required to comply with subpart I to part 135 of this chapter.	

Part 91, Subpart C—Equipment, Instrument, and Certificate Requirements

(u) Section 91.205(b)(11) and (14) of this chapter.	Applies to small powered-lift	Position and anti-collision lights must meet § 23.2530(b) of this chapter.
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TABLE 1 TO § 194.302—Continued

Regulation	Applicability	Additional requirements or clarification
(v) Section 91.205(d)(3)(i) of this chapter. (w) Section 91.207 of this chapter. (x) Section 91.219 of this chapter. (y) Section 91.223(a) and (c) of this chapter.	Applies to powered-lift certified for instrument flight rules operations. Applies to all powered-lift. Applies to all powered-lift. Applies to powered-lift configured with 6 or more passenger seats, excluding any pilot seat.	Instead of terrain awareness and warning system (TAWS), powered-lift must be equipped with a helicopter terrain awareness and warning system (HTAWS) that meets the requirements in TSO-C194 and Section 2 of RTCA DO-309 (incorporated by reference, see § 194.109) or a FAA-approved TAWS A/HTAWS hybrid system.
Part 91, Subpart D—Special Flight Operations		
(z) Section 91.313(g) of this chapter.	Applies to restricted category small powered-lift.	
Part 91, Subpart E—Maintenance, Preventive Maintenance, and Alterations		
(aa) Section 91.409(e) through (h) of this chapter.	Applies to technically-advanced powered-lift which are powered-lift equipped with an electronically advanced system in which the pilot interfaces with a multi-computer system with increasing levels of automation in order to aviate, navigate, or communicate.	(1) Unless otherwise authorized by the Administrator, a technically advanced powered-lift must be equipped with an electronically advanced multi-computer system that includes one or more of the following installed components: (i) An electronic Primary Flight Display (PFD) that includes, at a minimum, an airspeed indicator, turn coordinator, attitude indicator, heading indicator, altimeter, and vertical speed indicator; (ii) An electronic Multifunction Display (MFD) that includes, at a minimum, a moving map using Global Positioning System (GPS) navigation with the aircraft position displayed; (iii) A multi-axis autopilot integrated with the navigation and heading guidance system; and (iv) Aircraft design with advanced fly-by-wire-flight control system that utilizes electronically operated controls with no direct mechanical link from the pilot to the control surfaces. (2) The display elements described in paragraphs (aa)(1)(i) and (ii) of this section must be continuously visible.
(bb) Section 91.411 of this chapter.	Applies to all powered-lift.	
Part 91, Subpart F—Large and Turbine-Powered Multiengine Airplanes and Fractional Ownership Program Aircraft		
(cc) Section 91.501 of this chapter.	Applies to large powered-lift regardless of powerplant, as well as powered-lift operating under subpart K to part 91 of this chapter, and subject to any limitations outlined in this part.	Any sections or paragraphs within sections to subpart F to part 91 of this chapter that refer to a specific category of aircraft and that are not referenced in this table or the table to § 194.306, do not apply to powered-lift.
(dd) Section 91.503 of this chapter.	Applies to powered-lift subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section.	Powered-lift may comply with § 91.503(a)(5) of this chapter by having the appropriate engine or multiple-engines inoperative climb performance data available at the pilot station of the aircraft.
(ee) Section 91.505 of this chapter.	Applies to powered-lift subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section.	
(ff) Section 91.507 of this chapter.	Applies to powered-lift subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section.	
(gg) Section 91.509 of this chapter.	Applies to powered-lift subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section.	(1) Powered-lift operating over water under § 91.509(a) or (b) of this chapter may use either the nearest shore or the nearest off-shore heliport structure by which to measure the nautical mile limits provided in § 91.509(a) and (b). (2) The lifeline required by § 91.509(b)(5) of this chapter must be stored in accordance with § 25.1411(g) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(hh) Section 91.511 of this chapter.	Applies to powered-lift subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section.	Powered-lift operating over water under § 91.511(a) of this chapter may use either the nearest shore or the nearest off-shore heliport structure by which to measure the nautical mile limits provided in § 91.511(a).
(ii) Section 91.513 of this chapter.	Applies to powered-lift subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section.	
(jj) Section 91.515 of this chapter.	Applies to powered-lift subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section.	
(kk) Section 91.517 of this chapter.	Applies to powered-lift subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section.	

TABLE 1 TO § 194.302—Continued

Regulation	Applicability	Additional requirements or clarification
(ll) Section 91.519 of this chapter.	Applies to powered-lift subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section.	
(mm) Section 91.521 of this chapter.	Applies to large powered-lift subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section.	The safety belt and shoulder harness required by § 91.521 of this chapter must comply with § 25.785 of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(nn) Section 91.523 of this chapter.	Applies to powered-lift having a seating capacity of more than 19 passengers subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section.	The carry-on baggage required by § 91.523 of this chapter must be stowed such that it can withstand the inertia forces specified in § 25.561(b)(3) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(oo) Section 91.525 of this chapter.	Applies to powered-lift subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section.	
(pp) Section 91.527(a) of this chapter.	Applies to powered-lift subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section.	(1) Powered-lift critical surfaces, as outlined in the Aircraft Flight Manual for that aircraft, must also be determined to be free of frost, ice, or snow. (2) Powered-lift critical surfaces under this section are determined by the manufacturer.
(qq) Section 91.527(b)(2) and (3) of this chapter.	Applies to powered-lift subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section.	Instead of § 91.527(b)(2) and (3) of this chapter, to operate instrument flight rules (IFR) into known light or moderate icing conditions or VFR into known light or moderate icing conditions, an operator must comply with § 194.306(xx).
(rr) Section 91.527(c) of this chapter.	Applies to powered-lift subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section.	No pilot may fly a powered-lift into known or forecast severe icing conditions.
(ss) Section 91.531(a)(1) and (2), (b), and (c) of this chapter.	Applies to powered-lift subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section and that meet the additional requirements as set forth in each paragraph of § 91.531 of this chapter; § 91.531(b)(2) of this chapter applies to large powered-lift that meet the additional requirements set forth in that paragraph.	
(tt) Section 91.533 of this chapter.	Applies to powered-lift subject to the requirements of subpart F to part 91 of this chapter as specified in paragraph (cc) of this section.	

Part 91, Subpart G—Additional Equipment and Operating Requirements for Large and Transport Category Aircraft

(uu) Section 91.603 of this chapter.	Applies to large powered-lift	The aural speed warning device required by § 91.603 of this chapter must comply with § 25.1303(c)(1) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(vv) Section 91.605(b)(1) of this chapter.	Applies to large powered-lift	The Aircraft Flight Manual must contain the takeoff weight performance information.
(ww) Section 91.605(b)(2) of this chapter.	Applies to large powered-lift	The Aircraft Flight Manual must contain the landing performance information.
(xx) Section 91.605(b)(3), (b)(4)(ii), and (c) of this chapter.	Applies to large powered-lift that execute takeoff operations using wing-borne lift and that have takeoff performance information contained in the Aircraft Flight Manual.	
(yy) Section 91.609(c), (d), (e), (i), and (j) of this chapter.	Paragraph (c) of § 91.609 of this chapter applies to powered-lift with a passenger seating configuration, excluding any pilot seats, of 10 or more seats; § 91.609(e) of this chapter applies to powered-lift with a passenger seating configuration of six or more seats and for which two pilots are required by type certification or operating rule; § 91.609(d) of this chapter applies to powered-lift required by that section to have a flight data recorder; and § 91.609(i) and (j) of this chapter apply to powered-lift required by that section to have a cockpit voice recorder and a flight data recorder.	(1) Operators of powered-lift having a passenger seating configuration, excluding any pilot seat, of 10 or more must comply with § 194.310 or § 194.311 in lieu of the appendices referenced in § 91.609(c)(1) of this chapter. (2) For compliance with § 91.609(c)(3), (e)(1), and (i) of this chapter, powered-lift must comply with the certification provisions listed in those paragraphs or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter. (3) Under § 91.609(d) of this chapter, the flight recorder must operate continuously from the earlier of when the powered-lift begins the takeoff roll or begins lift-off until the later of when the powered-lift completes the landing roll or lands at its destination.
(zz) Section 91.613(b)(2) of this chapter.	Applies to large powered-lift	The thermal/acoustic installation materials required by § 91.613(b)(2) of this chapter must meet the requirements of § 25.856 of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.

Part 91, Subpart K—Fractional Ownership Operations

(aaa) Section 91.1037 of this chapter.	Applies to large powered-lift subject to the requirements of subpart K to part 91 of this chapter that are certificated to conduct landing operations in wing-borne flight mode as indicated in the Aircraft Flight Manual.	If a powered-lift operator is required to comply with this section, the operator must also comply with § 91.1025(o)(7) of this chapter.
(bbb) Section 91.1041(b) and (d) of this chapter.	Applies to all powered-lift subject to the requirements of subpart K to part 91 of this chapter.	

TABLE 1 TO § 194.302—Continued

Regulation	Applicability	Additional requirements or clarification
(ccc) Section 91.1045(a) of this chapter.	Applies to powered-lift subject to the requirements of subpart K to part 91 of this chapter with a passenger-seat configuration of more than 30 seats or a payload capacity of more than 7,500 pounds.	Under § 91.1045(a)(3) of this chapter, instead of TAWS, powered-lift must be equipped with a helicopter terrain awareness and warning system (HTAWS) that meets the requirements in TSO-C194 and Section 2 of RTCA DO-309 (incorporated by reference, see § 194.109) or a FAA-approved TAWS A/ HTAWS hybrid system.
(ddd) Section 91.1045(b) of this chapter.	Applies to powered-lift subject to the requirements of subpart K to part 91 of this chapter with a passenger-seat configuration of 30 seats or fewer, excluding each crewmember, and a payload capacity of 7,500 pounds or less.	Compliance with § 91.1045(b)(3) of this chapter requires a helicopter terrain awareness and warning system that complies with § 194.306(s).

TABLE 1 TO § 194.302

Regulation	Applicability	Additional requirements or clarification
Part 91, Subpart A—General		
(a) Section 91.9 (a) and (b) of this chapter.	Applies to all powered-lift	The requirement for an approved Aircraft Flight Manual is set forth in the airworthiness criteria established under § 21.17(b) of this chapter.
Part 91, Subpart B—Flight Rules		
(b) Section 91.103(b)(1) of this chapter.	Applies to powered-lift for which an approved Aircraft Flight Manual containing takeoff and landing distance data is required.	
(c) Section 91.107(a)(3)(i) through (iii) of this chapter.	Applies to all powered-lift	The exception under § 91.107(a)(3) of this chapter for seaplane and float equipped rotorcraft operations during movement on the surface applies to persons pushing off a powered-lift from the dock or persons mooring the powered-lift at the dock.
(d) Section 91.119(d) of this chapter.	Applies to powered-lift operating in vertical-lift flight mode	Under § 91.119(d) of this chapter, a powered-lift may be operated in vertical-lift flight mode at less than the minimums prescribed in § 91.119(b) or (c) of this chapter, provided each person operating the powered-lift complies with any routes or altitudes specifically prescribed for powered-lift by the FAA.
(e) Section 91.126(b)(1) of this chapter.	Applies to powered-lift operating in wing-borne flight mode	If the powered-lift is operating in vertical-lift flight mode, see paragraph (f) of this section.
(f) Section 91.126(b)(2) of this chapter.	Applies to powered-lift operating in vertical-lift flight mode	If the powered-lift is operating in wing-borne flight mode, see paragraph (e) of this section.
(g) Section 91.129(e)(1) and (2), (g)(2), and (h) of this chapter.	Applies to large or turbine-powered powered-lift.	
(h) Section 91.129(e)(3) of this chapter.	Applies to powered-lift preparing to land in wing-borne flight mode.	
(i) Section 91.129(f)(1) of this chapter.	Applies to powered-lift operating in wing-borne flight mode	(1) If the powered-lift is operating in vertical-lift flight mode, see paragraph (j) of this section. (2) Section 91.129(f)(1) does not apply when the operator of a powered-lift is conducting a circling approach under part 97 of this chapter or when otherwise requested by air traffic control (ATC).
(j) Section 91.129(f)(2) of this chapter.	Applies to powered-lift operating in vertical-lift flight mode	(1) If the powered-lift is operating in wing-borne flight mode, see paragraph (i) of this section. (2) Section 91.129(f)(2) does not apply when the operator of a powered-lift is conducting a circling approach under part 97 of this chapter or when otherwise requested by ATC.
(k) Section 91.131(a)(2) of this chapter.	Applies to large powered-lift.	
(l) Section 91.151(a) and (b) of this chapter.	Applies to powered-lift	(1) A powered-lift with the performance capability, as outlined in the Aircraft Flight Manual, to conduct a landing in the vertical-lift flight mode along the entire route of flight may use the VFR fuel requirements outlined in § 91.151(b). (2) Powered-lift unable to meet the requirements of paragraph (l)(1) of this section must use the rule requirements outlined in § 91.151(a).
(m) Section 91.155(a) of this chapter.	The helicopter provision under § 91.155(a) applies to powered-lift operating in vertical-lift flight mode and at a speed that allows the pilot to see any other traffic or obstructions in time to avoid a collision.	(1) Except as provided in § 91.155(b), powered-lift that meet the requirements of paragraph (m) of this section may operate under the helicopter VFR visibility minimums outlined under § 91.155(a) in class G airspace. (2) Powered-lift unable to meet the requirements of paragraph (m) of this section must use the VFR visibility minimums in § 91.155(a) for aircraft other than helicopters.
(n) Section 91.155(b)(1) of this chapter.	Applies to powered-lift operating in the vertical-lift flight mode and at a speed that allows the pilot to see any other traffic or obstructions in time to avoid a collision.	(1) Powered-lift that meet the requirements of paragraph (n) of this section may use the VFR visibility minimums outlined in § 91.155(b)(1) in Class G airspace. (2) Powered-lift unable to meet the requirements of paragraph (n) of this section must use the visibility minimums outlined in § 91.155(b)(2).
(o) Section 91.155(b)(2) of this chapter.	Applies to powered-lift	Powered-lift operating in Class G airspace that cannot meet the requirements of paragraph (n) of this section must use the VFR visibility minimums outlined under § 91.155(b)(2).

TABLE 1 TO § 194.302—Continued

Regulation	Applicability	Additional requirements or clarification
(p) Section 91.157(b)(3), (b)(4), and (c) of this chapter.	The helicopter exceptions outlined in §91.157(b)(3), (b)(4), and (c) apply to powered-lift operating in vertical-lift flight mode when those aircraft are operated at a speed that allows the pilot to see any other traffic or obstructions in time to avoid a collision.	
(q) Section 91.167(a)(3) and (b)(2)(ii) of this chapter.	The helicopter provisions in §91.167(a)(3) and (b)(2)(ii) apply to powered-lift authorized to conduct copter procedures and that have the performance capability for the entire flight to conduct a landing in the vertical-lift flight mode, as outlined in the Aircraft Flight Manual.	(1) Powered-lift that meet the requirements of paragraph (q) of this section may use the helicopter provisions under §91.167(a)(3) and 91.167(b)(2)(ii). (2) Powered-lift that are unable to meet the requirements outlined in paragraph (q) of this section must use the 45-minute fuel requirement outlined in §91.167(a)(3) and the aircraft requirement outlined in §91.167(b)(2)(i).
(r) Section 91.169(b)(2)(ii) and (c)(1)(ii) of this chapter.	Applies to powered-lift authorized to conduct copter procedures and that have the performance capability to land in the vertical-lift flight mode, as outlined in the Aircraft Flight Manual.	(1) Powered-lift that meet the requirements of paragraph (r) of this section may use the helicopter provisions specified in §91.169(b)(2)(ii) and §91.169(c)(1)(ii). (2) Powered-lift that are unable to meet the requirements outlined in paragraph (r) of this section must use the requirements for aircraft other than helicopters under §91.169(b)(2)(i) and (c)(1)(i).
(s) Section 91.175(f)(2)(iii) of this chapter.	Applies to powered-lift with two engines or less, that takeoff in vertical-lift flight mode, and that are authorized to conduct copter procedures.	Powered-lift with two engines or less that are unable to meet the requirements outlined in this paragraph (s) must comply with §91.175(f)(2)(i).
(t) Section 91.175(f)(4)(i) of this chapter.	Applies to part 135 powered-lift operators required to comply with subpart I to part 135 of this chapter.	
Part 91, Subpart C—Equipment, Instrument, and Certificate Requirements		
(u) Section 91.205(b)(11) and (14).	Applies to small powered-lift	Position and anti-collision lights must meet §23.2530(b) of this chapter.
(v) Section 91.205(d)(3)(i)	Applies to powered-lift certified for instrument flight rules operations.	
(w) Section 91.207	Applies to all powered-lift.	
(x) Section 91.219	Applies to all powered-lift.	
(y) Section 91.223(a) and (c)	Applies to powered-lift configured with 6 or more passenger seats, excluding any pilot seat.	Instead of terrain awareness and warning system (TAWS), powered-lift must be equipped with a helicopter terrain awareness and warning system (HTAWS) that meets the requirements in Technical Standard Order (TSO)—C194 and Section 2 of RTCA DO-309 (incorporated by reference, see § 194.109) or a FAA-approved TAWS A/HTAWS hybrid system.
Part 91, Subpart D—Special Flight Operations		
(z) Section 91.313(g)	Applies to restricted category small powered-lift.	
Part 91, Subpart E—Maintenance, Preventive Maintenance, and Alterations		
(aa) Section 91.409(e) through (h).	Applies to technically-advanced powered-lift which are powered-lift equipped with an electronically advanced system in which the pilot interfaces with a multi-computer system with increasing levels of automation in order to aviate, navigate, or communicate.	(1) Unless otherwise authorized by the Administrator, a technically advanced powered-lift must be equipped with an electronically advanced multi-computer system that includes one or more of the following installed components: (i) An electronic Primary Flight Display (PFD) that includes, at a minimum, an airspeed indicator, turn coordinator, attitude indicator, heading indicator, altimeter, and vertical speed indicator; (ii) An electronic Multifunction Display (MFD) that includes, at a minimum, a moving map using Global Positioning System (GPS) navigation with the aircraft position displayed; (iii) A multi-axis autopilot integrated with the navigation and heading guidance system; and (iv) Aircraft design with advanced fly-by-wire-flight control system that utilizes electronically operated controls with no direct mechanical link from the pilot to the control surfaces. (2) The display elements described in paragraphs (aa)(1)(i) and (ii) of this section must be continuously visible.
(bb) Section 91.411	Applies to all powered-lift.	
Part 91, Subpart F—Large and Turbine-Powered Multiengine Airplanes and Fractional Ownership Program Aircraft		
(cc) Section 91.501	Applies to large powered-lift regardless of powerplant, as well as powered-lift operating under subpart K to part 91, and subject to any limitations outlined in this SFAR.	Any sections or paragraphs within sections to subpart F to part 91 that refer to a specific category of aircraft and that are not referenced in the SFAR tables to this section or §194.306, do not apply to powered-lift.
(dd) Section 91.503	Applies to powered-lift subject to the requirements of subpart F to part 91 as specified in paragraph (cc) of this section.	Powered-lift may comply with §91.503(a)(5) by having the appropriate engine or multiple-engines inoperative climb performance data available at the pilot station of the aircraft.
(ee) Section 91.505	Applies to powered-lift subject to the requirements of subpart F to part 91 as specified in paragraph (cc) of this section.	
(ff) Section 91.507	Applies to powered-lift subject to the requirements of subpart F to part 91 as specified in paragraph (cc) of this section.	

TABLE 1 TO § 194.302—Continued

Regulation	Applicability	Additional requirements or clarification
(gg) Section 91.509	Applies to powered-lift subject to the requirements of subpart F to part 91 as specified in paragraph (cc) of this section.	(1) Powered-lift operating over water under § 91.509(a) or (b) may use either the nearest shore or the nearest off-shore heliport structure by which to measure the nautical mile limits provided in § 91.509(a) and (b).
(hh) Section 91.511	Applies to powered-lift subject to the requirements of subpart F to part 91 as specified in paragraph (cc) of this section.	(2) The lifeline required by § 91.509(b)(5) must be stored in accordance with § 25.1411(g) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(ii) Section 91.513	Applies to powered-lift subject to the requirements of subpart F to part 91 as specified in paragraph (cc) of this section.	Powered-lift operating over water under § 91.511(a) may use either the nearest shore or the nearest off-shore heliport structure by which to measure the nautical mile limits provided in § 91.511(a).
(jj) Section 91.515	Applies to powered-lift subject to the requirements of subpart F to part 91 as specified in paragraph (cc) of this section.	
(kk) Section 91.517	Applies to powered-lift subject to the requirements of subpart F to part 91 as specified in paragraph (cc) of this section.	
(ll) Section 91.519	Applies to powered-lift subject to the requirements of subpart F to part 91 as specified in paragraph (cc) of this section.	
(mm) Section 91.521	Applies to large powered-lift subject to the requirements of subpart F to part 91 as specified in paragraph (cc) of this section.	The safety belt and shoulder harness required by § 91.521 must comply with § 25.785 of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(nn) Section 91.523	Applies to powered-lift having a seating capacity of more than 19 passengers subject to the requirements of subpart F to part 91 as specified in paragraph (cc) of this section.	The carry-on baggage required by § 91.523 must be stowed such that it can withstand the inertia forces specified in § 25.561(b)(3) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(oo) Section 91.525	Applies to powered-lift subject to the requirements of subpart F to part 91 as specified in paragraph (cc) of this section.	
(pp) Section 91.527(a)	Applies to powered-lift subject to the requirements of subpart F to part 91m as specified in paragraph (cc) of this section.	(1) Powered-lift critical surfaces, as outlined in the Aircraft Flight Manual for that aircraft, must also be determined to be free of frost, ice, or snow.
(qq) Section 91.527(b)(2) and (3).	Applies to powered-lift subject to the requirements of subpart F to part 91 as specified in paragraph (cc) of this section.	(2) Powered-lift critical surfaces under this section are determined by the manufacturer.
(rr) Section 91.527(c)	Applies to powered-lift subject to the requirements of subpart F to part 91 as specified in paragraph (cc) of this section.	Instead of § 91.527(b)(2) and (3), to operate instrument flight rules (IFR) into known light or moderate icing conditions or VFR into known light or moderate icing conditions, an operator must comply with § 194.306(xx).
(ss) Section 91.531(a)(1) and (2), (b), and (c).	Applies to powered-lift subject to the requirements of subpart F to part 91 as specified in paragraph (cc) of this section and that meet the additional requirements as set forth in each paragraph of § 91.531. Section 91.531(b)(2) applies to large powered-lift that meet the additional requirements set forth in that paragraph.	No pilot may fly a powered-lift into known or forecast severe icing conditions.
(tt) Section 91.533	Applies to powered-lift subject to the requirements of subpart F to part 91 as specified in paragraph (cc) of this section.	

Part 91, Subpart G—Additional Equipment and Operating Requirements for Large and Transport Category Aircraft

(uu) Section 91.603	Applies to large powered-lift	The aural speed warning device required by § 91.603 must comply with § 25.1303(c)(1) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(vv) Section 91.605(b)(1)	Applies to large powered-lift	The Aircraft Flight Manual must contain the takeoff weight performance information.
(ww) Section 91.605(b)(2)	Applies to large powered-lift	The Aircraft Flight Manual must contain the landing performance information.
(xx) Section 91.605(b)(3), (b)(4)(ii), and (c).	Applies to large powered-lift that execute takeoff operations using wing-borne lift and that have takeoff performance information contained in the Aircraft Flight Manual.	
(yy) Section 91.609(c), (d), (e), (i), and (j).	Paragraph (c) of § 91.609 applies to powered-lift with a passenger seating configuration, excluding any pilot seats, of 10 or more seats; paragraph (e) of § 91.609 applies to powered-lift with a passenger seating configuration of six or more seats and for which two pilots are required by type certification or operating rule; paragraph (d) of § 91.609 applies to powered-lift required by that section to have a flight data recorder; and paragraphs (i) and (j) of § 91.609 apply to powered-lift required by that section to have a cockpit voice recorder and a flight data recorder.	(1) Operators of powered-lift having a passenger seating configuration, excluding any pilot seat, of 10 or more must comply with § 194.310 or § 194.311 in lieu of the appendices referenced in § 91.609(c)(1).
		(2) For compliance with § 91.609(c)(3), (e)(1), and (i), powered-lift must comply with the certification provisions listed in those paragraphs or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
		(3) Under § 91.609(d), the flight recorder must operate continuously from the earlier of when the powered-lift begins the takeoff roll or begins lift-off until the later of when the powered-lift completes the landing roll or lands at its destination.

TABLE 1 TO § 194.302—Continued

Regulation	Applicability	Additional requirements or clarification
(zz) Section 91.613(b)(2)	Applies to large powered-lift	The thermal/acoustic installation materials required by § 91.613(b)(2) must meet the requirements of § 25.856 of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
Part 91, Subpart K—Fractional Ownership Operations		
(aaa) Section 91.1037	Applies to large powered-lift subject to the requirements of subpart K to part 91 that are certificated to conduct landing operations in wing-borne flight mode as indicated in the Aircraft Flight Manual.	If a powered-lift operator is required to comply with this section, the operator must also comply with § 91.1025(o)(7) of this chapter.
(bbb) Section 91.1041(b) and (d).	Applies to all powered-lift subject to the requirements of subpart K to part 91.	
(ccc) Section 91.1045(a)	Applies to powered-lift subject to the requirements of subpart K to part 91 with a passenger-seat configuration of more than 30 seats or a payload capacity of more than 7,500 pounds.	Under § 91.1045(a)(3), instead of TAWS, powered-lift must be equipped with a helicopter terrain awareness and warning system (HTAWS) that meets the requirements in Technical Standard Order (TSO)—C194 and Section 2 of RTCA DO—309 (incorporated by reference, see § 194.109) or a FAA-approved TAWS A/HTAWS hybrid system.
(ddd) Section 91.1045(b)	Applies to powered-lift subject to the requirements of subpart K to part 91 with a passenger-seat configuration of 30 seats or fewer, excluding each crewmember, and a payload capacity of 7,500 pounds or less.	Compliance with § 91.1045(b)(3) requires a helicopter terrain awareness and warning system that complies with § 194.306(s).

§ 194.303 IFR takeoff, approach, and landing minimums.

Section 91.1039(c) of this chapter applies to all powered-lift operated under subpart K to part 91 of this chapter regardless of powerplant type.

§ 194.304 ATC transponder and altitude reporting equipment and use.

Notwithstanding § 194.301, the exceptions outlined in § 91.215(b)(3) and (5) of this chapter for aircraft not certificated with an engine-driven

electrical system do not apply to powered-lift.

§ 194.305 Applicability of copter procedures under part 97 of this chapter to powered-lift.

Persons operating powered-lift may use copter procedures as defined in § 97.3 of this chapter if the aircraft is certified for instrument flight rule operations and does not contain a limitation prohibiting use of such procedures in its Aircraft Flight Manual.

§ 194.306 Provisions under part 135 of this chapter applicable to powered-lift.

No person may operate a powered-lift under part 135 of this chapter unless that person complies with the regulations listed in the first column of table 1 to this section, notwithstanding their applicability to airplanes, helicopters, or rotorcraft, subject to the applicability provisions in the second column and any additional requirements or clarification specified in the third column.

TABLE 1 TO § 194.306

Regulation	Applicability	Additional requirements or clarification
Part 135, Subpart A—General		
(a) Section 135.1(a)(9) of this chapter.	Applies to powered-lift conducting operations in accordance with subpart L of part 135 of this chapter.	
(b) Section 135.23(r) of this chapter.	Applies to powered-lift required to comply with § 135.385 of this chapter as set forth in paragraphs (hhh) and (iii) of this section.	
Part 135, Subpart B—Flight Operations		
(c) Section 135.93(a) through (f) of this chapter.	Applies to all powered-lift	(1) The requirements referencing an Airplane Flight Manual under § 135.93(b) of this chapter apply to a powered-lift's Aircraft Flight Manual. (2) Under § 135.93(c) of this chapter, no person operating a powered-lift may use an autopilot enroute, including climb and descent, below the following— (i) Either: (A) At a minimum engagement altitude specified in the Aircraft Flight Manual; or (B) If no minimum engagement altitude is specified, 500 feet, or at an altitude that is no lower than twice the altitude loss specified in the Aircraft Flight Manual for an autopilot malfunction in cruise conditions, whichever is greater; or (ii) Notwithstanding the requirements of paragraphs (c)(2)(i)(A) and (B) of this section, at an altitude specified by the Administrator.
(d) Section 135.117(a)(9) of this chapter.	Applies to powered-lift conducting operations beyond the autorotational distance from the shoreline, as defined in § 135.168(a) of this chapter, or gliding distance of a shoreline.	

TABLE 1 TO § 194.306—Continued

Regulation	Applicability	Additional requirements or clarification
(e) Section 135.128(a) of this chapter.	Applies to all powered-lift	The exception under § 135.128(a) of this chapter for seaplane and float equipped rotorcraft operations during movement on the surface applies to persons pushing off a powered-lift from the dock or persons mooring the powered-lift at the dock.
Part 135, Subpart C—Aircraft and Equipment		
(f) Section 135.145(b) of this chapter.	Applies to all powered-lift unless the certificate holder has previously proven a powered-lift under part 135 of this chapter.	
(g) Section 135.145(d)(1) of this chapter.	Applies to all powered-lift unless a powered-lift of the same make or similar design has been proven or validated by that certificate holder under part 135 of this chapter.	
(h) Section 135.150(a)(7) of this chapter.	Applies to large powered-lift with a passenger seating configuration, excluding any pilot seat, of more than 19.	The public address system required by § 135.150(a)(7) of this chapter must comply with § 25.1423 of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(i) Section 135.150(b)(7) of this chapter.	Applies to large powered-lift with a passenger seating configuration, excluding any pilot seat, of more than 19.	The crewmember interphone system must comply with the requirements of § 135.150(b)(7) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(j) Section 135.151(a) of this chapter.	Applies to powered-lift with a passenger seating configuration of six or more seats and for which two pilots are required by certification or operating rules.	The cockpit voice recorder must be installed and equipped in accordance with the certification provisions listed in § 135.151(a)(1) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(k) Section 135.151(b) of this chapter.	Applies to powered-lift with a passenger seating configuration of 20 or more seats.	The cockpit voice recorder must be installed and equipped in accordance with the certification provisions listed in § 135.151(b)(1) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(l) Section 135.151(d) of this chapter.	Applies to large powered-lift or powered-lift equipped with a cockpit voice recorder.	The cockpit voice recorder required by § 135.151(d) of this chapter must record the uninterrupted audio signal received by a boom or mask microphone in accordance with § 25.1457(c)(5) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(m) Section 135.151(g)(1) of this chapter.	Applies to powered-lift with a passenger seating configuration of six or more seats, for which two pilots are required by certification or operating rules, and that are required to have a flight data recorder under § 135.152 of this chapter.	The cockpit voice recorder must be installed and equipped in accordance with the appropriate certification provisions listed in § 135.151(g)(1)(i) and (iv) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(n) Section 135.151(g)(2) of this chapter.	Applies to powered-lift with a passenger seating configuration of 20 or more seats and that is required to have a flight data recorder under § 135.152 of this chapter.	The cockpit voice recorder must be installed and equipped in accordance with the appropriate certification provisions listed in § 135.151(g)(2)(i) and (iv) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(o) Section 135.151(h) of this chapter.	Applies to powered-lift required to have a cockpit voice recorder and a flight data recorder under part 135 with installed datalink communication equipment.	
(p) Section 135.152(a) of this chapter.	Section 135.152(a) of this chapter applies to powered-lift with a passenger seating configuration of 10 to 19 seats.	Powered-lift operators must comply with § 194.312 or § 194.313 in lieu of the appendices referenced in § 135.152 of this chapter.
(q) Section 135.152(b) introductory text and (b)(3) of this chapter.	Section 135.152(b) introductory text and (b)(3) apply to powered-lift with a passenger seating configuration of 20 to 30 seats.	
(r) Section 135.152(c), (d), (f), and (j) of this chapter.	Applies to powered-lift with a passenger seating configuration, excluding crewmember seats, of 10 to 30.	<p>(1) The flight recorder must be installed and equipped in accordance with the appropriate certification provisions listed in § 135.152 of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.</p> <p>(2) Certificate holders must keep the recorded data until the powered-lift has been operating for at least 25 hours.</p> <p>(3) The powered-lift flight recorder must be operated continuously from the instant the powered-lift begins the takeoff roll or lift-off until the landing is completed.</p>
(s) Section 135.154(a) and (c) of this chapter.	Applies to powered-lift configured with 6 or more passenger seats, excluding any pilot seat.	Instead of TAWS, powered-lift must be equipped with a helicopter terrain awareness and warning system (HTAWS) that meets the requirements in TSO-C194 and Section 2 of RTCA DO-309 (incorporated by reference, see § 194.109) or a FAA-approved TAWS A/HTAWS hybrid system.
(t) Section 135.158 of this chapter.	Applies to powered-lift equipped with a flight instrument pitot heating system.	Under § 135.158(a) of this chapter, no person may operate a powered-lift equipped with a flight instrument pitot heating system unless the aircraft is also equipped with an operable pitot heat indication system that complies with § 23.2605 or § 25.1326 of this chapter, or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter that provides an alert that is in clear view of a flightcrew member.
(u) Section 135.159(a)(1) of this chapter.	Applies to powered-lift with a third attitude instrument system that meets the requirements of § 135.159(a)(1) of this chapter.	

TABLE 1 TO § 194.306—Continued

Regulation	Applicability	Additional requirements or clarification
(v) Section 135.160 of this chapter.	Applies to all powered-lift.	
(w) Section 135.163(g) of this chapter.	Applies to all powered-lift	The two required generators may be mounted on a drivetrain that is driven by two separate powerplants as outlined in § 135.163(g) of this chapter for multi-engine helicopters.
(x) Section 135.165(d) of this chapter.	Applies to powered-lift having a passenger seat configuration, excluding any pilot seat, of 10 seats or more, or a powered-lift in a commuter operation, as defined in part 119 of this chapter.	
(y) Section 135.165(g)(1) of this chapter.	Applies to powered-lift for purposes of approving a single long-range navigation system and a single long-range communication system for extended over-water operations.	
(z) Section 135.168 of this chapter.	Applies to powered-lift operating beyond autorotational distance or gliding distance from the shoreline.	<p>(1) The life preserver required by § 135.168(b)(1) of this chapter need not be worn but must be readily available for its intended use and easily accessible to each occupant when the powered-lift is a multiengine aircraft operated at a weight that will allow it to climb, with the critical engine inoperative or while experiencing a critical change of thrust, at least 50 feet a minute, at an altitude of 1,000 feet above the surface.</p> <p>(2) For powered-lift unable to meet the requirements of paragraph (z)(1) of this section, the occupants must wear life preservers during the flight.</p> <p>(3) For purposes of paragraphs (z), (ii), (jj), and (kk) of this section, <i>critical change of thrust</i> means a failure that would most adversely affect the performance or handling qualities of an aircraft.</p>
(aa) Section 135.169(a) of this chapter.	Applies to large powered-lift	Powered-lift must comply with appropriate certification provisions listed in § 135.169(a) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(bb) Section 135.169(b)(1) and (b)(8) of this chapter.	Applies to small powered-lift with a passenger seating configuration, excluding pilot seats, of 10 seats or more.	<p>(1) Under § 135.169(b)(1) of this chapter, small powered-lift with a passenger seating configuration of 10 seats or more must comply with the applicable requirements for transport category powered-lift or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.</p> <p>(2) Under § 135.169(b)(8) of this chapter, small powered-lift with a passenger seating configuration of 10 seats or more must comply with the applicable requirements under part 23 of this chapter referenced in § 135.169(b)(8) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.</p>
(cc) Section 135.169(d) of this chapter.	Applies to large powered-lift with a cargo or baggage compartment of 200 cubic feet or greater.	The cargo and baggage compartments required by § 135.169(d) of this chapter must comply with the certification provisions listed in that paragraph or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(dd) Section 135.170(b)(1) of this chapter.	Applies to large powered-lift; § 135.170(b)(1)(ii) applies to large powered-lift with a passenger capacity of 20 or more.	Powered-lift must comply with appropriate certification provisions listed in § 135.170(b)(1) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(ee) Section 135.170(b)(2) of this chapter.	Applies to large powered-lift	The seat cushions required by § 135.170(b)(2) of this chapter must comply with § 25.853 of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(ff) Section 135.170(c)(2) of this chapter.	Applies to large powered-lift	The seat cushions required by § 135.170(c)(2) of this chapter must comply with § 25.856 of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(gg) Section 135.178 of this chapter.	Applies to powered-lift having a passenger-seating configuration of more than 19 seats.	The additional emergency equipment must comply with appropriate certification provisions listed in § 135.178 of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(hh) Section 135.180 of this chapter.	Applies to powered-lift with a passenger seat configuration, excluding any pilot seat, of 10 to 30 seats.	The Aircraft Flight Manual must contain the information outlined in § 135.180(b) of this chapter.
(ii) Section 135.181(a)(2) of this chapter.	Applies to powered-lift	No person may operate a multiengine powered-lift carrying passengers over-the-top or in IFR conditions at a weight that will not allow it to climb, with the critical engine inoperative or while experiencing a critical change of thrust as defined in paragraph (z) of this section, at least 50 feet a minute when operating at the MEAs of the route to be flown or 5,000 feet MSL, whichever is higher.
(jj) Section 135.181(b) of this chapter.	Applies to powered-lift conducting offshore passenger operations.	Multiengine powered-lift carrying passengers offshore may conduct such operations in over-the-top or in IFR conditions at a weight that will allow the powered-lift to climb at least 50 feet per minute with the critical engine inoperative or while experiencing a critical change of thrust as defined in paragraph (z) of this section, when operating at the MEA of the route to be flown or 1,500 feet MSL, whichever is higher.

TABLE 1 TO § 194.306—Continued

Regulation	Applicability	Additional requirements or clarification
(kk) Section 135.183(c) of this chapter.	Applies to powered-lift	No person may operate a land aircraft carrying passengers over water unless it is a multiengine aircraft operated at a weight that will allow it to climb, with the critical engine inoperative or while experiencing a critical change of thrust as defined in paragraph (z) of this section, at least 50 feet a minute, at an altitude of 1,000 feet above the surface.
(ll) Section 135.183(d) of this chapter.	Applies if the powered-lift is equipped with flotation devices and carrying passengers over water.	
Part 135, Subpart D—VFR/IFR Operating Limitations and Weather Requirements		
(mm) Section 135.203(a) of this chapter.	Applies to powered-lift except those operating in the vertical-lift flight mode under paragraph (nn) of this section.	The Administrator may authorize a lower minimum altitude for a powered-lift if the FAA has determined, during type certification, the lower minimum altitude enables a transition from wing-borne to vertical-lift flight mode and the aircraft can conduct a safe autorotation, or an approved equivalent maneuver, to a landing but no lower than 300 feet above the surface.
(nn) Section 135.203(b) of this chapter.	Applies to powered-lift operating in vertical-lift flight mode that are certificated and able to conduct an autorotation or an approved equivalent maneuver to a landing.	Powered-lift that do not meet the requirements of this paragraph (nn) must use the VFR minimum altitudes outlined in paragraph (mm) of this section.
(oo) Section 135.205(a) of this chapter.	Applies to all powered-lift except as provided in paragraph (pp) of this section.	
(pp) Section 135.205(b) of this chapter.	Applies to powered-lift operating in vertical-lift flight mode and at a speed that allows the pilot adequate opportunity to see and avoid any other air traffic or any obstructions in time to avoid a collision.	Powered-lift that do not meet the requirements of this paragraph (pp) must use the VFR visibility requirements outlined in § 135.205(a) of this chapter.
(qq) Section 135.207 of this chapter.	Applies if the powered-lift does not have the flight instrumentation listed in § 135.159 of this chapter installed and operable.	
(rr) Section 135.209(a) of this chapter.	Applies to all powered-lift except as provided in paragraph (ss) of this section.	(1) The Administrator may authorize deviations from paragraph (a) of § 135.209 of this chapter for specific routes with one or more predetermined suitable landing areas if the FAA finds the operation can be conducted safely. If the Administrator authorizes such a deviation, an operations specification will be issued to the operator containing, at a minimum, the specific routes and the VFR fuel reserve specified in minutes. The Administrator may, at any time, terminate any grant of deviation authority issued under this paragraph.
(ss) Section 135.209(b) of this chapter.	Applies to powered-lift with the performance capability, as provided in the Aircraft Flight Manual, for the entire flight to conduct a landing in the vertical-lift flight mode.	(2) <i>Suitable landing area</i> for purposes of this paragraph (rr) and paragraph (ss) of this section means an area that provides the operator reasonable capability to land without causing undue hazard to persons or property. These suitable landing areas must be site specific, designated by the operator, and accepted by the FAA.
(tt) Section 135.221(b) of this chapter.	Applies to powered-lift authorized to conduct copter procedures and which can land in the vertical-lift flight mode, as provided in the Aircraft Flight Manual.	The Administrator may authorize deviations from § 135.209(b) of this chapter for specific routes with one or more predetermined suitable landing areas if the FAA finds the operation can be conducted safely. If the Administrator authorizes such a deviation, an operations specification will be issued to the operator containing, at a minimum, the specific routes and the VFR fuel reserve specified in minutes. The Administrator may, at any time, terminate any grant of deviation authority issued under this paragraph.
(uu) Section 135.223(a)(3) of this chapter.	Applies to powered-lift authorized to conduct copter procedures and that have the performance capability, as provided in the Aircraft Flight Manual, to conduct a landing in the vertical-lift flight mode for the entire flight.	Powered-lift that do not meet these criteria must use the alternate airport minimums specified for aircraft in § 135.221(a) of this chapter.
(vv) Section 135.225(e) of this chapter.	Applies to all powered-lift.	(1) A powered-lift that meets the requirements of paragraph (uu) of this section may use the 30-minute fuel requirements specified for helicopters in § 135.223(a)(3) of this chapter.
(ww) Section 135.227(b) of this chapter.	Applies to all powered-lift	(2) Powered-lift that are unable to meet the requirements outlined in paragraph (uu) of this section must use the 45-minute fuel requirement outlined in § 135.223(a)(3) of this chapter.
(xx) Section 135.227(d) of this chapter.	Applies to powered-lift that are type certificated and appropriately equipped for operations in icing conditions.	(1) Powered-lift critical surfaces, as outlined in the aircraft flight manual for that aircraft, must also be determined to be free of frost, ice, or snow.
(yy) Section 135.229(b)(2)(ii) of this chapter.	Applies to powered-lift taking off or landing in vertical-lift flight mode and equipped with landing lights oriented in a direction that enables the pilot to see the area to be used for landing or takeoff marked by reflective material.	(2) Powered-lift critical surfaces under this section are determined by the manufacturer.
		If a powered-lift is not taking off or landing in vertical-lift flight mode and is not equipped with landing lights oriented in a direction that enables the pilot to see the area to be used for landing or takeoff marked by reflective material, the powered-lift must take off or land at an airport with boundary or runway marker lights.

TABLE 1 TO § 194.306—Continued

Regulation	Applicability	Additional requirements or clarification
Part 135, Subpart F—Crewmember Flight Time and Duty Period Limitations and Rest Requirements		
(zz) Section 135.271 of this chapter.	Applies to powered-lift conducting operations in accordance with subpart L to part 135 of this chapter.	
Part 135, Subpart I—Airplane Performance Operating Limitations		
(aaa) Section 135.361(a) of this chapter.	As applicable to each powered-lift considering size and certification basis and subject to any limitations outlined in this part.	Any sections or paragraphs within sections to subpart I to part 135 of this chapter that refer to a specific category of aircraft and that are not referenced in the table to § 194.302 or this table, do not apply to powered-lift.
(bbb) Section 135.363(b) through (e) of this chapter.	As applicable to each powered-lift, regardless of power plant type, considering size and certification basis.	
(ccc) Section 135.363(f) of this chapter.	Applies to powered-lift that must comply with §§ 135.365 through 135.387 of this chapter as set forth in paragraphs (ddd) through (jjj) of this section.	
(ddd) Section 135.379(a) and (d) of this chapter.	Applies to large powered-lift	The Aircraft Flight Manual must contain the takeoff weight performance information.
(eee) Section 135.379(c), (e), (f), and (g) of this chapter.	Applies to large powered-lift certificated to conduct takeoff operations that utilize wing-borne lift as indicated in the aircraft flight manual.	The accelerate-stop distance required by § 135.379(c)(1) of this chapter must comply with § 25.109 of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(fff) Section 135.381 of this chapter.	Applies to large powered-lift.	
(ggg) Section 135.383(c) of this chapter.	Applies to large powered-lift.	
(hhh) Section 135.385(a) of this chapter.	Applies to large powered-lift	The Aircraft Flight Manual must contain the landing weight performance information.
(iii) Section 135.385(b), (d), (e), and (f) of this chapter.	Applies to large powered-lift certificated to conduct landing operations that utilize wing-borne lift and that have landing performance information contained in the aircraft flight manual.	Section 135.385(f) only applies to eligible on-demand operators.
(jjj) Section 135.387(a) and (b) of this chapter.	Applies to large powered-lift certificated to conduct landing operations that utilize wing-borne lift and that have landing performance information contained in the aircraft flight manual.	(1) Powered-lift operating under § 135.387(a) of this chapter must be able to complete a full stop landing within 60 percent of the effective length of the runway. (2) Section 135.387(b) only applies to eligible on-demand operators.
(kkk) Section 135.397(b) of this chapter.	Applies to small powered-lift having a passenger-seating configuration of more than 19 seats and that utilize wing-borne lift during takeoff and landing.	The Aircraft Flight Manual must contain the takeoff and landing weight performance information.
Part 135, Subpart J—Maintenance, Preventive Maintenance, and Alterations		
(lll) Section 135.429(d) of this chapter.	Applies to powered-lift that operate in remote areas or sites.	
Part 135, Subpart L—Helicopter Air Ambulance Equipment, Operations, and Training Requirements		
(mmm) Section 135.601 of this chapter.	Applies to powered-lift conducting operations in accordance with subpart L to part 135 of this chapter.	
(nnn) Section 135.603 of this chapter.	Applies to powered-lift conducting operations in accordance with subpart L to part 135 of this chapter.	(1) Under § 135.603 of this chapter, no certificate holder may use, nor may any person serve as, a pilot in command of an air ambulance operation unless that person meets the requirements of § 135.243 of this chapter and holds a powered-lift instrument rating or an airline transport pilot certificate with a category rating for that aircraft, that is not limited to VFR. (2) See § 194.249 of this chapter for references to class in part 135 of this chapter.
(ooo) Section 135.605 of this chapter.	Applies to powered-lift conducting operations in accordance with subpart L to part 135 of this chapter.	Powered-lift must be equipped with a helicopter terrain awareness and warning system (HTAWS) that meets the requirements in TSO-C194 and Section 2 of RTCA DO-309 (incorporated by reference, see § 194.109) or a FAA-approved TAWS A/HTAWS hybrid system.
(ppp) Section 135.607 of this chapter.	Applies to powered-lift conducting operations in accordance with subpart L to part 135 of this chapter.	
(qqq) Section 135.609 of this chapter.	Applies to powered-lift conducting operations in accordance with subpart L to part 135 of this chapter.	(1) For nonmountainous local flying areas, powered-lift must comply with the following weather minimums: (i) During day operations in a vertical-lift or wing-borne flight mode, a ceiling of 800 feet and visibility of 2 SM; (ii) During night operations in a vertical-lift flight mode, a ceiling of 800 feet and visibility of 3 SM; and (iii) During night operations in a wing-borne flight mode, a ceiling of 1500 feet and visibility of 3 SM. (2) For nonmountainous, non-local flying areas, powered-lift must comply with the following weather minimums: (i) During day operations in a vertical-lift or wing-borne flight mode, a ceiling of 800 feet and visibility of 3 SM; (ii) During night operations in a vertical-lift flight mode, a ceiling of 1000 feet and visibility of 3 SM. (iii) During night operations in a wing-borne flight mode, a ceiling of 1500 feet and visibility of 3 SM.

TABLE 1 TO § 194.306—Continued

Regulation	Applicability	Additional requirements or clarification
<p>(rrr) Section 135.611 of this chapter.</p> <p>(sss) Section 135.613(a) of this chapter.</p>	<p>Applies to powered-lift conducting operations in accordance with subpart L to part 135 of this chapter.</p> <p>Applies to powered-lift conducting operations in accordance with subpart L to part 135 of this chapter.</p>	<p>(3) For mountainous local flying areas, powered-lift must comply with the following weather minimums:</p> <ul style="list-style-type: none"> (i) During day operations in a vertical-lift or wing-borne flight mode, a ceiling of 800 feet and visibility of 3 SM; (ii) During night operations in a vertical-lift flight mode, a ceiling of 1000 feet and visibility of 3 SM. (iii) During night operations in a wing-borne flight mode, a ceiling of 2500 feet and visibility of 3 SM. <p>(4) For mountainous non-local flying areas, powered-lift must comply with the following weather minimums:</p> <ul style="list-style-type: none"> (i) During day operations in a vertical-lift or wing-borne flight mode, a ceiling of 1000 feet and visibility of 3 SM; and (ii) During night operations in a vertical-lift flight mode, a ceiling of 1000 feet and visibility of 5 SM; (iii) During night operations in a wing-borne flight mode, a ceiling of 2500 feet and visibility of 5 SM.
<p>(ttt) Section 135.613(b) of this chapter.</p>	<p>Applies to powered-lift conducting operations in accordance with subpart L to part 135.</p>	<p>(1) Section 135.613(a)(1) of this chapter only applies to powered-lift equipped and certified to conduct PinS approaches annotated with a “Proceed VFR” segment.</p> <p>(2) The applicable VFR weather minimums under § 135.613(a)(2) of this chapter for powered-lift operating in the wing-borne flight mode are:</p> <ul style="list-style-type: none"> (i) For Day Operations: No less than a 1000-foot ceiling and 2 statute miles flight visibility; and (ii) For Night Operations: No less than a 1500-foot ceiling and 3 statute miles flight visibility. <p>(3) The applicable VFR weather minimums under § 135.613(a)(2) of this chapter for powered-lift operating in the vertical-lift mode are:</p> <ul style="list-style-type: none"> (i) For Day Operations: No less than a 600-foot ceiling and 2 statute miles flight visibility; and (ii) For Night Operations: No less than a 600-foot ceiling and 3 statute miles flight visibility.
<p>(uuu) Section 135.615 of this chapter.</p> <p>(vvv) Section 135.617 of this chapter.</p> <p>(www) Section 135.619</p> <p>(xxx) Section 135.621</p>	<p>Applies to powered-lift conducting operations in accordance with subpart L to part 135 of this chapter.</p> <p>Applies to powered-lift conducting operations in accordance with subpart L to part 135 of this chapter.</p> <p>Applies to powered-lift operators with 10 or more powered-lift, helicopters, or any combination thereof, assigned to the certificate holder’s operations specifications for air ambulance operations.</p> <p>Applies to powered-lift conducting operations in accordance with subpart L to part 135 of this chapter.</p>	<p>(1) Under § 135.613(b)(1) of this chapter, for transitions from VFR to IFR upon departure, the VFR weather minimums outlined for powered-lift under paragraph (sss) of this section apply if:</p> <ul style="list-style-type: none"> (i) An FAA-approved obstacle departure procedure is followed; and (ii) An IFR clearance is obtained on or before reaching a pre-determined location that is not more than 3 NM from the departure location. <p>(2) Under § 135.613(b)(2) of this chapter, if the departure does not meet the requirements of paragraph (ttt)(1) of this section, the VFR weather minimums required by the SFAR for the class of airspace apply.</p> <p>(1) For powered-lift operating in wing-borne flight mode during the enroute phase of flight, under § 135.615(a)(3) of this chapter, (b), and (c), the following minimums apply:</p> <ul style="list-style-type: none"> (i) For day operations: no less than 500 feet above the surface or no less than 500 feet horizontally from any obstacle; or (ii) For night operations: at an altitude no less than 1,000 feet above the highest obstacle within a horizontal distance of 5 miles from the course intended to be flown or, in designated mountainous terrain, no less than 2,000 feet above the highest obstacle within a horizontal distance of 5 miles from the course intended to be flown. <p>(2) For powered-lift operating in vertical-lift flight mode during the enroute phase of flight, under § 135.615(a)(3), (b), and (c) of this chapter the following minimums apply:</p> <ul style="list-style-type: none"> (i) No less than 300 feet for day operations. (ii) No less than 500 feet for night operations.

TABLE 1 TO § 194.306

Regulation	Applicability	Additional requirements or clarification
Part 135, Subpart A—General		
(a) Section 135.1(a)(9)	Applies to powered-lift conducting operations in accordance with subpart L to part 135.	
(b) Section 135.23(r)	Applies to powered-lift required to comply with § 135.385 as set forth in paragraphs (hhh) and (iii) of this section.	
Part 135, Subpart B—Flight Operations		
(c) Section 135.93(a) through (f)	Applies to all powered-lift	<p>(1) The requirements referencing an Airplane Flight Manual under § 135.93(b) apply to a powered-lift's Aircraft Flight Manual.</p> <p>(2) Under § 135.93(c), no person operating a powered-lift may use an autopilot enroute, including climb and descent, below the following—</p> <p>(i) Either:</p> <p>(A) At a minimum engagement altitude specified in the Aircraft Flight Manual; or</p> <p>(B) If no minimum engagement altitude is specified, 500 feet, or at an altitude that is no lower than twice the altitude loss specified in the Aircraft Flight Manual for an autopilot malfunction in cruise conditions, whichever is greater; or</p> <p>(ii) Notwithstanding the requirements of paragraphs (c)(2)(i)(A) and (B) of this section, at an altitude specified by the Administrator.</p>
(d) Section 135.117(a)(9)	Applies to powered-lift conducting operations beyond the autorotational distance from the shoreline, as defined in § 135.168(a), or gliding distance of a shoreline.	
(e) Section 135.128(a)	Applies to all powered-lift	The exception under § 135.128(a) for seaplane and float equipped rotorcraft operations during movement on the surface applies to persons pushing off a powered-lift from the dock or persons mooring the powered-lift at the dock.
Part 135, Subpart C—Aircraft and Equipment		
(f) Section 135.145(b)	Applies to all powered-lift unless the certificate holder has previously proven a powered-lift under part 135.	
(g) Section 135.145(d)(1)	Applies to all powered-lift unless a powered-lift of the same make or similar design has been proven or validated by that certificate holder under part 135.	
(h) Section 135.150(a)(7)	Applies to large powered-lift with a passenger seating configuration, excluding any pilot seat, of more than 19.	The public address system required by § 135.150(a)(7) must comply with § 25.1423 of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(i) Section 135.150(b)(7)	Applies to large powered-lift with a passenger seating configuration, excluding any pilot seat, of more than 19.	The crewmember interphone system must comply with the requirements of § 135.150(b)(7) or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(j) Section 135.151(a)	Applies to powered-lift with a passenger seating configuration of six or more seats and for which two pilots are required by certification or operating rules.	The cockpit voice recorder must be installed and equipped in accordance with the certification provisions listed in § 135.151(a)(1) or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(k) Section 135.151(b)	Applies to powered-lift with a passenger seating configuration of 20 or more seats.	The cockpit voice recorder must be installed and equipped in accordance with the certification provisions listed in § 135.151(b)(1) or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(l) Section 135.151(d)	Applies to large powered-lift or powered-lift equipped with a cockpit voice recorder.	The cockpit voice recorder required by § 135.151(d) must record the uninterrupted audio signal received by a boom or mask microphone in accordance with § 25.1457(c)(5) of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(m) Section 135.151(g)(1)	Applies to powered-lift with a passenger seating configuration of six or more seats, for which two pilots are required by certification or operating rules, and that are required to have a flight data recorder under § 135.152.	The cockpit voice recorder must be installed and equipped in accordance with the appropriate certification provisions listed in § 135.151(g)(1)(i) and (iv) or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(n) Section 135.151(g)(2)	Applies to powered-lift with a passenger seating configuration of 20 or more seats and that is required to have a flight data recorder under § 135.152.	The cockpit voice recorder must be installed and equipped in accordance with the appropriate certification provisions listed in § 135.151(g)(2)(i) and (iv) or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(o) Section 135.151(h)	Applies to powered-lift required to have a cockpit voice recorder and a flight data recorder under part 135 with installed datalink communication equipment.	
(p) Section 135.152(a)	Paragraph (a) of § 135.152 applies to powered-lift with a passenger seating configuration of 10 to 19 seats.	Powered-lift operators must comply with § 194.312 or § 194.313 in lieu of the appendices referenced in § 135.152.

TABLE 1 TO § 194.306—Continued

Regulation	Applicability	Additional requirements or clarification
(q) Section 135.152(b) introductory text and (b)(3).	Paragraphs (b) introductory text and (b)(3) of § 135.152 apply to powered-lift with a passenger seating configuration of 20 to 30 seats.	
(r) Section 135.152(c), (d), (f), and (j).	Applies to powered-lift with a passenger seating configuration, excluding crewmember seats, of 10 to 30.	<p>(1) The flight recorder must be installed and equipped in accordance with the appropriate certification provisions listed in § 135.152 or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.</p> <p>(2) Certificate holders must keep the recorded data until the powered-lift has been operating for at least 25 hours.</p> <p>(3) The powered-lift flight recorder must be operated continuously from the instant the powered-lift begins the takeoff roll or lift-off until the landing is completed.</p>
(s) Section 135.154(a) and (c) ..	Applies to powered-lift configured with 6 or more passenger seats, excluding any pilot seat.	Instead of TAWS, powered-lift must be equipped with a helicopter terrain awareness and warning system (HTAWS) that meets the requirements in Technical Standard Order (TSO)–C194 and Section 2 of RTCA DO–309 (incorporated by reference, see § 194.109) or a FAA-approved TAWS A/HTAWS hybrid system.
(t) Section 135.158	Applies to powered-lift equipped with a flight instrument pitot heating system.	Under § 135.158(a), no person may operate a powered-lift equipped with a flight instrument pitot heating system unless the aircraft is also equipped with an operable pitot heat indication system that complies with § 23.2605 of this chapter, or § 25.1326 of this chapter, or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) that provides an alert that is in clear view of a flightcrew member.
(u) Section 135.159(a)(1)	Applies to powered-lift with a third attitude instrument system that meets the requirements of paragraph (a)(1) of § 135.159.	
(v) Section 135.160	Applies to all powered-lift.	
(w) Section 135.163(g)	Applies to all powered-lift	The two required generators may be mounted on a drivetrain that is driven by two separate powerplants as outlined in § 135.163(g) for multi-engine helicopters.
(x) Section 135.165(d)	Applies to powered-lift having a passenger seat configuration, excluding any pilot seat, of 10 seats or more, or a powered-lift in a commuter operation, as defined in part 119 of this chapter.	
(y) Section 135.165(g)(1)	Applies to powered-lift for purposes of approving a single long-range navigation system and a single long-range communication system for extended over-water operations.	
(z) Section 135.168	Applies to powered-lift operating beyond autorotational distance or gliding distance from the shoreline.	<p>(1) The life preserver required by § 135.168(b)(1) need not be worn but must be readily available for its intended use and easily accessible to each occupant when the powered-lift is a multiengine aircraft operated at a weight that will allow it to climb, with the critical engine inoperative or while experiencing a critical change of thrust, at least 50 feet a minute, at an altitude of 1,000 feet above the surface.</p> <p>(2) For powered-lift unable to meet the requirements of paragraph (z)(1) of this section, the occupants must wear life preservers during the flight.</p> <p>(3) For purposes of paragraphs (z), (ii), (jj), and (kk) of this section, <i>critical change of thrust</i> means a failure that would most adversely affect the performance or handling qualities of an aircraft.</p>
(aa) Section 135.169(a)	Applies to large powered-lift	Powered-lift must comply with appropriate certification provisions listed in § 135.169(a) or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(bb) Section 135.169(b)(1) and (b)(8).	Applies to small powered-lift with a passenger seating configuration, excluding pilot seats, of 10 seats or more.	<p>(1) Under § 135.169(b)(1), small powered-lift with a passenger seating configuration of 10 seats or more must comply with the applicable requirements for transport category powered-lift or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.</p> <p>(2) Under § 135.169(b)(8), small powered-lift with a passenger seating configuration of 10 seats or more must comply with the applicable requirements under part 23 of this chapter referenced in § 135.169(b)(8) or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.</p>
(cc) Section 135.169(d)	Applies to large powered-lift with a cargo or baggage compartment of 200 cubic feet or greater.	The cargo and baggage compartments required by § 135.169(d) must comply with the certification provisions listed in that paragraph or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(dd) Section 135.170(b)(1)	Applies to large powered-lift; paragraph (b)(1)(ii) of § 135.170 applies to large powered-lift with a passenger capacity of 20 or more.	Powered-lift must comply with appropriate certification provisions listed in § 135.170(b)(1) or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.

TABLE 1 TO § 194.306—Continued

Regulation	Applicability	Additional requirements or clarification
(ee) Section 135.170(b)(2)	Applies to large powered-lift	The seat cushions required by § 135.170(b)(2) must comply with § 25.853 of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(ff) Section 135.170(c)(2)	Applies to large powered-lift	The seat cushions required by § 135.170(c)(2) must comply with § 25.856 of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(gg) Section 135.178	Applies to powered-lift having a passenger-seating configuration of more than 19 seats.	The additional emergency equipment must comply with appropriate certification provisions listed in § 135.178 or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(hh) Section 135.180	Applies to powered-lift with a passenger seat configuration, excluding any pilot seat, of 10 to 30 seats.	The Aircraft Flight Manual must contain the information outlined in § 135.180(b).
(ii) Section 135.181(a)(2)	Applies to powered-lift	No person may operate a multiengine powered-lift carrying passengers over-the-top or in IFR conditions at a weight that will not allow it to climb, with the critical engine inoperative or while experiencing a critical change of thrust as defined in paragraph (z) of this section, at least 50 feet a minute when operating at the MEAs of the route to be flown or 5,000 feet MSL, whichever is higher.
(jj) Section 135.181(b)	Applies to powered-lift conducting offshore passenger operations.	Multiengine powered-lift carrying passengers offshore may conduct such operations in over-the-top or in IFR conditions at a weight that will allow the powered-lift to climb at least 50 feet per minute with the critical engine inoperative or while experiencing a critical change of thrust as defined in paragraph (z) of this section, when operating at the MEA of the route to be flown or 1,500 feet MSL, whichever is higher.
(kk) Section 135.183(c)	Applies to powered-lift	No person may operate a land aircraft carrying passengers over water unless it is a multiengine aircraft operated at a weight that will allow it to climb, with the critical engine inoperative or while experiencing a critical change of thrust as defined in paragraph (z) of this section, at least 50 feet a minute, at an altitude of 1,000 feet above the surface.
(ll) Section 135.183(d)	Applies if the powered-lift is equipped with flotation devices and carrying passengers over water.	

Part 135, Subpart D—VFR/IFR Operating Limitations and Weather Requirements

(mm) Section 135.203(a)	Applies to powered-lift except those operating in the vertical-lift flight mode under paragraph (nn) of this section.	The Administrator may authorize a lower minimum altitude for a powered-lift if the FAA has determined, during type certification, the lower minimum altitude enables a transition from wing-borne to vertical-lift flight mode and the aircraft can conduct a safe autorotation, or an approved equivalent maneuver, to a landing but no lower than 300 feet above the surface.
(nn) Section 135.203(b)	Applies to powered-lift operating in vertical-lift flight mode that are certificated and able to conduct an autorotation or an approved equivalent maneuver to a landing.	Powered-lift that do not meet the requirements of this paragraph (nn) must use the VFR minimum altitudes outlined in paragraph (mm) of this section.
(oo) Section 135.205(a)	Applies to all powered-lift except as provided in paragraph (pp) of this section.	
(pp) Section 135.205(b)	Applies to powered-lift operating in vertical-lift flight mode and at a speed that allows the pilot adequate opportunity to see and avoid any other air traffic or any obstructions in time to avoid a collision.	Powered-lift that do not meet the requirements of this paragraph (pp) must use the VFR visibility requirements outlined in § 135.205(a).
(qq) Section 135.207	Applies if the powered-lift does not have the flight instrumentation listed in § 135.159 installed and operable.	
(rr) Section 135.209(a)	Applies to all powered-lift except as provided in paragraph (ss) of this section.	(1) The Administrator may authorize deviations from paragraph (a) of § 135.209 for specific routes with one or more predetermined suitable landing areas if the FAA finds the operation can be conducted safely. If the Administrator authorizes such a deviation, an operations specification will be issued to the operator containing, at a minimum, the specific routes and the VFR fuel reserve specified in minutes. The Administrator may, at any time, terminate any grant of deviation authority issued under this paragraph. (2) <i>Suitable landing area</i> for purposes of this paragraph (rr) and paragraph (ss) of this section means an area that provides the operator reasonable capability to land without causing undue hazard to persons or property. These suitable landing areas must be site specific, designated by the operator, and accepted by the FAA.
(ss) Section 135.209(b)	Applies to powered-lift with the performance capability, as provided in the Aircraft Flight Manual, for the entire flight to conduct a landing in the vertical-lift flight mode.	The Administrator may authorize deviations from paragraph (b) of § 135.209 for specific routes with one or more predetermined suitable landing areas if the FAA finds the operation can be conducted safely. If the Administrator authorizes such a deviation, an operations specification will be issued to the operator containing, at a minimum, the specific routes and the VFR fuel reserve specified in minutes. The Administrator may, at any time, terminate any grant of deviation authority issued under this paragraph.

TABLE 1 TO § 194.306—Continued

Regulation	Applicability	Additional requirements or clarification
(tt) Section 135.221(b)	Applies to powered-lift authorized to conduct copter procedures and which can land in the vertical-lift flight mode, as provided in the Aircraft Flight Manual.	Powered-lift that do not meet these criteria must use the alternate airport minimums specified for aircraft in § 135.221(a).
(uu) Section 135.223(a)(3)	Applies to powered-lift authorized to conduct copter procedures and that have the performance capability, as provided in the Aircraft Flight Manual, to conduct a landing in the vertical-lift flight mode for the entire flight.	(1) A powered-lift that meets the requirements of paragraph (uu) of this section may use the 30-minute fuel requirements specified for helicopters in § 135.223(a)(3). (2) Powered-lift that are unable to meet the requirements outlined in paragraph (uu) of this section must use the 45-minute fuel requirement outlined in § 135.223(a)(3).
(vv) Section 135.225(e)	Applies to all powered-lift.	
(ww) Section 135.227(b)	Applies to all powered-lift	(1) Powered-lift critical surfaces, as outlined in the aircraft flight manual for that aircraft, must also be determined to be free of frost, ice, or snow. (2) Powered-lift critical surfaces under this section are determined by the manufacturer.
(xx) Section 135.227(d)	Applies to powered-lift that are type certificated and appropriately equipped for operations in icing conditions.	
(yy) Section 135.229(b)(2)(ii)	Applies to powered-lift taking off or landing in vertical-lift flight mode and equipped with landing lights oriented in a direction that enables the pilot to see the area to be used for landing or takeoff marked by reflective material.	If a powered-lift is not taking off or landing in vertical-lift flight mode and is not equipped with landing lights oriented in a direction that enables the pilot to see the area to be used for landing or takeoff marked by reflective material, the powered-lift must take off or land at an airport with boundary or runway marker lights.
Part 135, Subpart F—Crewmember Flight Time and Duty Period Limitations and Rest Requirements		
(zz) Section 135.271	Applies to powered-lift conducting operations in accordance with subpart L to part 135.	
Part 135, Subpart I—Airplane Performance Operating Limitations		
(aaa) Section 135.361(a)	As applicable to each powered-lift considering size and certification basis and subject to any limitations outlined in this SFAR.	Any sections or paragraphs within sections to subpart I to part 135 that refer to a specific category of aircraft and that are not referenced in the SFAR tables to § 194.302 or this section, do not apply to powered-lift.
(bbb) Section 135.363(b) through (e).	As applicable to each powered-lift, regardless of power plant type, considering size and certification basis.	
(ccc) Section 135.363(f)	Applies to powered-lift that must comply with §§ 135.365 through 135.387 as set forth in paragraphs (ddd) through (jjj) of this section.	
(ddd) Section 135.379(a) and (d).	Applies to large powered-lift	The Aircraft Flight Manual must contain the takeoff weight performance information.
(eee) Section 135.379(c), (e), (f), and (g).	Applies to large powered-lift certificated to conduct takeoff operations that utilize wing-borne lift as indicated in the aircraft flight manual.	The accelerate-stop distance required by § 135.379(c)(1) must comply with § 25.109 of this chapter or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) of this chapter.
(fff) Section 135.381	Applies to large powered-lift.	
(ggg) Section 135.383(c)	Applies to large powered-lift.	
(hhh) Section 135.385(a)	Applies to large powered-lift	The Aircraft Flight Manual must contain the landing weight performance information.
(iii) Section 135.385(b), (d), (e), and (f).	Applies to large powered-lift certificated to conduct landing operations that utilize wing-borne lift and that have landing performance information contained in the aircraft flight manual.	Paragraph (f) of § 135.385 only applies to eligible on-demand operators.
(jjj) Section 135.387(a) and (b)	Applies to large powered-lift certificated to conduct landing operations that utilize wing-borne lift and that have landing performance information contained in the aircraft flight manual.	(1) Powered-lift operating under § 135.387(a) must be able to complete a full stop landing within 60 percent of the effective length of the runway. (2) Paragraph (b) of § 135.387 only applies to eligible on-demand operators.
(kkk) Section 135.397(b)	Applies to small powered-lift having a passenger-seating configuration of more than 19 seats and that utilize wing-borne lift during takeoff and landing.	The Aircraft Flight Manual must contain the takeoff and landing weight performance information.
Part 135, Subpart J—Maintenance, Preventive Maintenance, and Alterations		
(lll) Section 135.429(d)	Applies to powered-lift that operate in remote areas or sites.	
Part 135, Subpart L—Helicopter Air Ambulance Equipment, Operations, and Training Requirements		
(mmm) Section 135.601	Applies to powered-lift conducting operations in accordance with subpart L to part 135.	
(nnn) Section 135.603	Applies to powered-lift conducting operations in accordance with subpart L to part 135.	(1) Under § 135.603, no certificate holder may use, nor may any person serve as, a pilot in command of an air ambulance operation unless that person meets the requirements of § 135.243 and holds a powered-lift instrument rating or an airline transport pilot certificate with a category rating for that aircraft, that is not limited to VFR. (2) See § 194.249 for references to class in part 135.

TABLE 1 TO § 194.306—Continued

Regulation	Applicability	Additional requirements or clarification
(ooo) Section 135.605	Applies to powered-lift conducting operations in accordance with subpart L to part 135.	Powered-lift must be equipped with a helicopter terrain awareness and warning system (HTAWS) that meets the requirements in Technical Standard Order (TSO)—C194 and Section 2 of RTCA DO—309 (incorporated by reference, see § 194.109) or a FAA-approved TAWS A/HTAWS hybrid system.
(ppp) Section 135.607	Applies to powered-lift conducting operations in accordance with subpart L to part 135.	
(qqq) Section 135.609	Applies to powered-lift conducting operations in accordance with subpart L to part 135.	<p>(1) For nonmountainous local flying areas, powered-lift must comply with the following weather minimums:</p> <p>(i) During day operations in a vertical-lift or wing-borne flight mode, a ceiling of 800 feet and visibility of 2 SM;</p> <p>(ii) During night operations in a vertical-lift flight mode, a ceiling of 800 feet and visibility of 3 SM; and</p> <p>(iii) During night operations in a wing-borne flight mode, a ceiling of 1500 feet and visibility of 3 SM.</p> <p>(2) For nonmountainous, non-local flying areas, powered-lift must comply with the following weather minimums:</p> <p>(i) During day operations in a vertical-lift or wing-borne flight mode, a ceiling of 800 feet and visibility of 3 SM;</p> <p>(ii) During night operations in a vertical-lift flight mode, a ceiling of 1000 feet and visibility of 3 SM.</p> <p>(iii) During night operations in a wing-borne flight mode, a ceiling of 1500 feet and visibility of 3 SM.</p> <p>(3) For mountainous local flying areas, powered-lift must comply with the following weather minimums:</p> <p>(i) During day operations in a vertical-lift or wing-borne flight mode, a ceiling of 800 feet and visibility of 3 SM;</p> <p>(ii) During night operations in a vertical-lift flight mode, a ceiling of 1000 feet and visibility of 3 SM.</p> <p>(iii) During night operations in a wing-borne flight mode, a ceiling of 2500 feet and visibility of 3 SM.</p> <p>(4) For mountainous non-local flying areas, powered-lift must comply with the following weather minimums:</p> <p>(i) During day operations in a vertical-lift or wing-borne flight mode, a ceiling of 1000 feet and visibility of 3 SM; and</p> <p>(ii) During night operations in a vertical-lift flight mode, a ceiling of 1000 feet and visibility of 5 SM;</p> <p>(iii) During night operations in a wing-borne flight mode, a ceiling of 2500 feet and visibility of 5 SM.</p>
(rrr) Section 135.611	Applies to powered-lift conducting operations in accordance with subpart L to part 135.	
(sss) Section 135.613(a)	Applies to powered-lift conducting operations in accordance with subpart L to part 135.	<p>(1) Section 135.613(a)(1) only applies to powered-lift equipped and certified to conduct PinS approaches annotated with a “Proceed VFR” segment.</p> <p>(2) The applicable VFR weather minimums under § 135.613(a)(2) for powered-lift operating in the wing-borne flight mode are:</p> <p>(i) For Day Operations: No less than a 1000-foot ceiling and 2 statute miles flight visibility; and</p> <p>(ii) For Night Operations: No less than a 1500-foot ceiling and 3 statute miles flight visibility.</p> <p>(3) The applicable VFR weather minimums under § 135.613(a)(2) for powered-lift operating in the vertical-lift mode are:</p> <p>(i) For Day Operations: No less than a 600-foot ceiling and 2 statute miles flight visibility; and</p> <p>(ii) For Night Operations: No less than a 600-foot ceiling and 3 statute miles flight visibility.</p>
(ttt) Section 135.613(b)	Applies to powered-lift conducting operations in accordance with subpart L to part 135.	<p>(1) Under § 135.613(b)(1), for transitions from VFR to IFR upon departure, the VFR weather minimums outlined for powered-lift under paragraph (sss) of this section apply if:</p> <p>(i) An FAA-approved obstacle departure procedure is followed; and</p> <p>(ii) An IFR clearance is obtained on or before reaching a pre-determined location that is not more than 3 NM from the departure location.</p> <p>(2) Under § 135.613(b)(2), if the departure does not meet the requirements of paragraph (ttt)(1) of this section, the VFR weather minimums required by the SFAR for the class of airspace apply.</p>

TABLE 1 TO § 194.306—Continued

Regulation	Applicability	Additional requirements or clarification
(uuu) Section 135.615	Applies to powered-lift conducting operations in accordance with subpart L to part 135.	(1) For powered-lift operating in wing-borne flight mode during the enroute phase of flight, under § 135.615(a)(3), (b), and (c), the following minimums apply: (i) For day operations: no less than 500 feet above the surface or no less than 500 feet horizontally from any obstacle; or (ii) For night operations: at an altitude no less than 1,000 feet above the highest obstacle within a horizontal distance of 5 miles from the course intended to be flown or, in designated mountainous terrain, no less than 2,000 feet above the highest obstacle within a horizontal distance of 5 miles from the course intended to be flown. (2) For powered-lift operating in vertical-lift flight mode during the enroute phase of flight, under § 135.615(a)(3), (b), and (c) the following minimums apply: (i) No less than 300 feet for day operations. (ii) No less than 500 feet for night operations.
(vvv) Section 135.617	Applies to powered-lift conducting operations in accordance with subpart L to part 135.	
(www) Section 135.619	Applies to powered-lift operators with 10 or more powered-lift, helicopters, or any combination thereof, assigned to the certificate holder's operations specifications for air ambulance operations.	
(xxx) Section 135.621	Applies to powered-lift conducting operations in accordance with subpart L to part 135.	

§ 194.307 Applicability of rules for eligible on-demand operations.

No person may operate a powered-lift in an eligible on-demand operation under part 135 of this chapter without complying with the requirements specified for the second in command of a fixed-wing aircraft contained in § 135.4(a)(3) of this chapter.

§ 194.308 Applicability of national air tour safety standards under part 136 of this chapter to powered-lift.

- (a) Persons operating powered-lift in commercial air tours must continue to comply with rules applicable to all aircraft in part 136 of this chapter, as applicable to the operation.
- (b) Suitable landing area, as defined in § 136.1 of this chapter, applies to powered-lift conducting commercial air tours.
- (c) Critical change of thrust for purposes of this section means a failure

that would most adversely affect the performance or handling qualities of an aircraft.

(d) No person may operate a powered-lift in a commercial air tour unless that person complies with the regulations listed in the first column of table 1 to this section, notwithstanding their applicability to airplanes or rotorcraft, subject to the applicability provisions in the second column, and any additional requirements or clarification specified in the third column:

TABLE 1 TO § 194.308

Regulation	Applicability	Additional Requirements or Clarification
Part 136, Subpart A National Air Tour Safety Standards		
(1) Section 136.9	Applies to powered-lift used in commercial air tours over water beyond the shoreline.	(i) Section 136.9(b)(2) applies to powered-lift operating in wing-borne flight mode within power-off gliding distance to the shoreline for the duration of the time that the flight is over water. (ii) Section 136.9(b)(3), applies to multiengine powered-lift that can be operated with the critical engine inoperative or while experiencing a critical change of thrust, at a weight that will allow it to climb, at least 50 feet a minute, at an altitude of 1,000 feet above the surface, as provided in the approved aircraft flight manual for that aircraft.
(2) Section 136.11	Applies to powered-lift used in commercial air tours over water beyond the shoreline.	(i) Section 136.11(a)(1) applies to single-engine powered-lift. (ii) Section 136.11(a)(2) applies to multi-engine powered-lift that cannot be operated with the critical engine inoperative or while experiencing a critical change of thrust, at a weight that will allow it to climb, at least 50 feet a minute, at an altitude of 1,000 feet above the surface, as provided in the approved aircraft flight manual for that aircraft.
(3) Section 136.13	Applies to powered-lift.	
(4) Section 136.75(a)	Applies to all single-engine powered-lift conducting air tours in Hawaii beyond the shore of any island.	
(5) Section 136.75(b)	Applies to powered-lift.	
(6) Section 136.75(c)	Applies to powered-lift with an Aircraft Flight Manual containing height velocity information.	Except for approach to and transition from a hover, and except for the purpose of takeoff and landing, the PIC of a powered-lift may only operate such aircraft at a combination of height and forward speed (including hover) that would permit a safe landing in the event of engine power loss or critical change of thrust, in accordance with the height-speed envelope for that powered-lift under current weight and aircraft altitude.

§ 194.309 Applicability of flight instruction; Simulated instrument flight.

The requirement to hold the appropriate category and class rating in § 91.109(c)(1)(i) of this chapter is not

applicable to operations conducted to meet alternate aeronautical experience requirements set forth in §§ 194.225, 194.227, and 194.229.

§ 194.310 Powered-lift in vertical-lift flight mode, flight recorder specifications under part 91 of this chapter.

TABLE 1 TO § 194.310

Parameters	Range	Installed system ¹ minimum accuracy (to recovered data)	Sampling interval (per second)	Resolution 3 read out
Relative Time (From Recorded on Prior to Takeoff).	4 hr minimum	±0.125% per hour	1	1 sec.
Indicated Airspeed	VM in to VD (KIAS) (minimum airspeed signal attainable with installed pilot-static system).	±5% or ±10 kts., whichever is greater.	1	1 kt.
Altitude	− 1,000 ft. to 20,000 ft. pressure altitude.	±100 to ±700 ft. (see Table 1, TSO C51–a).	1	25 to 150 ft.
Magnetic Heading	360°	±5°	1	1°
Vertical Acceleration	− 3g to + 6g	±0.2g in addition to ±0.3g maximum datum.	4 (or 1 per second where peaks, ref. to 1g are recorded).	0.05g.
Longitudinal Acceleration	±1.0g	±1.5% max. range excluding datum error of ±5%.	2	0.03g.
Pitch Attitude	100% of usable range	±2°	1	0.8°.
Roll Attitude	±60 or 100% of usable range, whichever is greater.	±2°	1	0.8°.
Altitude Rate	±8,000 fpm	±10% Resolution 250 fpm below 12,000 ft. indicated.	1	250 fpm below 12,000.
<i>Engine Power, Each Engine:</i>				
Main Rotor Speed	Maximum Range	±5%	1	1%. ²
Free or Power Turbine	Maximum Range	±5%	1	1%. ²
Engine Torque	Maximum Range	±5%	1	1%. ²
<i>Flight Control Hydraulic Pressure:</i>				
Primary (Discrete)	High/Low		1.	
Secondary—if applicable (Discrete)	High/Low		1.	
Radio Transmitter Keying (Discrete)	On/Off		1.	
Autopilot Engaged (Discrete)	Engaged or Disengaged		1.	
SAS Status-Engaged (Discrete)	Engaged or Disengaged		1.	
SAS Fault Status (Discrete)	Fault/OK		1.	
<i>Flight Controls:</i>				
Pilot Inputted—Primary Controls (I.E. Ascent, descent, acceleration, and deceleration, heading and directional control for all axis).	Full range	±3%	2	1%. ²
Controllable Stabilator Position	Full range	±3%	2	1%. ²

¹ When data sources are aircraft instruments (except altimeters) of acceptable quality to fly the aircraft the recording system excluding these sensors (but including all other characteristics of the recording system) shall contribute no more than half of the values in this column.

² Percent of full range.

§ 194.311 Powered-lift in wing-borne flight mode, flight recorder specifications under part 91 of this chapter.

TABLE 1 TO § 194.311

Parameters	Range	Installed system ¹ minimum accuracy (to recovered data)	Sampling interval (per second)	Resolution read out
Relative Time (From Recorded on Prior to Takeoff).	8 hr minimum	±0.125% per hour	1	1 sec.
Indicated Airspeed	Vso to VD (KIAS)	±5% or ±10 kts., whichever is greater. Resolution 2 kts. below 175 KIAS.	1	1%. ³
Altitude	− 1,000 ft. to max cert. alt. of A/C.	±100 to ±700 ft. (see Table 1, TSO C51–a).	1	25 to 150 ft.
Magnetic Heading	360°	±5°	1	1°.
Vertical Acceleration	− 3g to + 6g	±0.2g in addition to ±0.3g maximum datum.	4 (or 1 per second where peaks, ref. to 1g are recorded).	0.03g.
Longitudinal Acceleration	±1.0g	±1.5% max. range excluding datum error of ±5%.	2	0.01g.
Pitch Attitude	100% of usable	±2°	1	0.8°.
Roll Attitude	±60° or 100% of usable range, whichever is greater.	±2°	1	0.8°.
Stabilizer Trim Position, or	Full Range	±3% unless higher uniquely required.	1	1%. ³
Pitch Control Position				

TABLE 1 TO § 194.311—Continued

Parameters	Range	Installed system ¹ minimum accuracy (to recovered data)	Sampling interval (per second)	Resolution read out
Engine Power, Each Engine:	Full Range	±3% unless higher uniquely required.	1	1%. ³
Fan or N ¹ Speed or EPR or Cockpit indications Used for Aircraft Certification OR. Prop. speed and Torque (Sample Once/ Sec as Close together as Practicable). Altitude Rate ² (need depends on altitude resolution). Angle of Attack ² (need depends on altitude resolution). Radio Transmitter Keying (Discrete)	Maximum Range	±5%	1	1%. ³
TE Flaps (Discrete or Analog)	±8,000 fpm	±10%. Resolution 250 fpm below 12,000 ft. indicated..	1 (prop Speed)	1%. ³
LE Flaps (Discrete or Analog)	−20° to 40° or 100% of usable range.	±2°	1 (torque)	1%. ³
Thrust Reverser, Each Engine (Discrete)	On/Off .....	.....	1	250 fpm. below 12,000.
Spoiler/Speedbrake (Discrete)	Each discrete position (U, D, T/O, AAP) OR.	.....	1	0.8%. ³
Autopilot Engaged (Discrete)	Analog 0–100% range	±3%	1	1%. ³
	Each discrete position (U, D, T/O, AAP) OR.	.....	1 .....	.....
	Analog 0–100% range	±3°	1	1%. ³
	Stowed or full reverse.	.....	1 .....	.....
	Stowed or out .....	.....	1 .....	.....
	Engaged or Disengaged .....	.....	1 .....	.....

¹ When data sources are aircraft instruments (except altimeters) of acceptable quality to fly the aircraft the recording system excluding these sensors (but including all other characteristics of the recording system) shall contribute no more than half of the values in this column.

² If data from the altitude encoding altimeter (100 ft. resolution) is used, then either one of these parameters should also be recorded. If, however, altitude is recorded at a minimum resolution of 25 feet, then these two parameters can be omitted.

³ Percent of full range.

§ 194.312 Powered-lift in vertical-lift flight mode, flight recorder specifications under part 135 of this chapter.

TABLE 1 TO § 194.312

Parameters	Range	Installed system ¹ minimum accuracy (to recovered data)	Sampling interval (per second)	Resolution read out
Relative time (from recorded on prior to take-off).	25 hr minimum	±0.125% per hour	1	1 sec.
Indicated airspeed	V _m in to V _D (KIAS) (minimum airspeed signal attainable with installed pilot-static system).	±5% or ±10 kts., whichever is greater.	1	1 kt.
Altitude	−1,000 ft. to 20,000 ft. pressure altitude.	±100 to ±700 ft. (see Table 1, TSO C51–a).	1	25 to 150 ft.
Magnetic heading	360°	±5°	1	1°.
Vertical acceleration	−3g to + 6g	±0.2g in addition to ±0.3g maximum datum.	4 (or 1 per second where peaks, ref. to 1g are recorded).	0.05g.
Longitudinal acceleration	±1.0g	±1.5% max. range excluding datum error of ±5%.	2	0.03g.
Pitch attitude	100% of usable range	±2°	1	0.8°.
Roll attitude	±60° or 100% of usable range, whichever is greater.	±2°	1	0.8°.
Altitude rate	±8,000 fpm	±10% Resolution 250 fpm below 12,000 ft. indicated.	1	250 fpm below 12,000.
<i>Engine Power, Each Engine:</i>				
Main rotor speed	Maximum range	±5%	1	1%. ²
Free or power turbine	Maximum range	+ 5%	1	1%. ²
Engine torque	Maximum range	±5%	1	1%. ²
<i>Flight Control—Hydraulic Pressure:</i>				
Primary (discrete)	High/low .....	.....	1 .....	.....
Secondary—if applicable (discrete)	High/low .....	.....	1 .....	.....
Radio transmitter keying (discrete)	On/off .....	.....	1 .....	.....
Autopilot engaged (discrete)	Engaged or disengaged .....	.....	1 .....	.....
SAS status—engaged (discrete)	Engaged/disengaged .....	.....	1 .....	.....
SAS fault status (discrete)	Fault/OK .....	.....	1 .....	.....
<i>Flight Controls:</i>				
Primary Controls (I.E. Ascent, descent, acceleration, and deceleration, heading and directional control for all axis) ³ .	Full range	±3%	2	1%. ²
Controllable Stabilator Position ³	Full range	±3%	2	1%. ²

¹ When data sources are aircraft instruments (except altimeters) of acceptable quality to fly the aircraft the recording system excluding these sensors (but including all other characteristics of the recording system) shall contribute no more than half of the values in this column.

² Percent of full range.

³ For all aircraft manufactured on or after December 6, 2010, the sampling interval per second is 4.

§ 194.313 Powered-lift in wing-borne flight mode, flight recorder specification under part 135 of this chapter.

TABLE 1 TO § 194.313

Parameters	Range	Installed system ¹ minimum accuracy (to recovered data)	Sampling interval (per second)	Resolution read out
Relative time (from recorded on prior to take-off).	25 hr minimum	±0.125% per hour	1	1 sec.
Indicated airspeed	V _{so} to V _D (KIAS)	±5% or ±10 kts., whichever is greater. Resolution 2 kts. below 175 KIAS.	1	1%. ³
Altitude	–1,000 ft. to max cert. alt. of A/C.	±100 to ±700 ft. (see Table 1, TSO C51–a).	1	25 to 150
Magnetic heading	360°	±5°	1	1°
Vertical acceleration	–3g to +6g	±0.2g in addition to ±0.3g maximum datum.	4 (or 1 per second where peaks, ref. to 1g are recorded).	0.03g.
Longitudinal acceleration	±1.0g	±1.5% max. range excluding datum error of ±5%.	2	0.01g.
Pitch attitude	100% of usable	±2°	1	0.8°
Roll attitude	±60° or 100% of usable range, whichever is greater.	±2°	1	0.8°
Stabilizer trim position	Full range	±3% unless higher uniquely required.	1	1%. ³
Or Pitch control position	Full range	±3% unless higher uniquely required.	1	1%. ³
<i>Engine Power, Each Engine</i> Fan or N ₁ speed or EPR or cockpit indications used for aircraft certification.	Maximum range	±5%	1	1%. ³
Or Prop. speed and torque (sample once/sec as close together as practicable).			1 (prop speed), 1 (torque).	
Altitude rate ² (need depends on altitude resolution).	±8,000 fpm	±10%. Resolution 250 fpm below 12,000 ft. indicated.	1	250 fpm Below 12,000
Angle of attack ² (need depends on altitude resolution).	–20° to 40° or of usable range.	±2°	1	0.8%. ³
Radio transmitter keying (discrete)	On/off		1.	
TE flaps (discrete or analog)	Each discrete position (U, D, T/O, AAP). Or. Analog 0–100% range	±3°	1	1%. ³
LE flaps (discrete or analog)	Each discrete position (U, D, T/O, AAP). Or. Analog 0–100% range	±3°	1	1%. ³
Thrust reverser, each engine (Discrete)	Stowed or full reverse		1.	
Spoiler/speedbrake (discrete)	Stowed or out		1.	
Autopilot engaged (discrete)	Engaged or disengaged		1.	

¹ When data sources are aircraft instruments (except altimeters) of acceptable quality to fly the aircraft the recording system excluding these sensors (but including all other characteristics of the recording system) shall contribute no more than half of the values in this column.
² If data from the altitude encoding altimeter (100 ft. resolution) is used, then either one of these parameters should also be recorded. If, however, altitude is recorded at a minimum resolution of 25 feet, then these two parameters can be omitted.
³ Percent of full range.

Subpart D—Maintenance, Preventive Maintenance, Rebuilding, and Alteration Requirements for Powered-Lift Under Part 43 of This Chapter

§ 194.401 Applicability.

Unless otherwise specified by this part, powered-lift must continue to comply with rules applicable to all aircraft in part 43 of this chapter.

§ 194.402 Maintenance provisions.

The following maintenance provisions under part 43 of this chapter that pertain to rotorcraft also apply to powered-lift:

(a) Section 43.3(h) of this chapter applies to certificate holders operating powered-lift under part 135 of this chapter in a remote area; and

(b) In lieu of complying with § 43.15(b) of this chapter, each person performing an inspection required by part 91 of this chapter on a powered-lift shall inspect critical parts in accordance with the maintenance manual or Instruction for Continuous Airworthiness, or as otherwise approved by the Administrator.

(1) A “critical part” has the same meaning as provided in §§ 27.602 and 29.602 of this chapter.

(2) [Reserved]

Appendix A to Part 194. Minimum Requirements for a Pilot Training Program in a Powered-Lift Originally Type Certificated or Seeking Type Certification With One Set of Controls and a Single Pilot Station

1. Applicability

(a) This appendix prescribes the minimum requirements to apply for a pilot training program for the following ratings in a powered-lift originally type certificated or seeking type certification with one set of controls and a single pilot station:

- (1) Powered-lift Category;
- (2) Powered-lift Type;
- (3) Instrument-Powered-lift.

(b) Notwithstanding the exceptions in § 194.211, a person utilizing the alternate pathway set forth in this appendix must apply for all three ratings simultaneously.

2. Eligibility

(a) To utilize the alternate framework set forth by this appendix, an applicant must be qualified in accordance with the requirements set forth by § 194.215(a).

(b) The alternate framework set forth in this appendix may only be provided under a part 135, 141, or 142 approved training program.

3. Ground Training

(a) An applicant must receive and log all required ground training set forth by §§ 61.63(b) and 61.65(b) of this chapter prior to receiving training in accordance with section 4. of this appendix.

(b) Following the required ground training as set forth in paragraph (a) of this section, an applicant must successfully complete a written or oral check administered by the training provider.

4. Simulator Training in a Level C or Higher Full Flight Simulator Representative of a Powered-Lift With Single Controls and a Single Pilot Station

(a) In lieu of flight training in a powered-lift with single controls and a single pilot station, an applicant seeking a powered-lift category rating, instrument rating, and a type rating may complete all applicable flight training requirements prescribed in part 61 of this chapter or the corresponding framework prescribed in §§ 194.217 through 194.235 (except for the cross-country requirements in § 194.233), as applicable, in a qualified Level C or higher full flight simulator representative of the powered-lift type with single controls and a single pilot station.

(b) Following the training set forth in paragraph (a) of this section, the applicant must satisfactorily accomplish a check with a check pilot, a training center evaluator, an authorized instructor, instructor pilot, an FAA aviation safety inspector, or another person authorized by the FAA to administer this check in a qualified Level C or higher full flight simulator in accordance with the approved training program. The check must consist of oral questioning followed by the satisfactory performance of all the maneuvers and procedures required for the issuance of a commercial pilot certificate with a powered-lift category rating, for the issuance of an instrument-powered-lift rating and for the issuance of a powered-lift type rating, except those tasks waived in accordance with § 194.207(c).

5. Aircraft Familiarity Flight

(a) Within 90 days of an applicant's successful completion of the check set forth by section 4.(b) of this appendix, the applicant must observe an aircraft familiarity flight with an authorized instructor.

(b) The aircraft familiarity flight must include the following components:

(1) The authorized instructor must demonstrate the flight maneuvers and procedures required for the issuance of a commercial pilot certificate with a powered-lift category rating, for the issuance of an instrument-powered-lift rating and for the issuance of a powered-lift type rating, except those tasks waived in accordance with § 194.207(c), in the aircraft in flight, and

(2) The applicant must have unobstructed visual sight of the controls and instrumentation and maintain active communication with the authorized instructor for the entire flight.

(c) The aircraft familiarity flight may occur during one flight or over multiple flights.

(d) Following successful completion of the aircraft familiarity flight, the authorized instructor may endorse the applicant to act as pilot in command of the specific powered-lift to accomplish the demonstration flight with an authorized instructor on board as set forth in section 6.(a) of this appendix. The endorsement is valid for 90 days from the date of successful completion of the full flight simulator check set forth by section 4.(b) of this appendix.

6. Demonstration and Solo Flights

(a) *Demonstration flight.*

(1) After an applicant receives an endorsement to act as PIC in accordance with section 5.(d) of this appendix, the applicant must complete a demonstration flight under the direct observation of an authorized instructor.

(2) The demonstration flight must include the following components:

(i) The applicant must demonstrate the flight maneuvers and procedures required for the issuance of a commercial pilot certificate with a powered-lift category rating, for the issuance of an instrument-powered-lift rating and for the issuance of a powered-lift type rating, except those tasks waived in accordance with § 194.207(c), in the aircraft in flight, and

(ii) The authorized instructor must have unobstructed visual sight of the controls and instrumentation and maintain active communication with the applicant for the entire flight.

(3) The demonstration flight may occur during one flight or over multiple flights.

(4) Upon determination that the applicant has demonstrated satisfactory proficiency in the aircraft, the check pilot, training center evaluator, authorized instructor, instructor pilot, FAA aviation safety inspector, or another person authorized by the FAA to administer this check may endorse the applicant to act as pilot in command of the specific powered-lift to conduct solo flight in accordance with paragraph (c) of this section. The endorsement is valid for 90 days from the day the demonstration flight is successfully completed.

(b) *Failure to complete demonstration flight during endorsement period.*

(1) If the applicant does not successfully complete the demonstration flight in paragraph (a) of this section within the 90-day endorsement period, the applicant may receive another endorsement by:

(i) Completing a demonstration of proficiency in the full flight simulator consisting of the tasks and maneuvers set forth by section 10. of this appendix, in addition to any maneuvers or procedures deemed necessary by the check pilot, training center evaluator, authorized instructor, instructor pilot, an FAA aviation safety inspector, or other person authorized by the FAA to administer this check to ensure proficiency, and

(ii) Completing an aircraft familiarity flight meeting the requirements of section 5.(b) of this appendix.

(2) After the applicant meets the requirements of paragraph (b)(1) of this section, the applicant may receive another endorsement for the applicant to act as pilot in command of the specific powered-lift to accomplish the demonstration flight with an authorized instructor on board as set forth in section 6.(a) of this appendix. This endorsement is valid for 90 days from the day the demonstration of proficiency in the full flight simulator was successfully completed.

(c) *Solo Flights.* After an applicant receives an endorsement to conduct solo flights in accordance with section 6.(a)(4) of this appendix, the applicant must complete 20 hours of solo flight in the aircraft, which must include:

(1) 10 hours of solo flight time in accordance with § 61.129(e)(4) or the corresponding alternate provision set forth in §§ 194.217 through 194.231 of this part;

(2) 10 hours of solo flight time that includes the maneuvers and procedures required for the issuance of a commercial pilot certificate with a powered-lift category rating, for the issuance of an instrument-powered-lift rating and for the issuance of a powered-lift type rating; and

(3) The alternate cross-country aeronautical experience requirements prescribed in § 194.233 of this part.

(d) *Lapse of endorsement for solo flights.*

If the applicant does not successfully complete the solo flight time required in paragraph (c) of this section within the 90-day endorsement period, the applicant may receive another 90-day endorsement by satisfying the requirements of paragraph (d)(1) or (2) of this section, as applicable.

(1) If the applicant seeks to renew the endorsement for another 90-day period and is within the 90-day period of the original endorsement, the applicant must complete a demonstration flight consisting of the tasks and maneuvers set forth by section 10. of this appendix, in addition to any maneuvers or procedures deemed necessary by the check pilot, training center evaluator, authorized instructor, instructor pilot, FAA aviation safety inspector, or another person authorized by the FAA to ensure proficiency.

(2) If the applicant seeks another endorsement outside the 90-day period of the original endorsement, the applicant must:

(i) The applicant must satisfactorily complete a demonstration of proficiency in the full flight simulator consisting of the tasks and maneuvers set forth by section 10. of this appendix, in addition to any maneuvers or procedures deemed necessary by the authorized instructor to ensure proficiency, successful completion of which will result in a 90-day endorsement to accomplish a demonstration flight with an authorized instructor on board; and

(ii) The applicant must complete a demonstration flight with a check pilot, training center evaluator, authorized instructor, instructor pilot, FAA aviation safety inspector, or another person authorized by the FAA to administer this check consisting of the tasks and maneuvers

set forth by section 10. of this appendix, in addition to any maneuvers or procedures deemed necessary by the authorized instructor to ensure proficiency.

7. Practical Test

(a) The applicant may meet the training requirements of § 61.129(e)(3)(iv) in a Level C or higher FFS.

(b) A person who uses a flight simulator or flight training device for any portion of the practical test in accordance with § 61.64(a) of this chapter after training in accordance with this appendix and does not meet the requirements of § 61.64(e) of this chapter will—

(1) Receive a limitation that states “the certificate is subject to certain pilot in command limitations,” in lieu of the limitation set forth by § 61.64(f); and

(2) Be restricted from the carriage of persons or property other than necessary for the conduct of the flight.

(c) The limitation described under paragraph (b) of this section may be removed from the pilot certificate by meeting the requirements set forth in section 8. of this appendix.

8. Supervised Operating Experience for a Powered-Lift With Single Controls and a Single Pilot Station

(a) The limitation set forth in paragraph 7.(b) of this appendix may be removed if the pilot complies with the following:

(1) Performs 10 hours of flight time in an aircraft of category and type for which the limitation applies under the observation of a pilot who holds a category and type rating without limitations for the aircraft, maintaining full communication with the observing pilot;

(2) Logs each flight and the observing pilot attests in writing to each flight; and

(3) Presents evidence of the supervised operating experience to any examiner or Flight Standards office to have the limitation removed.

(b) The flight time required in paragraph (a)(1) of this section must include a cross-country flight in a powered-lift under instrument flight rules on a flight plan filed with an air traffic control facility that involves—

(i) A flight of at least 100 nautical miles along airways or by directed routing from an air traffic control facility;

(ii) An instrument approach at each airport; and

(iii) Three different kinds of approaches with the use of navigation systems.

(c) The observing pilot must have unobstructed visual sight of the controls and instrumentation.

9. Deviation Authority

The Administrator may authorize a deviation from the simulator qualification requirement in section 4. of this appendix stipulating that training must be completed in a qualified Level C or higher full flight simulator upon a determination by the Administrator that—

(a) The alternative training device is of adequate fidelity to be used as a substitution for in-aircraft flight training; and

(b) The effectiveness and objectives of the training program can be met utilizing the alternative training device.

10. Maneuvers and Procedures Required for Certain Flights Prescribed by This Appendix

This section sets forth the maneuvers and procedures required for flights required in accordance with sections 6.(b)(1)(i), 6.(d)(1), 6.(d)(2)(i), and 6.(d)(2)(ii) of this appendix, except those maneuvers and procedures

under tasks waived in accordance with § 194.207(c).

(a) Proper flight preparation procedures, including preflight planning and preparation, powerplant operation, and aircraft systems;

(b) Taxiing or surface operations, including runups;

(c) Takeoffs and landings, including normal and crosswind;

(d) Straight and level flight, and turns in both directions;

(e) Climbs and climbing turns;

(f) Airport traffic patterns, including entry and departure procedures;

(g) Collision avoidance, windshear avoidance, and wake turbulence avoidance;

(h) Descents with and without turns;

(i) Flight at various airspeeds from cruise to slow flight;

(j) Stall entries from various flight attitudes and power combinations with recovery initiated at the first indication of a stall, and recovery from a full stall;

(k) Emergency procedures and equipment malfunctions;

(l) Ground reference maneuvers;

(m) Approaches to a landing with simulated engine malfunctions;

(n) Go-arounds;

(o) Approaches to the landing area;

(p) Hovering and hovering turns; and

(q) For a multiengine powered-lift, simulated one-engine-inoperative approaches and landings.

Issued under authority provided by 49 U.S.C. 106(f), 40113, 44701–44705, 44707, 44712, 44713, 44715, 44722, and 44730 in Washington, DC, on October 22, 2024.

Michael Gordon Whitaker,

Administrator.

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