



AUVSI Response to Docket No. [FAA-2023-1275 Notice No. 23-8](#) | Integration of Powered-Lift: Pilot Certification and Operations; Miscellaneous Amendments Related to Rotorcraft and Airplanes | Due August 14, 2023

The Association for Uncrewed Vehicle Systems International (AUVSI) appreciates the opportunity to comment on this important Federal Aviation Administration (FAA) Notice of Proposed Rulemaking (NPRM). This NPRM has been the focus of industry, the FAA, and Congress for quite a while. AUVSI applauds the FAA for its work and diligence on this topic to date, and we appreciate Congress including language in their FAA Reauthorization texts that will help ensure critical timelines are maintained. In addition to being timely, it is essential that this rulemaking meet the immediate needs of the Advanced Air Mobility (AAM) industry and, to the extent possible, lay the foundations for the future.

AUVSI is the world's largest non-profit organization dedicated to the advancement of uncrewed systems, autonomy, and robotics. We represent corporations and professionals from more than 60 countries that are involved in industry, government, and academia. AUVSI's primary markets span the defense, civil, and commercial industries. AUVSI's membership also includes many of the leading companies in the AAM industry. Uncrewed systems of all sizes and missions represent an expansive market within the transportation system, and it is our mission to ensure all types of uncrewed systems, autonomy, and robotics companies that work with us have access to the resources they need to be successful in such a highly competitive industry.

AUVSI's advocacy is rooted in the desire to ensure government and regulatory bodies advance safety and foster innovation, rather than stifle it. Right now, there is not an adequate regulatory scheme in place for powered-lift aircraft/operations, thereby stifling the innovation of the industry and our members. Without a powered-lift special federal aviation regulation (SFAR), the AAM industry will not be able to scale in the near term, and will likely look for opportunities to expand outside the United States. This NPRM is a necessary step, but we are concerned that it falls short in a few areas, which are outlined below. AUVSI does not want to let perfect be the enemy of the good, but we do not want a final rule to have any unintended consequences on the industry that we work so closely with. We are committed to working with the FAA on solutions to these concerns moving forward.

While AUVSI appreciates the FAA's willingness to continue to engage in the rulemaking process in support of AAM, by diverging from international approaches and delaying engagement with autonomous and simplified vehicle operations (e.g., simplified flight controls), the proposed language falls short of meeting the needs of both AUVSI's membership and the AAM industry. The legacy thinking that is applied throughout the proposed document does not truly support the needs of electric vertical takeoff and landing (eVTOL) aircraft and operators, and the AAM industry more broadly, and is likely to impede the safety and environmental improvements attendant with eVTOL aircraft and their operations. To unlock both the safety and market potential of the AAM industry, the unique capabilities of eVTOL aircraft,

including their unique flight characteristics and varying extents of automation and autonomy, from supported piloted operations to fully remotely supervised, must be more directly considered in the rules governing their operation. This proposed SFAR falls short of this long-term vision, and more critically, for entry into service considerations as well.

AUVSI is especially concerned about the lack of consideration that is given to autonomy and automation in the proposed language. Additionally, we have varying members in the AAM space whose business models differ in a variety of ways. On behalf of our AAM membership we would also like to direct attention to critical concerns in other areas, outside autonomy, as well. We strongly encourage the FAA to reconsider their approach in these areas, or at least, provide a normalized pathway for alternative solutions to satisfy the desired safety intent through built-in flexibility in the final rule language.

Type Ratings: While AUVSI membership is generally aligned with the idea that eVTOL pilots should have a type rating for each unique aircraft they fly, the reliance on a category is not justified from a cost-benefit perspective. Per the FAA’s own acknowledgement in the proposal’s preamble, the eVTOL aircraft undergoing airworthiness certification today are substantially different from the dual turboprop tilt-rotors that were the original inspiration for the category. Given that many eVTOL aircraft share significantly more with modern airplanes or helicopters, the application of a category restriction to these aircraft does not enhance safety beyond what is achieved with a type rating. Also, looking towards international harmonization in this area, the International Civil Aviation Organization (ICAO) guidance on this topic¹ should be given serious consideration.

Flight Training Requirements: The requirements as proposed prioritize hours over experience in a way that is impractical for modern eVTOL aircraft, overly burdensome for operators and pilots, and less effective from a safety perspective. Given that the majority of the proposed missions for eVTOL aircraft are relatively short duration flights and that the aircraft themselves may be range-constrained due to energy storage considerations, basing flight training requirements on time and/or distance flown does not provide for the greatest level of safety for a given amount of flight time. Instead, the focus would be better placed on specific experiences and proficiency therein. In other words, practicing and demonstrating required maneuvers, such as takeoff and landing, over a representative range of conditions, provides a more efficient pathway to higher levels of competency and safety. This approach can be facilitated by the appropriate use of approved flight simulator training devices (FSTDs).

FSTDs: By applying excessive requirements to flight simulators that could be used to support pilot training, the availability to the industry of another key safety-enhancing tool is unnecessarily restricted. Flight simulation is already an established pillar of both flight training and engineering design and evaluation. Appropriately validated FSTDs allow pilots to experience a wide range of

¹ Guidance on the Implementation of ICAO Standards and Recommended Practices for Tilt-rotors (10103), see Annex 1 Personnel Training §2.1.1.4

flight conditions, off-nominal conditions, and other critical but statistically unlikely situations in an efficient, safe, and effective training environment. Facilitating the approval of FSTDs and giving credit for the training time that they enable allows for pilots to be trained more efficiently and to higher levels of competency than can be accomplished otherwise. Appropriate use of FSTDs also mitigate the need for dual-pilot aircraft operations during pilot training by providing adequate simulator experience prior to having a pilot operate an actual aircraft.

Dual Controls: By requiring dual controls, the proposal disregards significant advancements in safety technology as well as uncrewed flight-testing experience that has been gained with many eVTOL aircraft and could be used to effectively support single pilot training operations. Single-control pilot training is not a new idea, even for complex aircraft (e.g., the F-35B) and can be made even safer for modern eVTOL aircraft through the application of simplified flight controls, advanced envelope protection systems, other pilot-supporting on-board automation, and extensive simulator training time. Instead of a blanket requirement for dual controls, a tailored approach that takes these risk mitigating factors into consideration would be more appropriate. The FAA has not adequately considered the costs to the industry in the regulatory impact analysis associated with having to follow these requirements.

Energy Reserves: Industry has been investing significant effort in evaluating and adapting the safety intent of existing time-based fuel reserve requirements to eVTOL aircraft². The decision to apply the airplane 30-minute fuel reserve is overly conservative and inconsistent with the application of the original rule safety intent to modern eVTOL aircraft. The increased reliability and safety features which are incorporated into these aircraft combined with unique concepts of operations that provide for short flights with many more safe landing locations than would be available for airplane operations mean that a performance-based requirement is much more appropriate.

Looking to the future of AAM and returning to the conversation of autonomy, AUVSI strongly encourages the FAA to acknowledge the safety benefit that advanced and autonomy-enabled systems can provide in the operation of eVTOL aircraft in both operations and training. This would be consistent with the FAA's stated position in the recently published Modernization of Special Airworthiness Certification, or "MOSAIC" NPRM (Docket FAA-2023-1377) that automation and simplified flight controls have made aircraft "easier to operate" and can be used to prevent pilot "task saturation" and increase safety. Powered-lift aircraft stand to benefit particularly from the safety benefits of autonomy, automation, and simplified flight controls.

Where "automation" is discussed in this proposal, its full potential is apparently not understood nor is it being enabled. By requiring a "technically advanced powered-lift" to be equipped with a specific set of legacy displays that may or may not be appropriate to the actual operation of that aircraft (see 91.409(e)

² One such effort particularly worthy of attention is being conducted by the General Aviation Manufacturer's Association (GAMA).

through (h)), information and display clutter that can be detrimental to safety is virtually guaranteed. This requirement is also inconsistent with the flightcrew interface requirements that have been put forward as part of the proposed airworthiness standards/criteria for both the Joby JAS4-1 and the Archer Model M001 Powered-Lift aircraft which state simply that “navigation, surveillance, and powerplant controls and displays, as needed, so qualified flightcrew can monitor and perform defined tasks associated with the intended functions of systems and equipment...” Indirectly imposing a design requirement through an operational rule is not a best practice and does not benefit aviation safety.

Another area where the proposal falls short in support of autonomy, including advanced autopilots, is in the upholding of 14 CFR 135.93 altitude restrictions on the use of autopilot systems. While a fully autonomous “autoflight system” *may* ultimately be considered independently from the current treatment of autopilot systems, 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 is short sighted and safety-limiting.

Additionally, for the U.S. to retain its global leadership as an innovator in aviation, our regulatory landscape needs to both enable this innovation and ensure collaboration with the international community. The language proposed here fails to do so. Despite having set expectations that this SFAR would align with ICAO, by moving away from that type rating approach, FAA is both reversing a perceived commitment to the industry and international community and adding unnecessary barriers for U.S. operators, which do not advance aviation safety.

The above concerns are only a subset of those expressed by AUVSI member organizations with the proposed SFAR language. The generally overly conservative application of legacy thinking and requirements — directly to a new industry, without the adaptation necessary to achieve a clearly stated safety-intent — is highly concerning. Using a manually piloted, conventionally fueled aircraft from the 1990s as a precedent-setting application for fully electric, highly autonomous, modern aircraft is not serving either the FAA’s mission of upholding safety or the needs of the U.S. AAM industry as they compete on a global stage. AUVSI urges the FAA to reconsider this approach, boldly support our U.S. AAM industry, and facilitate the safety improvements that the currently proposed language is likely to stifle.

Respectfully submitted,

Michael Robbins

Michael Robbins
Chief Advocacy Officer
AUVSI