

FOREWORDS

Federal Aviation Administration

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Safely Meeting the Growing Demand for Unmanned Aircraft Systems

Over the last several years, the awareness of unmanned aircraft systems (UAS) has grown rapidly. Furthermore, UAS technology holds the potential to offer many benefits. In a November 2009 speech, FAA Administrator Randy Babbitt extolled the merits of UAS saying, "The technology has shown amazing potential."

However, likening the effect of UAS to the advent of the jet engine, Administrator Babbitt also acknowledged the level of technical maturity is not where it needs to be for full operation in the National Airspace System (NAS). "We're talking about an exponential leap in capability," referring to the development of sense-and-avoid technology, the keystone for successful UAS integration. "We have to make sure sense-and-avoid is more than a given - it must be a guarantee," Babbitt added.

In 2009, to support the safe integration of unmanned aircraft into the NAS, the Federal Aviation Administration (FAA) reorganized its Unmanned Aircraft Program Office (UAPO) into the Flight Standards Service. The UAPO is responsible for meeting the technical, operational, and regulatory challenges that UAS operations pose today while preparing to meet future demands. Currently, UAS operations for civilian commercial purposes are largely prohibited, limited to mainly research and development, product demonstration, or crew training with an experimental certification. In the United States, public-use applicants for UAS must obtain a Certificate of Waiver or Authorization (COA) which is processed by the FAA's Air Traffic Organization and reviewed by the UAPO, the primary point of contact for unmanned operations. The application is reviewed to ensure the operation is safe and appropriate safety mitigations are imposed. If there are any questions about the safety of the operation, safety studies are required for those situations where a proponent wants to do something that is outside the bounds of the interim operational guidance material. FAA grants COAs on a case-by-case basis and only when it is clear that operations can be conducted safely. Manufacturers may also operate UAS under the authority of a Special Airworthiness Certificate, Experimental Category (SAC-EC). Similar to the COA, the SAC-EC is an exception process. These requests require close review in order to assure safety for other NAS users, the public, and property on the ground.

Despite the multitude of restrictions, COA applications have increased nearly tenfold in recent years. Realizing the rapid expansion of this billion-dollar industry, the FAA is taking steps toward allowing small unmanned aircraft to operate commercially in the NAS - under low-risk conditions - in the near future. As part of the rulemaking process, the FAA formed an Aviation Rulemaking Committee to develop recommendations for consideration. The FAA expects to have a published Special Federal Aviation Regulation (SFAR) by mid-2011, with a final rule expected in late 2012.

The purpose of this SFAR is threefold:

- Educate
- Promote controlled & safe development of UAS technology
- Gather data for future rulemaking efforts

As Administrator Babbitt pointed out, one of the biggest challenges for the safe integration of UAS is addressing the complexity of collision avoidance. RTCA Special

Committee 203 is helping to close knowledge gaps caused by operational variations. FAA asked the committee to provide recommendations to establish minimum performance standards for UAS. The committee's guidance will help serve as a foundation to assure safe, efficient, and compatible UAS operations with other aircraft operating in the NAS. As part of these standards, the committee plans to recommend standards and procedures for UAS sense-and-avoid systems that will provide a safety level equivalent to that of manned aircraft. The standards are scheduled to be completed between 2013 and 2015, according to the committee's most recent plenary session, and once established, will allow the FAA to begin a more detailed approach towards certifying and regulating specific components and systems.

In addition, FAA recognizes that international coordination of standards is critical to harmonization. FAA staff members participate in several international forums including the European Organization for Civil Aviation Equipment Working Group -73 and the International Civil Aviation Organization UAS Study Group. FAA relies upon the dedication of UVS International to facilitate international coordination and to promote the exchange of UAS information on a global scale.

Looking ahead to the Next Generation Air Transportation System (NextGen), the FAA is working with several industry partners to investigate UAS-NAS integration issues. Research has included flight tests demonstrating 4-dimensional trajectory capabilities on UAS and human-in-the-loop simulations to collect UAS performance data. Upcoming activities include investigating UAS operations during contingency situations such as lost link, pilot and ATC roles and responsibilities, and impacts to the NAS.

The primary objectives of these activities are to advance integration of UAS operations into the NAS, provide the FAA confidence in the safety case for UAS, provide a platform for validation of RTCA SC-203 UAS performance requirements under development, and utilize the advanced capabilities of the UAS community to serve as a test bed for exploring NextGen concepts.

These are just a few of the ongoing activities the FAA is pursuing. As the airspace system evolves to its next generation, FAA is committed to support the integration of UAS without causing delays, capacity reduction, or placing current airspace users at increased risk.

We still have a long way to go, and there are no easy answers. But the FAA is poised to meet the challenge of integrating UAS into the NAS by utilizing NextGen technologies, working with industry, and adopting an incremental approach toward NAS integration.

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