



International Civil Aviation Organization

MIDANPIRG/19 and RASG-MID/9 Meetings

(Riyadh, Saudi Arabia, 14-17 February 2022)

Agenda Item 3.2: MID Region Safety priorities (Plenary)

**SAFETY ASSURANCE OF GROUND-BASED ASSOCIATED ELEMENTS OF UNMANNED
AIRCRAFT SYSTEMS**

(Presented by the United States)

SUMMARY

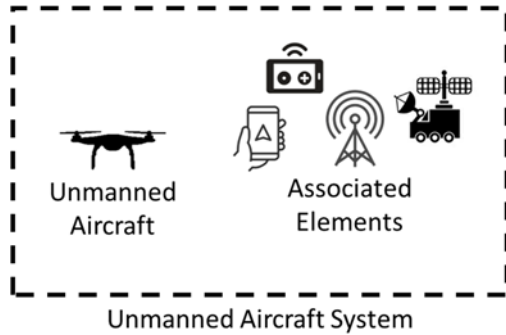
The Federal Aviation Administration (FAA) has been actively working type certification projects for Unmanned Aircraft Systems (UAS). This paper provides information on the FAA's policy memo, "FAA Approval of UAS Special Class Unmanned Aircraft (UA) Projects and their Associated Elements," which details the policy for type certification of low-risk unmanned aircraft using the Durability and Reliability Means of Compliance. This policy outlines the FAA's approach to limit the boundary of type certification to the Unmanned Aircraft only, and approve the ground-based Associated Elements (AE) through an operational approval.

1. INTRODUCTION

1.1 The FAA issued its first type certificates to UAS in 2013, in support of operations in the Arctic. Since that time, the FAA has gained experience with type certification of UAS, including new insights and knowledge. As the FAA has continued working with the public and industry to create and refine standards for UAS, it has determined that a change to type certification policy is necessary. The FAA will issue a type certificate (TC) for UA, and will approve the use of AE through operational limitations and operational approvals.

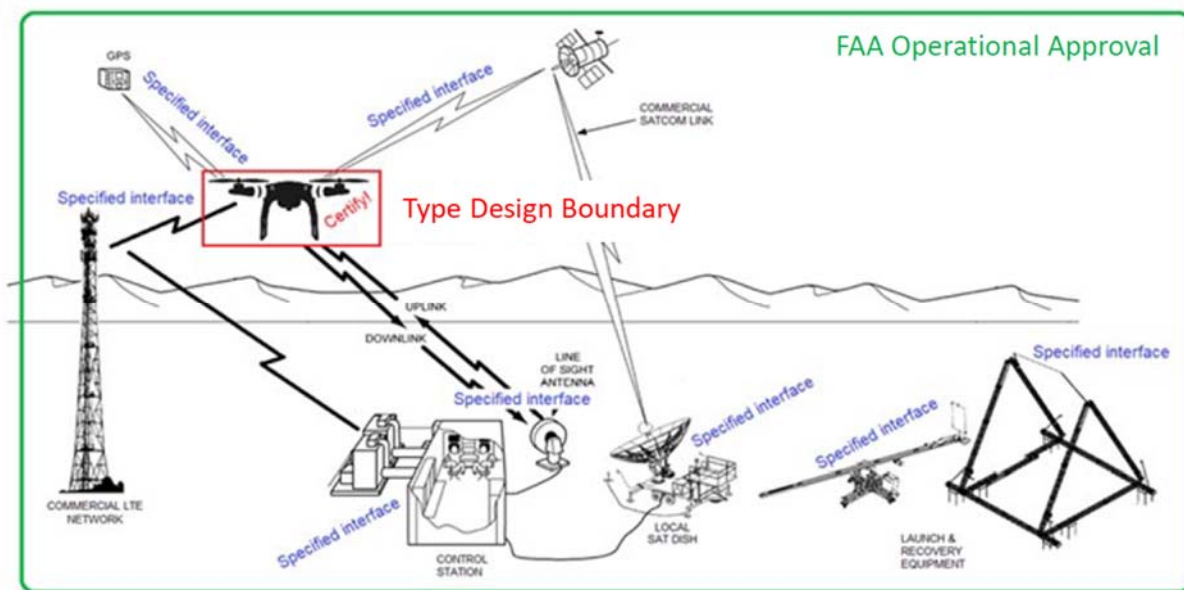
2. DISCUSSION

2.1 The FAA defines a UAS as a UA and its AE, which includes communication links and the components that control the UA that are required to operate the UAS safely and efficiently in the U.S. National Airspace System. AE are elements that are not airborne or directly affixed to the aircraft.



2.2 As the FAA progressed with type certification projects that included AE in the type design, several issues arose. Some AE, such as launch-and-recovery systems or fleet-management software, are frequently used with more than one UA. Including these components within the type design of the UA raised challenges for the certificate of airworthiness for individual UA and continued conformance to type design. Post-Type Certification changes to these AE could pose extensive aircraft recordkeeping and configuration management challenges, such as keeping track of which specific AE are associated with specific UA and recording an alteration of an AE in the maintenance records of many UA.

2.3 The FAA plans to use current projects to establish the groundwork for the future. As such, the FAA is undertaking a deliberate policy positioning to avoid establishing an incorrect precedent. Title 14 of the United States Code of Federal Regulations (CFR), Chapter 1, Part 21 (i.e. 14 CFR 21), *Certification Procedures for Products and Articles*, and 14 CFR 43, *Maintenance, Preventive Maintenance, Rebuilding, and Alteration*, were written for certificated products with all systems affecting airworthiness on board an aircraft. These regulations did not consider many of the unique features of UAS designs that many applicants are proposing, including ground-based control stations and radar, cloud computing, and cellular/satellite communications. Applying these regulations to AE is impractical and does not provide an appropriate oversight methodology for the unique nature of these items.



2.4 In July 2021, the FAA published a memorandum on the approval of UAS special class UA projects and their associated elements, which outlined policy for UA that use Durability and Reliability (D&R) testing in the special class airworthiness criteria. This policy outlined that the regulations for type design approval, production approval, conformity, certificates of airworthiness, and maintenance are only to be applied to unmanned aircraft, and not to the associated elements. However, because safe UAS operations depend and rely upon both the UA and the AE, the FAA will consider the AE in assessing whether the UA meets the criteria that comprise the certification basis. While the AE items themselves are outside the scope of the UA type design, the TC applicant must provide sufficient specifications for any aspect of the AE that could affect airworthiness. The use of AE may be approved with certain specifications as an operating limitation and be included in the Type Certificate Data Sheet (TCDS) and flight manual. This is an analogous approach to how the use of aviation fuels is approved, as fuel specifications are contained in operating limitations of the TC.

2.5 Similar to FAA regulations 14 CFR 21 and 43, regulations in 14 CFR 91, *General Operating and Flight Rules*, were not originally drafted to accommodate UAS operations. The FAA enables compliance with 14 CFR 91 regulations for UAS operations by providing regulatory relief through the exemption or waiver process. During this evaluation, the FAA may observe the operational suitability of the UAS in order to develop appropriate conditions and limitations that assure the safety of the operation. These conditions and limitations could contain specifications for services and systems that are not covered by the airworthiness criteria in the TC for the UA but that are necessary to assure the safety of the proposed operation in consideration of the regulatory relief granted.

2.6 This approach underscores the importance of a holistic assessment of the UA and its proposed operation to appropriately define proper mitigations through certification requirements and operational limitations. This policy reflects a first step for the FAA to position itself for the future to integrate new UAS solutions into the National Airspace System. Future policy will expand on this Policy Memo to provide details on the approach for additional UAS.

2.7 The memorandum discussed in paragraph 2.4 above, *FAA Approval of UAS Special Class UA Projects and their Associated Elements*, is available on the FAA website: [AIR600-21-AIR-600-PM01 \(https://drs.faa.gov/browse/excelExternalWindow/115a6df8-5440-438c-ac3b-f31c6797409a\)](https://drs.faa.gov/browse/excelExternalWindow/115a6df8-5440-438c-ac3b-f31c6797409a)

3. ACTION BY THE MEETING

3.1 The meeting is invited to note the content of the paper.