International Civil Aviation Organization
CAR/SAM Regional Planning and Implementation Group (GREPECAS)

INFORMATION PAPER

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Online, 21 – 22 April 2022

Agenda Item 2: **Follow-up on the CAR/SAM Planning and Implementation Regional Group (GREPECAS) Programmes and Projects**
2.2 Other Emerging ANS Topics

UPDATE ON UNITED STATES UNMANNED AIRCRAFT SYSTEMS (UAS) INTEGRATION ACTIVITIES

(Presented by the United Sates)

EXECUTIVE SUMMARY

This paper presents an update on the U.S. Federal Aviation Administration's (FAA) activities to integrate Unmanned Aircraft Systems (UAS), referred to herein as drones, into the U.S. National Airspace System (NAS). The paper will include updates on drone-related rulemaking, the UAS Integration Pilot Program (IPP), the BEYOND program, UAS Traffic Management (UTM), the Advanced Aviation Advisory Committee (AAAC), Safety Risk Management (SRM) Policy, Night Operations and Operations Over People Rule Implementation, Optionally Piloted Aircraft (OPA), and Durability & Reliability (D&R).

Strategic Objectives:	• Air Navigation Capacity and Efficiency
References:	• FAA Regulations and policies

1. Introduction

1.1 As drones are fundamentally changing aviation, the FAA is committed to supporting this change and working with the drone community to ensure that this dynamic shift is safely integrated. For theFAA, safety is always the most important factor for any operation, including drones.

1.2 Over the past several years, the FAA has pursued a number of actions to safely integrate drones effectively into the U.S. NAS, beginning with regulatory efforts such as the introduction of registration requirements and the small drone rule (Title 14, U.S. Code of Federal Regulations (14 CFR) part 107). Now, the FAA is building on this foundation to expand on part 107 and to implement remote identification (ID) and lessons learned from UAS IPP operational research tests.

1.3 Further, the FAA engages with the broader drone community to promote a joint understanding of goals and constraints, and to develop specific requirements needed to support operations and approval processes. This engagement supports mutual education and facilitates common approaches and solutions. This Information Paper summarizes recent and forthcoming efforts by the FAA to address the continuing safe integration of drones into the NAS.

2. Discussion

2.1 As of the beginning of 2021, the FAA expanded part 107 to include the Operation of Small Unmanned Aircraft Systems Over People, and has put in place the Remote Identification of Unmanned Aircraft rule for drones. Each was published in January 2021 and became effective on April 21, 2021.

UAS IPP and BEYOND

2.2 Since it began in 2017, the UAS IPP brought state, local and tribal governments together with private sector entities, such as drone operators and manufacturers, to accelerate safe drone integration. The overarching goal of the IPP was to assist the U.S. Department of Transportation (DOT) and the FAA in crafting new rules, policies, and guidance that support more complex low-altitude operations. Through the IPP, the FAA worked with participating state, local and tribal governments to engage with their citizens to help the federal government understand how people view and interact with drones in their own local communities.

2.3 The IPP concluded in October 2020, per the presidential memorandum that established the program. During its three-year existence, a significant amount of work was accomplished that supported drone integration into the NAS. Participants in the program conducted more than 21,000 flight operations for more than 7,300 flight hours across a variety of mission profiles, including package delivery, infrastructure inspection, and public safety operations. IPP operators Wing LLC and UPS Flight Forward were issued the first two air carrier certificates for drone cargo delivery under 14 CFR part 135. The program also helped to inform current and future activities that support drone integration into the NAS. Upon completion, a final report was submitted and subsequently published on December 17, 2021.

2.4 After the IPP's conclusion, this work continues under the successor program, "BEYOND." The name emphasizes the program's focus on beyond visual line of sight (BVLOS) operations, the next step moving beyond IPP, and moving beyond part 107 operations to continue to advance more complex drone operations. The BEYOND program is designed and implemented to take on those challenges and continue the IPP mission, focusing on enabling BVLOS operations without visual observers that are repeatable, scalable, and economically viable. As under the IPP, there is a specific emphasis on infrastructure inspection, public aircraft operations and small package delivery. BEYOND also focuses on analyzing and quantifying the societal and economic benefits of drone operations and ensuring robust community engagement efforts.

2.5 In the year and a half since its inception, BEYOND has had some notable successes of its own. More than 6,700 flights have been conducted to support a diverse portfolio of drone use cases, including critical infrastructure inspections, and relief efforts for flooding, hurricane and other natural disasters. During the COVID-19 pandemic, many of BEYOND's lead participants pivoted to include community support, such as part 107 delivery of food, medicines, personal protective equipment, testing supplies and more; and part 135 delivery of the COVID-19 vaccine. Participants have received important approvals, including the first means of compliance for Categories 2 and 3 of the Operations Over People

rule, multiple Special Airworthiness Certificates – Experimental Category (SAC-ECs), to conduct visual line-of-sight operations across an entire airport, and to conduct flights utilizing a camera system as a primary mitigation for identifying and avoiding traffic. There are also multiple program participants working toward Type Certification and Part 135 Certification approvals.

UAS Traffic Management

2.6 The FAA is pursuing several efforts in parallel that are related to the development and implementation of UTM services. For example, we continue to refine the UTM Concept of Operations and are collaborating with industry and the U.S. National Aeronautics and Space Administration (NASA) to develop a third version that will include more details on performance authorizations and drone volume reservations. Additionally, in March 2021, the FAA published a progress report for phase 2 of the UTM Pilot Program (UPP 2). The FAA published the final report on UPP 2 in August 2021.

2.7 The FAA is also developing a UTM Implementation Plan that will address a number of technical and policy-related topics associated with the development and implementation of drones and will include lessons learned from the final report for UPP 2. The plan is projected to be published in late 2022.

2.8 The FAA, in collaboration with NASA, recently announced the UTM Field Test demonstrations, which will occur later in 2022. This program will enable industry participants (UTM services as well as drone operators) to test a variety of concepts and technologies, and show how the latest industry standards can support and enable safe and scalable BVLOS operations at selected UAS Test Sites.

2.9 The FAA is collaborating with industry through our BEYOND program, partnerships for safety, and other venues to facilitate the deployment of third party services that can support more complex drone operations. The FAA continues to support industry development of interoperability and performance standards for UTM services. An initial version of ASTM's Standard Specification for UAS Service Suppliers has been finalized and is projected to be published later this year.

2.10 The FAA is engaged in multiple bilateral efforts to harmonize on UTM concepts and technical implementation efforts and the agency is also working multilaterally with the Joint Authorities for Rulemaking on Unmanned Systems (JARUS) to harmonize safety services for UTM. We support continued refinement of the UTM framework document from the ICAO UAS Advisory Group and efforts in JARUS to define safety risk considerations for UTM services.

The Drone Advisory Committee Becomes the Advanced Aviation Advisory Committee

2.11 The Drone Advisory Committee (DAC) is now the Advanced Aviation Advisory Committee (AAAC). The AAAC is a broad-based federal advisory committee that provides independent advice and recommendations to the FAA on key drone and advanced air mobility (AAM) integration issues, interests and policies. The AAAC's work relates to the efficiency and safety of integrating advanced aviation technologies into the NAS.

2.12 The charter amendment modified the FAA's DAC, renaming the committee and expanding membership from 35 to 41 members. The added membership expands representation in current stakeholder groups to include members with an AAM background. Additionally, there is a new stakeholder group that includes a community advocate representative to provide insight and expertise on potential impacts of increased drone traffic on communities.

2.13 The AAAC charter and solicitation for new members were announced in the U.S. Federal Register. The first official AAAC meeting was held February 23, 2022. The proceedings are available on the FAA's YouTube channel: https://www.youtube.com/watch?v=FvFtxYGsnsw. The FAA tasked the AAAC to provide recommendations on the Advanced Air Mobility Strategic Framework for Near-term Operations. The next AAAC meeting is scheduled for June 30, 2022.

Safety Risk Management Policy for Drones

2.14 With almost 900,000 drone registrations within the United States and the industry measuring technology generations in months, not years, the regulatory system for aviation has struggled to keep up with the pace of drone technology and the unique nature of hazards and mitigations in some unmanned aircraft (UA) operations. The need for speed is clear in setting up a Safety Risk Management (SRM) process to ensure safety risks related to specific drone operations associated with waivers and exemptions are carefully evaluated to identify, assess, and mitigate hazards to an acceptable level. On October 4, 2019, the FAA published Order 8040.6 – Unmanned Aircraft Systems Safety Risk Management (SRM) Policy (https://bit.ly/3KTatsi). The FAA is working on updating FAA Order 8040.6 to align with the newest version of FAA Order 8040.4, scheduled for publication in 2022.

2.15 FAA Order 8040.6 establishes the methods by which the FAA manages applicants' requests to operate drones and how the Office of Aviation Safety (AVS) performs SRM in accordance with FAA Order 8040.4, SRM Policy Requirements, for drone requests for appropriate action to operate (e.g., waivers, exemptions, authorizations). The order defines the scope, roles and responsibilities, triage, governance, SRM triggers, and includes a template for documenting the steps of SRM. This process supports FAA Order 8040.4 and establishes a baseline with common hazards and mitigations. The use of the methods in 8040.6 enable the FAA to address safety risk associated with drone operations in the NAS in a more consistent, coordinated, and timely manner. It also drives early internal FAA coordination so stakeholders petitioning for exemptions or requesting waivers can work with"one FAA" rather than multiple offices. Google Wing, Amazon, UPS Flight Forward, BNSF, and Xcel Energy have already made waiver applications using the new Order 8040.6 – UAS SRM Policy.

Night Operations and Operations Over People Rule Implementation

2.16 Operation of Small Unmanned Aircraft Systems over People is the FAA's next step to safely integrate drones in to the NAS. The final rule was published in January 2021, with an effective date of April 21, 2021. The final rule allows for routine night operations, operations over people, and operations over moving vehicles under certain circumstances. As of January 10, 2022, 32,150 pilots have completed the new recurrent training that includes night operations and operations over people subject areas. As of the same date, 31,003 applicants have completed the updated (part 107) initial Aeronautical Knowledge Test.

2.17 The final rule creates four categories of operations for small UA to conduct operations over people and moving vehicles. Each category of drone must meet certain eligibility requirements as prescribed by the rule. Category 1 drone operations over people are authorized to begin immediately upon the effective date of the rule, and do not require an FAA-accepted Declaration of Compliance (DOC). Operators intending to conduct Category 2 and/or Category 3 operations over people or moving vehicles are required to apply for and receive an FAA-Accepted DOC prior to conducting these types of operations. Anyone who designs, produces or modifies a small UA for operations over people may apply for a DOC. Typically these are manufacturers. Manufacturers of Categories 2 or 3 small UA must meet eligibility requirements as prescribed in part 107.120 and 107.130, respectively, using an FAA-accepted Means of Compliance (MOC). Applicants must submit a DOC in accordance with the requirements of part 107.155 to the FAA at https://uasdoc.faa.gov/login for FAA review and acceptance. By submitting a DOC, the applicant attests that they have met the requirements of the rule using an FAA-accepted MOC. Upon the effective date of the rule, an applicant may submit an MOC in accordance with part 107.160 to the FAA's Aircraft Certification Office (AIR) for review and acceptance. Information on how to do so is available at https://uasdoc.faa.gov/login. Currently, AIR has received three MOCs from industry for review and possible acceptance. At present, one MOC has been accepted. More information is available at: https://bit.ly/3rE1i7r

2.18 Remote pilots who wish to conduct Category 2 or 3 operations over people and moving vehicles must use a small UA that is eligible for those operations. Eligible small UA are listed on an FAA accepted DOC and labeled for the category of operation. To inform remote pilots and small UA manufacturers, the FAA provides a list of FAA-accepted MOCs and DOCs at https://uasdoc.faa.gov/login. To date, AIR has not accepted any DOC for Category 2 and/or 3 small drones.

2.19 To conduct Category 4 operations over people and/or moving vehicles, a remote pilot must use an eligible small UA. To be eligible, the small UA must have an airworthiness certificate issued under part 21 and be operated in accordance with the operating limitations specified in the approved flight manual or otherwise specified by the FAA. Category 4 operations over people and/or moving vehicles may be conducted as long as the operating limitations do not prohibit such operations. AIR and the FAA Flight Standards Service (AFS) are collaborating to finalize operating limitations for these Category 4 small drone operations over people.

Optionally Piloted Aircraft

2.20 FAA Order 8130.34 – Airworthiness Certification of Unmanned Aircraft Systems and Optionally Piloted Aircraft (https://bit.ly/3JXeCdp) establishes procedures for the issuance of special airworthiness certificates for experimental purposes to drones, OPA, and aircraft intended to be flown as either a drone or an OPA under the designation "OPA/UAS." The experimental purposes authorized in the order include research and development, showing compliance with regulations, crew training, exhibition, and market surveys. The order also establishes procedures for issuing special flight permits to drones for the purpose of production flight testing. The procedures in the order are used by FAA aviation safety inspectors and by private persons who are delegated authority to issue special airworthiness certificates.

Durability and Reliability (D&R)

2.21 The FAA has developed and published applicant-specific D&R airworthiness criteria for type certification of low risk UA under 14 CFR part 21.17(b). The D&R process defines a certification pathway for these low risk aircraft that is consistent with the FAA's safety continuum. D&R relies on system level testing of the entire UAS, composed of the UA and its associated elements (AE) which are not physically part of the aircraft. In the D&R process, an applicant must demonstrate an acceptable level of airworthiness by accomplishing a number of successful representative flight hours across the entire operational envelope and range of limits, test the outcomes of likely failures of the drones, perform specific demonstration tests, and meet a set of design criteria. Operational approval will be granted for the aircraft based on the reliability demonstrated during certification testing and the concept of operations of the aircraft. The operating approval will identify approved AE configurations as well as their limitations.

Conclusion

2.22 The FAA will continue to collaborate closely with ICAO Member States and private industry to produce a comprehensive and collaborative approach to the safe integration of drones into the national airspace.

2.23 The meeting is invited to note the content of this information paper and visit the FAA's UAS website (www.faa.gov/uas) for more detailed information.

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