



International Civil Aviation Organization

**The First Meeting of the APANPIRG ATM Sub-Group
(ATM /SG/1)**

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Agenda Item 4: ATM Systems (Modernisation, Seamless ATM, CNS, ATFM)

INTEGRATION OF UAS INTO THE UNITED STATES' NAS

(Presented by the United States)

SUMMARY

This paper presents an update of the FAA's work to integrate Unmanned Aircraft Systems (UAS) into the National Airspace System (NAS). As they are inherently different from manned aircraft, introduction of UAS into the nation's airspace is challenging for both the FAA and aviation community. UAS must be integrated into a NAS that is evolving from ground-based navigational aids to a GPS-based system in NextGen, as well as considered for other crucial services, such as search and rescue.

This paper relates to –

Strategic Objectives:

A: *Safety – Enhance global civil aviation safety*

C: *Environmental Protection and Sustainable Development of Air Transport – Foster harmonized and economically viable development of international civil aviation that does not unduly harm the environment*

Global Plan Initiatives:

GPI-8 Collaborative airspace design and management

GPI-12 Functional integration of ground systems with airborne systems

GPI-17 Data link applications

GPI-21 Navigation systems

GPI-22 Communication infrastructure

1. INTRODUCTION

1.1 Unmanned Aircraft Systems (UAS) come in a variety of shapes and sizes and serve diverse purposes. They may have a wingspan as large as a Boeing 737 or smaller than a radio-controlled model airplane. Regardless of size, a designated pilot is always in command of a UAS.

1.2 Historically, UAS have supported military and security operations overseas, and training performed in the United States. Today, UAS are used to perform border and port surveillance by the Department of Homeland Security, to help with scientific research and environmental monitoring by NASA and NOAA, to support public safety by law enforcement agencies, to help state universities conduct research, and to support various other missions for public (government) entities. The United States Coast Guard is also working to implement UAS in its critical mission of maritime search and rescue (SAR), as well as other missions.

1.3 As they are inherently different from manned aircraft, introduction of UAS into the nation's airspace is challenging for both the FAA and aviation community. UAS must be integrated into a National Airspace System (NAS) that is evolving from ground-based navigational aids to a GPS-based system in NextGen.

2. DISCUSSION

The FAA's Role: Safety

2.1 Safety is the FAA's top focus for UAS operations in the NAS. It is critical that UAS are not a hazard to other aircraft and do not compromise the safety of people or property.

2.2 The FAA authorizes UAS to fly outside "restricted" airspace in two different ways: special airworthiness certificates in the experimental category for civil aircraft and Certificates of Authorization (COA) for UAS flown by public entities. Recreational users of model aircraft, usually radio-controlled, are covered by separate FAA guidance at http://www.faa.gov/documentLibrary/media/Advisory_Circular/91-57.pdf

Civil UAS

2.3 Obtaining an experimental airworthiness certificate for a particular UAS is currently the primary means by which civil operators of unmanned aircraft are accessing the NAS. Experimental certificate regulations preclude carrying people or property for compensation or hire, but do allow operations for research and development, flight demonstrations and crew training. The FAA is working with civilian operators to collect technical and operational data that will help refine the UAS airworthiness certification process. The agency is currently developing a path for safe integration of civil UAS into the NAS as part of NextGen implementation.

Public UAS

2.4 COAs are available to public entities that want to fly a UAS for public aircraft operations in civil airspace. Current examples of users include the military, law enforcement, other governmental agencies, and public universities. Applicants make their request through an online process and the FAA evaluates the proposed operation to see if it can be conducted safely. The agency issues a COA based on the following principles:

- The COA allows an operator to use a defined block of airspace and includes special provisions unique to the proposed operation. For instance, a COA may require flying only under Visual Flight Rules (VFR) and/or only during daylight hours. COAs usually are issued for a specific period -- up to two years in many cases.
- Most COAs require coordination with an appropriate air traffic control facility and may require a transponder on the UAS to operate in certain types of airspace.
- Because UAS technology is not currently able to comply with "see and avoid" rules that apply to all aircraft, a visual observer or an accompanying "chase plane" must maintain visual contact with the UAS and serve as its "eyes" when operating outside airspace that is restricted from other users.
- COAs Issued:
 - 2009: 146
 - 2010: 283
 - 2011: 360
 - 2012: 452

2.5 The U.S. Coast Guard is responsible for SAR in the maritime environment – including oceanic and coastal waters. The U.S. Coast Guard, in view of its many civil missions (search and rescue, law enforcement, fisheries enforcement, pollution response, etc.) and increasing demand to provide maritime domain awareness, is preparing to acquire land- and ship-based UAS to augment manned aircraft. As one of the Coast Guard’s eleven missions, SAR is a primary requirement, and will be prosecuted from manned and unmanned air assets. Designating SAR as a primary mission requirement means that UAS will typically be available to respond when needed for a SAR incident.

2.6 The UAS should be considered as a means to address gaps in search and rescue (SAR) capability, a deficiency common to many States around the globe. UAS could provide a cost-effective alternative to manned aircraft as detailed in the ICAO Regional Air Navigation Plan; serve as a long-range search platform with greater endurance; conduct electronic searches; and in the future, possibly deliver life support equipment to mariners in distress.

2.7 Due to current restrictions within the National Airspace System (NAS), the Federal Aviation Administration (FAA) requires operating agencies to request a Certificate of Authorization (COA) before commencing UAS operations. With the exception of “emergency COAs” for large-scale disasters or mass casualty events, the nominal processing time is approximately sixty days, which does not permit timely or flexible flight operations, and prevents immediate launch or diversion of unmanned assets from other missions. The only exception to this is for operations within special use airspace (e.g., offshore warning areas), wherein the operating agency must coordinate with the controlling agency (typically DoD) for access. While special use airspace may offer a quicker processing time, it can vary greatly due to the complexity of adjacent airspace, mission type, traffic density, and other conflicting flight operations, at a minimum. Furthermore, flight operations are restricted to the altitude and lateral dimensions of the airspace, which may be minimal. Beyond the NAS (typically 12nm from shore), UAS will comply with ICAO procedures. If unable to comply, then the Coast Guard, as an operator of state aircraft, may elect to operate via “Due Regard,” in accordance with the Chicago Conventions of 1944

Streamlining the COA Process

2.8 The FAA has achieved one of the UAS milestones included in the 2012 FAA Reauthorization and Modernization Act of 2012: streamlining the process for public agencies to fly UAS in the NAS.

2.9 The FAA has been working with its government partners to streamline COA procedures. In 2009, the FAA, NASA and the Departments of Defense and Homeland Security formed a UAS Executive Committee, or “ExCom” to address UAS integration issues for federal public operators. The ExCom established a working group that developed suggestions to expedite the COA process and increase transparency into those activities.

2.10 The ExCom established metrics for tracking COAs throughout the process and improving the on-time rate for granting an authorization. The FAA tracks these metrics and briefs them at routine ExCom meetings. The agency also developed an automated, web-based process to streamline steps and ensure a COA application is complete and ready for review. The agency has developed procedures to grant expedited one-time COAs for time-sensitive emergency missions, such as disaster relief and humanitarian efforts.

2.11 In March, 2012 the FAA introduced another improvement by changing the length of a COA authorization from the current 12-month period to 24 months.

Model Aircraft

2.12 Recreational use of airspace by model aircraft is covered by FAA Advisory Circular 91-57, which generally limits operations to below 400 feet above ground level and away from airports and air traffic. In 2007, the FAA clarified that AC 91-57 only applies to modelers, and specifically excludes individuals or companies flying for business or commercial purposes.

Operation and Certification Standards

2.13 The FAA is developing new policies, procedures and approval processes to address the increasing desire by civilian operators to fly UAS in the NAS. Developing and implementing these new UAS standards and guidance is a long-term effort.

- The FAA chartered a UAS Aviation Rulemaking Committee in 2011 to serve as means for the FAA to receive inputs and recommendations from the aviation community on appropriate operational procedures, regulations and policies required to facilitate routine UAS access to the nation's airspace.
- The FAA has asked RTCA – a group that provides expert advice to the agency on technical issues – to work with industry to assist in the development of UAS standards. RTCA's technical group will address questions about how UAS will handle communication, command and control, and how they will “sense and avoid” other aircraft.

2.14 The FAA continues to work closely with its international aviation counterparts to harmonize standards, policies, procedures and regulatory requirements.

UAS Test Sites

2.15 In the FAA reauthorization act, Congress directed the FAA to establish six UAS “pilot projects,” generally referred to as test sites. These sites will provide valuable data to help safely integrate UAS into the nation's airspace.

2.16 Some facets of test site selection and operation include:

- Safe designation of airspace for integrated manned and unmanned flight operations in the national airspace system
- Development of certification standards and air traffic requirements for unmanned flight operations
- Coordinating with and leveraging the resources of NASA and the Department of Defense
- Addressing both civil and public unmanned aircraft systems
- Ensuring that the program is coordinated with the Next Generation Air Transportation System
- Ensuring the safety of unmanned aircraft systems and related navigation procedures before they are integrated into the national airspace system

2.17 Since March, 2012 the agency has received over 200 comments on the site and selection process guidelines which will aid in the selection of the test sites and their management organizations by the end of 2012.

2.18 In January, 2013 the FAA published as Screening Information Request (SIR) soliciting applications from parties interested in operating a UAS test site. The FAA hopes to announce the selection of UAS test sites by the end of the year.

Small Unmanned Aircraft

2.19 Small unmanned aircraft (sUAS) are the type of UAS likely to grow most quickly in civil commercial operations in the near term because of their versatility and relatively low initial cost and operating expenses. An Aviation Rulemaking Committee (ARC) examined the operational and safety issues associated with sUAS and provided recommendations on how to proceed with this rulemaking activity. We expect to publish a Notice of Proposed Rulemaking later this year.

2.20 Small UAS also hold great promise for law enforcement use. The 2012 reauthorization act directed the FAA to “allow a government public safety agency to operate unmanned aircraft weighing 4.4 pounds or less” under certain restrictions. The bill specified these UAS must be flown within the line of sight of the operator, less than 400 feet above the ground, during daylight conditions, inside Class G (uncontrolled) airspace and more than five miles from any airport or other location with aviation activities. The FAA has entered into a memorandum of agreement with the Department of Justice’s National Institute of Justice to facilitate the use of UAS by the law enforcement community.

A New Office for New Technology

2.21 The FAA continues to move aggressively toward the safe, timely and efficient integration of UAS into the nation’s air transportation system. In March 2012, the agency created a new UAS Integration Office, headed by a single executive, which brings together specialists from the aviation safety and air traffic organizations. The office serves as the FAA’s one-stop portal for all matters related to civil and public use of unmanned aircraft systems in U.S. airspace.

2.22 Additional information can be found at the following web sites:

General information:

<http://www.faa.gov/about/initiatives/uas/>

COA information:

http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/aaim/organizations/uas/coa/

Civil UAS certification through the experimental process:

<http://www.faa.gov/documentLibrary/media/Order/8130.34A.pdf>

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) Consider that unmanned aircraft systems have great potential to safely accomplish many operations that are considered dull, dirty and/or dangerous.

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