FACT SHEET
UNMANNED AIRCRAFT SYSTEMS (UAS)
Updated July 2011

Introduction

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 be smaller than a radio-controlled model aircraft. A designated pilot in command is always in control of a UAS.

Historically, UAS have mainly supported military and security operations overseas, with training occurring in the United States. In addition, UAS are utilized in U.S. border and port surveillance by the Department of Homeland Security, scientific research and environmental monitoring by NASA and NOAA, public safety by law enforcement agencies, research by state universities, and various other uses by public (government) agencies. Interest is growing in civil uses, including commercial photography, aerial mapping, crop monitoring, advertising, communications and broadcasting. Unmanned aircraft systems may increase efficiency, save money, enhance safety, and even save lives.

In the United States alone, approximately 50 companies, universities, and government organizations are developing and producing over 155 unmanned aircraft designs.

The FAA's Role: Safety First

The FAA's main concern about UAS operations in the National Airspace System (NAS) is safety. The NAS encompasses an average of more than 100,000 aviation operations per day, including air carrier, air taxi, general aviation, and military aircraft. There are approximately 18,000 air carrier aircraft and 230,000 active general aviation aircraft in the U.S. It is critical that UAS do not endanger current users of the NAS, including manned and other unmanned aircraft, or compromise the safety of persons or property on the ground.

In addition to recreational use of UAS by modelers, there are two acceptable means of operating UAS in the NAS outside of "restricted" airspace: Special Airworthiness Certificates in the Experimental Category (SAC-EC) and Certificates of Waiver or Authorization (COA).

Model Aircraft
Recreational use of the NAS is covered by FAA Advisory Circular (AC) 91-57, which generally limits operations to below 400 feet above ground level and away from airports and air traffic.

Experimental UAS
An SAC-EC is the only certification means available to civil operators for UAS and optionally-piloted aircraft (OPA). Due to regulatory requirements, this approval precludes carrying persons or property for compensation or hire, but does allow operations for research and development, market survey, and crew training.

Since July 2005, the FAA has issued 94 SAC-EC, to 13 civil operators covering 20 unique UAS and OPA types. The FAA works with these operators to collect technical and operational data to improve the UAS airworthiness certification process.

Public UAS
The COA process is available to public entities, including military, law enforcement, and other governmental agencies who want to fly a UAS in civil airspace. Applicants apply online and the FAA evaluates the request. The FAA issues a COA generally based on the following principles:

- The COA authorizes an operator to use defined airspace and includes special provisions unique to the proposed operation. For instance, a COA may include a requirement to operate only under Visual Flight Rules (VFR) and/or only during daylight hours. Most COAs are issued for a specified time period (up to one year, in most cases).
- Most COAs require coordination with an appropriate air traffic control facility and may require the UAS to have a transponder to operate in certain types of airspace.
- Due to the inability of UAS to comply with "see and avoid" rules as manned aircraft operations do, a visual observer or an accompanying "chase" aircraft must maintain visual contact with the UAS and serve as its "eyes" when operating outside of airspace that is restricted from other users.

The FAA issued 146 COAs in 2009 and 298 in 2010, more than doubling in one year. As of June 28, 2011, there were 251 active COAs, 90 different proponents, and 77 different aircraft types.

Civil UAS (Future Operations)
With the proposed small UAS Rule (described below) and the update to the Civil UAS NAS Integration Roadmap, the FAA is laying the path forward for safe integration of civil UAS into the NAS. The roadmap will describe the research and development necessary for the FAA to develop standards and policy for safe integration. An evolved transition will occur, with access increasing from accommodation to integration into today's NAS, and ultimately into the future NAS as it evolves over time.

Operation and Certification Standards

To address the increasing civil market and the desire by civilian operators to fly UAS, the FAA is developing new policies, procedures, and approval processes. Developing and implementing new UAS standards and guidance is a long-term effort.

- The FAA created the Unmanned Aircraft Program Office (UAPO), within Aviation Safety (AVS), and the Unmanned Aircraft Systems Group, within Air Traffic Organization (ATO), to integrate UAS safely and efficiently into the NAS. These specific AVS and ATO offices are co-located to enhance communication and efficiency.
- The FAA, working closely with stakeholders in the UAS community to define operational and certification requirements, stood up UAS Aviation Rulemaking Committee (ARC) to bring inputs and recommendations to the FAA on UAS matters. It is critical to develop and validate appropriate operational procedures, regulatory standards, and policies to enable routine UAS access to the NAS.
- The FAA has asked RTCA – a group that frequently advises the agency on technical issues – to work with industry and develop UAS standards. RTCA will answer two key questions:

  1. How will UAS handle communication, command, and control?
  2. How will UAS "sense and avoid" other aircraft?

- In addition, the FAA continues to work closely with its international counterparts to harmonize standards, policies, procedures, and regulatory requirements.

Data is Key

More safety data is needed to assist the FAA in making informed decisions on integration of UAS into the NAS, where the public travels each day. Currently, operations under COAs are required to report monthly operational data and incident/accident data. Increased data collection will allow the FAA to assess and enhance safety and expand the use of this technology.

Small Eyes in the Sky

The FAA expects small UAS (sUAS) to experience the greatest near-term growth in civil and commercial operations because of their versatility and relatively low initial cost and operating expenses. The agency has received extensive public comment on sUAS, both from proponents who believe their small size warrants minimal regulation and from groups concerned about hazards to manned general aviation aircraft and persons or property on the ground.

In April 2008, the FAA chartered the ARC to examine these operational and safety issues and make recommendations for proceeding with regulating sUAS. From this process, the agency drafted a Notice of Proposed Rulemaking with anticipated publication, late 2011.

One of the most promising potential uses for sUAS is in law enforcement. Although the sUAS ARC was not focused specifically on law enforcement organizations, these proponents were active participants on the ARC. Currently, any law enforcement organization must follow the COA process to conduct demonstration flights. The FAA is working with urban police departments in major metropolitan areas as well as national public safety organizations on test programs involving unmanned aircraft. The goal is to identify the challenges that UAS will bring into this environment to determine the operations that can be conducted safely by law enforcement.

The Bottom Line

Because of their inherent differences from manned aircraft, such as the pilot removed from the aircraft and the need for "sense and avoid," introduction of UAS into the NAS is challenging for both the FAA and aviation community. In addition, UAS must be integrated into an evolving NAS, from one with ground-based navigational aids to a GPS-based system in NextGen.

Each year, public agency interest and use of COAs have increased. With the introduction of the sUAS Rule for civil operators, there will be an increase in the number and scope of UAS flights in an already busy NAS. Decisions being made about UAS airworthiness and operational requirements must fully address safety implications of UAS flying in the same airspace as manned aircraft, and perhaps more importantly, aircraft with passengers.

Overcoming these challenges associated with the differences between manned and unmanned aircraft while simultaneously transitioning to NextGen further amplifies the need for extensive cooperation between the FAA, other government agencies, and industry.