

Expanding Use of Small Unmanned Aircraft Systems in the Arctic Implementation Plan *FAA Modernization and Reform Act of 2012*

Introduction

This plan responds to the following section of the *FAA Modernization and Reform Act of 2012* (the Act):

SEC. 332. INTEGRATION OF CIVIL UNMANNED AIRCRAFT SYSTEMS INTO NATIONAL AIRSPACE SYSTEM.

(d) EXPANDING USE OF UNMANNED AIRCRAFT SYSTEMS IN ARCTIC.—

(1) IN GENERAL - *Not later than 180 days after the date of enactment of this Act, the Secretary shall develop a plan and initiate a process to work with relevant Federal agencies and national and international communities to designate permanent areas in the Arctic where small unmanned aircraft may operate 24 hours per day for research and commercial purposes. The plan for operations in these permanent areas shall include the development of processes to facilitate the safe operation of unmanned aircraft beyond line of sight. Such areas shall enable over-water flights from the surface to at least 2,000 feet in altitude, with ingress and egress routes from selected coastal launch sites.* (2) AGREEMENTS - *To implement the plan under paragraph (1), the Secretary may enter into an agreement with relevant national and international communities.*

This Plan is intended to inform interested parties, operators, Federal agencies and international communities of the Federal Aviation Administration's (FAA) plan to establish permanent operational areas and corridor routes (for access to coastal launch sites) in the Arctic for the operation of small Unmanned Aircraft Systems (sUAS). These permanent areas will permit sUAS operations from the surface to at least 2,000 feet Above Ground Level (AGL) for research, commercial purposes and Search and Rescue (SAR). One of the Plan's objectives is to create a specific process to allow safe operation in the Arctic areas.

Areas of Opportunity

The requirements of the Arctic provisions of the Act present several challenges:

First, airspace areas as described in the legislation are over international waters that the FAA controls on behalf of the International Civil Aviation Organization (ICAO). Changes to the airspace will have to be approved by ICAO. Additionally, there are other international stakeholder bodies that exist for international cooperation in the Arctic region that must be consulted.

Second, the type of airspace described in the legislation does not fit any of the existing types of airspace currently used by the FAA. This means that rules for operation of the airspace will have to be created and agreed upon, driving the need for a new airspace rule.

Third, the legislative requirement to allow commercial sUAS Arctic operations requires aircraft design and production approval, operational approval and pilot aircraft certification. At this time, there are no applicable civil standards that may be used to certificate the aircraft, certificate the operators or certify pilots flying the aircraft, as described in the Act.

Given these challenges, the task of preparing a plan has proven to be both complex and time consuming. However, the FAA has found a way forward that should result in the successful creation of the permanent Arctic areas, approval criteria for the aircraft, and pilot certification criteria.

Benefits

Expanding sUAS into the Arctic provides benefits to many communities, including scientific research, SAR, environmental analysis, fisheries, marine mammal observers, oil and gas leaseholders and maritime route planners. The uses of sUAS will continue to expand as technologies and performance characteristics become better understood and integrated into sUAS operations.

Approach

The FAA has formed a team (the Team) of subject matter experts from across the FAA led by the Unmanned Aircraft Systems Integration Office (AFS-80). The Team consists of members from both FAA Headquarters and the Alaska Region. The Team has collaborated to create this plan.

Stakeholders

Members of the FAA Arctic Team have begun and will expand the process of working with relevant Federal agencies and international communities by seeking their input on this implementation plan. Groups consulted to-date include:

- National Oceanic and Atmospheric Administration (NOAA)
- United States Coast Guard
- National Aeronautics and Space Administration
- Department of Energy
- Department of the Interior
- UAS Executive Committee Senior Steering Group
- Department of State
- Arctic Council and its member States
- Cross Polar Working Group
- Marine Mammal Commission
- International Civil Aviation Organization (ICAO)
- The State of Alaska

Legislative Compliance

The FAA plans to establish three permanent Arctic areas to comply with the Act:

- 1) Southern Arctic Area: The portion of the Anchorage Continental Control Area (CTA) Flight Information Region (FIR) overlying the Bering Sea, north of the Aleutian chain and south of the Bering Strait beyond domestic US airspace.
- 2) Bering Strait Area: An area connecting the Southern and Northern Area through the Bering Strait which will allow sUAS to assist with SAR operations and shipping lane ice surveys.
- 3) Northern Arctic Area: The Anchorage Arctic CTA/FIR areas of the Chukchi Sea and the Beaufort Sea beyond domestic US airspace. The Anchorage Arctic CTA/FIR has a floor of FL230, the airspace below is Class "G" or uncontrolled airspace.

Corridor Routes and Procedures

The plan requires the establishment of several routes for ingress/egress from selected coastal launch sites to access the permanent Arctic areas. The routes will extend from the selected coastal launch sites, through domestic airspace to the permanent Arctic areas.

The procedures for using the permanent Arctic areas will be developed as a part of this plan. Typical procedures used for corridor routes in other areas of the NAS require operators using the corridor routes to file, activate, and close a flight plan with the appropriate aeronautical facility.

Airspace Actions

Definition of the airspace and the corridor routes has already commenced and will be the initial step in the process. "Warning Areas" exist in international airspace that are currently used for military operations. The safety of civil manned aircraft is maintained by keeping them out of these "Warning Areas" when they are in use by the military. The FAA has delegated management of the "Warning Areas" to the military. Hence, the designation "Warning Area" may not be used for civil operations. As a result, the "Warning Area" management approach, as described above, has been effective. For the permanent sUAS Arctic civil operations described in the Act, a similar "Warning Area" strategy will be used that will require rulemaking.

While sUAS areas are in use in the permanent Arctic areas, manned aircraft will be advised that UAS operations are in progress and the UAS may not be able to comply with operating rules that require manned aircraft to see and avoid other manned aircraft. When operating in the permanent Arctic areas, requiring manned aircraft to give right-of-way to the unmanned traffic is beyond the scope of existing Federal Aviation Regulations that address aircraft right-of-way. Additional rulemaking or a technical amendment(s) to existing rules may be required. Specific manned operations may be accommodated for operation in the area via an agreed to process consisting of an approved request, authorization and NOTAM. A coordinating body will be required to manage UAS, or both UAS and manned aircraft, access to the permanent Arctic areas to allow for manned operations to be conducted safely. This approach still poses a risk to general aviation aircraft that may be operating in or near the permanent Arctic areas and access corridors. A possible mitigation for this risk is to require all manned and unmanned aircraft to use an Automatic Dependent Surveillance Broadcast (ADS-B) system or other technologies that

enhance see/sense and avoid capabilities. Final configuration of the aircraft and operational rules will be determined by the FAA via a formal safety risk management assessment and rulemaking.

The FAA may designate one or more controlling government agencies to operate in the permanent Arctic areas and/or the corridor routes. Such designations are expected to be made in an agreement between the FAA and the controlling agency.

International Agreements

Resolving international issues will be time consuming and have already been initiated. Once the airspace design, sUAS certification standards, and the operating procedures have been developed, the design, certification standards and procedures will be vetted through ICAO. Approval by ICAO or relevant national or international entities will represent the agreement that is required in the legislation

Operating Requirements

Approval of UAS operations and pilots will challenge current regulations for manned aircraft. Procedures for pilot approval that have previously been developed for use by law enforcement may be applicable to operations conducted in the permanent Arctic areas. These procedures will be examined in conjunction with a review of the existing operational rules for approving commercial operations. The standard approach would be to use FAR PART 135—OPERATING REQUIREMENTS: COMMUTER AND ON DEMAND OPERATIONS. However, this Part is not written with sUAS in mind and many sections may not be applicable. The operational members of the FAA team will conduct a careful review of the operating airmen and certification rules to find the best fit for operations conducted in the permanent Arctic areas.

The FAA will examine existing operational approval methods to determine the most appropriate mechanism to grant these authorizations. Authorizations will be issued by the Alaska Region Flight Standards Organization after international agreements are in place and aircraft are certified.

As required by the legislation, only small UAS (55 lbs. or less in Gross Takeoff Weight) will be approved for operations in the permanent Arctic areas and corridor routes.

During the implementation of this plan, the FAA will develop processes to facilitate the safe operation of unmanned aircraft beyond line of sight, as directed in the Act. However, initial operations will only be permitted within line-of-sight, which will require both a pilot and a visual observer. A phased approach will be necessary to transition from line-of-sight operations to beyond line-of-sight operations. The FAA will review existing airmen certification and medical requirements to determine the appropriate qualifications or rely on sUAS rulemaking to set qualification standards.

Aircraft Certification

Providing airworthiness approval for sUAS will require careful analysis and consideration of which certification rules may be used to expeditiously approve the vehicles. We will review the current processes that have been used or are currently in use to approve sUAS. For example, one existing rule that may be usable to expedite certification efforts is FAR § 21.25 *Issue of type certificate: Restricted category aircraft*. However, use of this rule would be restricted to sUAS that have been “*manufactured in accordance with the requirements of and accepted for use by, an Armed Force of the United States*”.

The FAA will also need to determine a method of production approval that will be required for all type-certificated UAS. One approach to address this would be to use the Light Sport Airplane production approach in which the applicant demonstrates compliance to industry consensus standards. However, this approach is not currently permitted for aircraft that operate commercially. Another approach could be to develop a hybrid production approval scaled to UAS needs which could allow limited commercial operations. The FAA team will examine and choose the best alternative to approve aircraft for operation in the permanent Arctic areas. Regardless of the chosen path, the approval will be strictly limited to operating in the permanent Arctic areas.

Whichever certification standard is selected, all sUAS will be required to demonstrate conformity and conduct operations in accordance with certification design standards while conducting flight operations in the permanent Arctic areas and corridor routes

Safety Considerations

In order to achieve and maintain the highest possible level of safety in the permanent Arctic areas and corridor routes, the FAA will carry out safety studies in compliance with Section 335 of the Act. This means ensuring the safety of any other airspace user as well as the safety of persons and property on the ground. The safety studies will be conducted according to the approved Air Traffic Organization Safety Management System.