

NOTICE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Air Traffic Organization Policy

N JO 7110.495

Effective Date:
January 15, 2009

Cancellation Date:
January 14, 2010

SUBJ: Unmanned Aircraft Operations in the National Airspace System (NAS)

- 1. Purpose of This Notice.** This notice provides information on air traffic policies and prescribes procedures for the planning, coordination, and services involving the operation of unmanned aircraft systems (UAS) in the NAS. These policies and procedures reflect current written directives and regulations.
- 2. Audience.** This notice applies to the following Air Traffic Organization (ATO) service units: En Route and Oceanic, Terminal, System Operations Services, including Flight Services Program Operations, the David J. Hurley Air Traffic Control System Command Center (ATCSCC), and the National Capital Region Coordination Center (NCRCC); the Flight Standards Service's divisions at Federal Aviation Administration (FAA) Washington headquarters and international field offices; the Washington Operations Center Complex (WOCC); the Regional Operations Centers (ROC); the William J. Hughes Technical Center; the Mike Monroney Aeronautical Center; the Department of Homeland Security (DHS), Transportation Security Administration's (TSA) operations offices; Federal Security Directors (FSD); and the Transportation Security Operations Center (TSOC), including non-FAA elements of the NCRCC.
- 3. Where Can I Find This Notice?** The notice is available on the MYFAA employee Web site at https://employees.faa.gov/tools_resources/orders_notices/ and on the air traffic publications Web site at http://www.faa.gov/airports_airtraffic/air_traffic/publications.
- 4. Action.** Unmanned aircraft activities must be provided services in accordance with the policy, criteria, and procedures in this notice and in conjunction with other air traffic publications. When a conflict arises, supervisors must request a clarification from their respective service unit. Procedures/minima, applied jointly or otherwise, require the cooperation or concurrence of more than one facility/organization and must be documented in a letter of agreement. Letters of agreement only supplement this notice. Any minima they specify must not be less than that specified herein unless appropriate military authority has authorized application of reduced separation between military aircraft.
- 5. Certificate of Waiver or Authorization (COA).** This section prescribes the policies, guidance, and procedures on COA applications for UAS operations.
 - a. Application Process. A COA is issued by the ATO to a public operator for a specific unmanned aircraft (UA) activity. After a complete application is submitted, the FAA conducts a comprehensive operational and technical review. If necessary, provisions or limitations may be imposed as part of the approval to ensure the UA can operate safely with other users.

b. Application Submission. Electronic applications should be submitted following the provisions provided on the Web site: http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/aaim/organizations/uas/.

c. Application Information. The FAA must obtain sufficient information necessary to assess the proposed operations under current standards and procedures. Because of the dynamic changes in the development of UA technologies, the applicant is responsible for adequately describing the proposed operations so that an appropriate safety assessment can be conducted by the FAA. For this purpose, the following categories may be required to be addressed in a COA application:

- (1) Organizational and Operational Points of Contact.
- (2) Operational Description (for example, method of navigation, see and avoid).
- (3) Systems Description (for example, airframe, control station, or communications).
- (4) Airframe Performance Characteristics.
- (5) Airworthiness.
- (6) Contingency Procedures (for example, lost command/control link, lost communications, and emergency).
- (7) Avionics Equipment.
- (8) Lighting.
- (9) Frequency Spectrum Analysis.
- (10) Method of Air Traffic Control (ATC) Communications.
- (11) Surveillance Capability (for example, electronic and visual).
- (12) System Monitoring/Recording Capability.
- (13) Flightcrew Qualifications.
- (14) Flight Operations Description (flight plan).
- (15) Special Circumstances.
- (16) Emergency Applications. The FAA must ensure procedures are available to accommodate real-time applications that will directly support emergency and law enforcement-type operations. In no case must UA operations that reduce safety be approved.

(a) An emergency UAS COA may be considered when all of the following conditions apply:

- (i) A situation exists that is defined as a condition of distress or urgency where there is an extreme possibility of loss of life, and
- (ii) Manned flight is not possible due to a hazard or the operation cannot be conducted safely with manned flight, an increased risk to law enforcement officials exists, or manned assets are not available, and
- (iii) The proposed proponent and UAS are operating under a current approved COA.

NOTE-

Requests for UAS COAs that fall outside of these perimeters must be processed through the normal online COA application process.

- (b) Emergency UAS COAs must not be considered for:
 - (i) Demonstration flights.
 - (ii) Flights to test capabilities.
 - (iii) Training.
 - (iv) Flights in Class B airspace.
 - (v) Flights over populated areas.

6. Operations.

a. Types.

- (1) Public.
- (2) Civil.
- (3) Hobbyist.

NOTE-

Currently, FAA policy restricts COA to public operations as defined in title 14, Code of Federal Regulations (14 CFR), Part 1, Definitions and Abbreviations. Civil applicants must apply for a special airworthiness certificate experimental category and hobbyists should follow the guidance contained in Advisory Circular 91-57.

b. Operations. UAS operations should normally be conducted in the following areas:

- (1) Within active restricted areas.
- (2) Within active warning areas.

NOTE-

For those operations that cannot be conducted for private recreational use or contained wholly within active restricted areas or warning areas, the UAS operations must be conducted following procedures outlined in the issued COA.

c. General Procedures. UASs operating outside of restricted areas and warning areas must comply with the following:

(1) At least 60 days before the proposed commencement of UAS operations, the proponent must submit an application for a COA, using the online application system, Obstruction Evaluation/ Airport Airspace Analysis. COA guidance can be found in FAA Order (FAAO) JO 7210.3, Facility Operation and Administration, Part 6, Regulatory Information, Chapter 18, Waivers, Authorizations, and Exemptions.

NOTE-

Approvals for UAS operations should require the proponent to provide the UAS with a method that provides an equivalent level of safety, comparable to see-and-avoid requirements for manned aircraft. Methods to consider include, but are not limited to, radar observations, forward- or side-looking cameras, electronic detection systems, visual observation from one or more ground sites, monitoring by patrol or chase aircraft, or a combination thereof.

(2) COAs must have an effective date with duration not to exceed 1 year unless renewed or revalidated. The COA expires on the stated termination date unless sooner surrendered by the proponent or revoked by the issuing agency.

(3) UAs must be equipped with standard aircraft anticollision lights under criteria stipulated in 14 CFR, section 23.1401. These lights must be operated during all phases of flight to enhance flight safety.

(4) UAs must be equipped with an altitude encoding transponder that meets the specifications of 14 CFR, section 91.215. The transponder must be set to operate on a code assigned by ATC. Unless the use of a specific, special-use code is authorized, the UAS pilot-in-command must have the capability to reset the transponder code while the UA is airborne. If the transponder becomes inoperative, the mission may be canceled or recalled at the discretion of the affected service area or air traffic facility.

(5) Instantaneous two-way radio communications with all affected ATC facilities is required. For limited range, short duration flights, proponents may request relief from radio requirements provided a suitable means of alternate communications is available. Compliance with all ATC clearances is mandatory.

(6) The proponent or its representatives must be responsible at all times for collision avoidance maneuvers with nonparticipating aircraft and the safety of persons or property on the surface.

7. Procedures. UAS operations may occur within Class C, D, or E airspace with an operating airport traffic control tower. Current FAA policy does not allow UAS operations in Class B airspace. Nighttime operations, for all classes of terminal airspace, may be authorized if the proponent requests approval and a safety analysis for such operation are approved by the FAA.

a. Terminal.

(1) Class C airspace is to be used on a case-by-case basis only. UA operators must comply with the following FAA regulations:

- (a) Strict compliance with the provisions of the COA is required.
- (b) Lost link procedures must be clearly defined.
- (c) In the event of lost link, the UA must squawk code 7600.
- (d) Direct two-way radio communications with the UA pilot is required at all times.
- (e) Compliance with ATC instructions for arrivals, departures, and through flight is required.
- (f) Dedicated ground/chase aircraft observers are required for all UA flights.

NOTE-

Pilot may not perform concurrent observer duties.

- (g) Pilots/observers must have an FAA second class airman medical certificate or military equivalent.
- (h) Mixing of manned and unmanned traffic is not authorized.
- (i) Use of visual separation by the UA pilot is not authorized.
- (j) UA pilots and observers must be responsible for only one UA at a time.
- (k) UA operations must not have an adverse impact on manned operations (for example, excessive departure/arrival delays).
- (l) UA operations must not be conducted over populated areas.

- (m) All UA operations must be conducted during daylight hours.
 - (n) Traffic and safety alerts must be issued as appropriate.
 - (o) All operations must be conducted under visual meteorological conditions (VMC).
 - (p) Special visual flight rules (VFR) procedures are not authorized.
 - (q) An operating mode C/S transponder must be used.
- (2) UA operators using Class D airspace must comply with the following FAA regulations:
- (a) Strict compliance with the provisions of the COA is required.
 - (b) Lost link procedures must be clearly defined.
 - (c) In the event of lost link, the UA must squawk code 7600.
 - (d) Direct two-way radio communications with the UA pilot at all times.
 - (e) Compliance with all ATC instructions is required.
 - (f) Dedicated ground/chase aircraft observers are required for all UA flights.

NOTE-

Pilot may not perform concurrent observer duties.

- (g) Pilots/observers must have an FAA second class airman medical certificate or military equivalent.
 - (h) Mixing of manned and unmanned traffic is not authorized.
 - (i) Use of visual separation by the UA pilot is not authorized.
 - (j) UA pilots and observers must be responsible for only one UA at a time.
 - (k) UA operations must not have an adverse impact on manned operations (for example, excessive departure/arrival delays).
 - (l) UA operations must not be conducted over populated areas.
 - (m) All UA operations must be conducted during daylight hours.
 - (n) All UA operations must be conducted under VMC.
 - (o) Special VFR procedures are not authorized.
 - (p) An operating mode C/S transponder must be used.
- (3) UA operators using Classes E and G airspace must comply with the following FAA regulations:
- (a) Strict compliance with the provisions of the COA is required.
 - (b) Lost link procedures must be clearly defined.
 - (c) In the event of lost link, the UA must squawk code 7600.
 - (d) UA operations with an ATC tower require two-way communications.
 - (e) UA operations without a tower require two-way communications with the FAA facility assigned jurisdiction for ATC.
 - (f) Compliance with all ATC instructions is required.

- (g) Dedicated ground/chase aircraft observers are required for all UA flights.

NOTE-

Pilot may not perform concurrent observer duties.

- (h) Pilots/observers must have an FAA second class airman medical certificate or military equivalent.
- (i) Mixing of manned and unmanned traffic is not authorized.
- (j) In the airport traffic pattern, the use of visual separation by the UA pilot is not authorized.
- (k) UA pilots and observers must be responsible for only one UA at a time.
- (l) UA operations must not have an adverse impact on manned operations (for example, excessive departure/arrival delays).
- (m) UA operations must not be conducted over populated areas.
- (n) All UA operations must be conducted during daylight hours.
- (o) Traffic and safety alerts must be issued as appropriate.
- (p) All operations must be conducted under VMC.
- (q) An operating mode C/S transponder must be used.

b. En Route/Terminal Radar Approach Control (TRACON). UA flights in en route and TRACON airspace must be divided into two segments.

- (1) Flight below flight level (FL) 180, including Classes E and G airspace without a control tower:
 - (a) Strict compliance with the provisions of the COA is required.
 - (b) Lost link procedures must be clearly defined.
 - (c) In the event of lost link, the UA must squawk code 7600.
 - (d) Direct two-way communications with the UA pilot at all times.
 - (e) Compliance with all ATC instructions is required.
 - (f) Observers are required. Depending on the altitude of the UA operation, ground observers may be used.
 - (g) Chase aircraft acting as observers may be required.
 - (h) A dedicated chase pilot is required when specified.
 - (i) A dedicated observer is required when specified.

NOTE-

Pilot may not perform concurrent observer duties.

- (j) Pilots/observers must have an FAA second class airman medical certificate or military equivalent.
- (k) In the airport traffic pattern, the use of visual separation by the UA pilot is not authorized.

- (l) UA operations must not be conducted over populated areas.
 - (m) If installed, lights must be operational; night operations must have operational lights including, at a minimum, beacon and navigation lights.
 - (n) Traffic and safety alerts must be issued as appropriate.
 - (o) All operations must be conducted under VMC, regardless of flight rules filed for the operation (for example, instrument flight rules (IFR) or VFR).
 - (p) If operating IFR, a flight plan must be filed and followed once clearance is received.
 - (q) Operating mode C/S transponder unless exempted by 14 CFR, section 91.215.
 - (r) Only one UA in operation at a time.
 - (s) Operations in a military operations area require approval from the using agency.
- (2) Flight above FL 180 to FL 600, Class A airspace:
- (a) The UA pilot must have direct two-way communications with ATC.
 - (b) Pilots/observers must have an FAA second class airman medical certificate or military equivalent.
 - (c) Standard IFR separation will be applied unless noted in the COA.
 - (d) UA operations must not have an adverse impact on manned operations (for example: excessive departure/arrival delays).
 - (e) UA operations must not be conducted over populated areas.
 - (f) Traffic and safety alerts must be issued as appropriate.
 - (g) All operations will be conducted on an IFR flight plan.
 - (h) An operating mode C/S transponder must be used.
 - (i) The UA must operate below or above Reduced Vertical Separation Minimum (RVSM) altitudes unless it is RVSM-certified.
 - (j) UA operations are not authorized in RVSM airspace unless compliant.
 - (k) Descent below FL180 in Classes D, E, or G airspace without visual observers is not authorized.
 - (l) The pilot's qualifications for manned IFR flight must be current.
 - (m) Whenever possible, the UA must enter Class A airspace from active restricted airspace. If restricted airspace is not available, a chase aircraft, with a dedicated observer, must be used until the UA has reached FL 180.

NOTE-

In all classes of airspace, a COA is required for UA flights outside of active restricted or warning areas. The COA will contain additional requirements and compliance is mandatory.

c. Military Operations Interface Offices. If military operations or facilities are involved, prior coordination by the following appropriate headquarters is required for subsequent interface with FAA. (See TBL 1-1-3.)

TBL 1-1-3
Military Operations Interface Offices

Branch	Address
U.S. Navy	Department of the Navy Chief of Naval Operations N885F5 2000 Navy Pentagon Washington, DC 20350-2000
U.S. Air Force	HQ AFFSA/A3A 7919 Mid America Blvd, Suite 300 Oklahoma City, OK 73135
U.S. Army	Commander, USAASA (DAMO-AV-A) 9325 Gunston Road, Suite N319 Fort Belvoir, VA 22060-5582

8. Distribution. This notice is distributed to the following ATO service units: En Route and Oceanic, Terminal, Safety, System Operations Services, including Flight Services Program Operations, the David J. Hurley ATCSCC, and the NCRCC; the Flight Standards Service’s divisions at FAA Washington headquarters and international field offices; the WOCC; the ROC; the William J. Hughes Technical Center; the Mike Monroney Aeronautical Center; the DHS, TSA’s operations offices; FSDs; and the TSOC, including non-FAA elements of the NCRCC, and international aviation field offices, Department of Defense offices, selected Federal and State offices, and the interested aviation public.

9. Background. During the past few years, UA technology has been developing rapidly, driving a profound increase in requested operations in the NAS. Traditionally, UA operations have been conducted by the DOD or other Government agencies within restricted and warning areas. In recent years, the combined increases in requests by Government agencies has tripled and forecasts confirm that increase for the next 4 years. This notice incorporates information from other publications and serves as an ATO compilation of topics relating to unmanned aircraft. In many cases, the information contained in this order is complimented by guidance and directives from the Unmanned Aircraft Program Office under Aviation Safety and other regulations.

10. Definitions.

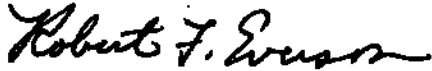
- a. **Airworthiness** – the condition in which the UAS conforms to its type certification (or military equivalent) and is in condition for safe operation.
- b. **Altitude** –
 - (1) Mean Sea Level unless otherwise specified; or
 - (2) Flight Level when followed by “FL;” or
 - (3) Above Ground Level when followed by “AGL.”
- c. **ATC communications** – the voice or data relay of instructions or information between the UAS pilot and the air traffic controller and other NAS users, normally conducted by radio.
- d. **Autonomous** – not controlled by others or by outside forces; independent judgment.
- e. **Autonomy** – the quality of being autonomous; self-determination.
- f. **Catastrophic** – the loss of the UA, other aircraft, or loss of life.

- g. **Certificate of Waiver or Authorization (COA)** – an FAA grant for a specific UA operation.
- h. **Command/control link** – the systems supporting the exchange of information between the ground control station and the airframe of the flight control systems.
- i. **Communication link** – the systems supporting the communications between the pilot and ATC, other aircraft, observers, or NAS users.
- j. **Direct visual control** – the means by which the UA is controlled and the pilot/observer exercises see and avoid responsibilities.
- k. **Equivalent level of safety** – an evaluation of a system or operation to determine the acceptable risk to people and property.
- l. **Ground control station** – the location and equipment used by a pilot.
- m. **Latency** - the time incurred between two particular interfaces (for example, data link/communications).
- n. **Lost link** – loss of command and control link between control station and aircraft. There are two types of link.
 - (1) Up link – transmits command instructions to the aircraft, and
 - (2) Down link – transmits the status of the aircraft and provides situational awareness to the pilot.
- o. **Observer** – ground-based personnel or observers within a chase aircraft.
- p. **Public aircraft** – aircraft operations that are inherently governmental as defined in FAR Subchapter A Definitions, Part 1.
- q. **Unmanned aircraft (UA)** – an aircraft operated without the possibility of direct human intervention from within or on the aircraft.
- r. **Unmanned aircraft system (UAS)** – airframe, ground control station, command and control links, and crewmembers.
- s. **Word usage:**
 - (1) *May* (need not followed by a verb) – procedure is optional.
 - (2) *Must* (followed by a verb or the use of an appropriate action verb in the imperative sense) – procedure is mandatory.
 - (3) *Should* (followed by a verb) – procedure is recommended.
 - (4) *Will* (followed by a verb) – indicates futurity; not a requirement for application of a procedure.
 - (5) Words importing the singular include the plural.
 - (6) Words importing the plural include the singular.

11. Related Publications.

- a. Title 14. Code of Federal Regulations, part 91
- b. FAAO JO 7110.65, Air Traffic Control
- c. FAAO JO 7210.3V, Facility Operation and Administration

- d. FAAO JO 7610.4, Special Operations
- e. Obstruction Evaluation/Airport Airspace Analysis, COA online
- f. RTCA Special Committee SC-203
- g. Unmanned Aircraft Program Office Operational Interim Approval Guidance 08-01



for Nancy B. Kalinowski
Vice President, System Operations Services
Air Traffic Organization

12-29-08
Date Signed