

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

CERTIFICATE OF WAIVER OR AUTHORIZATION

ISSUED TO

Department of the Navy

ADDRESS

USN PEO Strike Weapons and Unmanned Aviation
RADM William A. Moffett Building
47123 Buse Road, Bldg 2272
Patuxent River, Maryland 20670

This certificate is issued for the operations specifically described hereinafter. No person shall conduct any operation pursuant to the authority of this certificate except in accordance with the standard and special provisions contained in this certificate, and such other requirements of the Federal Aviation Regulations not specifically waived by this certificate.

OPERATIONS AUTHORIZED

Operation of the Global Hawk UAS in Class A and oceanic airspace under the jurisdiction of Washington Air Route Traffic Control Center (ARTCC), Jacksonville ARTCC, Houston ARTCC, Albuquerque ARTCC, and Los Angeles ARTCC to transit between (b) (3) and (b) (3)

The planned route of flight at (b) (3) avoids over flight of populated areas and heavily trafficked airways and will occur at an altitude from (b) (3)
See Special Provisions.

LIST OF WAIVED REGULATIONS BY SECTION AND TITLE

STANDARD PROVISIONS

1. A copy of the application made for this certificate shall be attached and become a part hereof.
2. This certificate shall be presented for inspection upon the request of any authorized representative of the Federal Aviation Administration, or of any State or municipal official charged with the duty of enforcing local laws or regulations.
3. The holder of this certificate shall be responsible for the strict observance of the terms and provisions contained herein.
4. This certificate is nontransferable.

Note-This certificate constitutes a waiver of those Federal rules or regulations specifically referred to above. It does not constitute a waiver of any State law or local ordinance.

SPECIAL PROVISIONS

Special Provisions are set forth and attached.

This certificate 2008-ESA-20 is effective from May 27, 2008, through May 26, 2009, and is subject to cancellation at any time upon notice by the Administrator or his/her authorized representative.

BY DIRECTION OF THE ADMINISTRATOR

(b) (6)

FAA Headquarters, AJR-36

(Region)

Ardyth Williams

(Signature)

May 22, 2008

(Date)

Air Traffic Manager, Unmanned Aircraft Systems

(Title)

ATTACHMENT to FAA FORM 7711-1

ISSUED TO: Department of the Navy

ADDRESS: USN PEO Strike Weapons and Unmanned Aviation
RADM William A. Moffett Building
47123 Buse Road, Bldg 2272
Patuxent River, Maryland 20670

NAME: Federal Aviation Administration (FAA) Certificate of Authorization (COA) for Global Hawk Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) outside of restricted/warning area airspace.

ACTIVITY: Operation of the Global Hawk UAS in Class A and oceanic airspace under the jurisdiction of Washington Air Route Traffic Control Center (ARTCC), Jacksonville ARTCC, Houston ARTCC, Albuquerque ARTCC, and Los Angeles ARTCC to transit between (b) (3)

he planned route of flight at (b) (3)
avoids over flight of populated areas and heavily trafficked airways (b) (3)

PURPOSE: To prescribe operating requirements in the NAS (outside of restricted and/or warning area airspace) for the purpose of transit flights.

DATES OF USE: This COA (2008-ESA-20) is valid from May 27, 2008 through May 26, 2009. Should a renewal become necessary, the proponent shall advise the FAA, in writing, no later than 60 days prior to the requested effective date.

GENERAL PROVISIONS:

- The review of this activity is based on our current understanding of the UAS operations, and the impact of such operations in the NAS, and therefore should not be considered a precedent for future operations. As changes occur in the UAS industry, or in our understanding of it, there may be changes to the limitations and conditions for similar operations.
- All personnel connected with the UAS operation must comply with the contents of this authorization and its special provisions.
- This COA will be reviewed and amended as necessary to conform to changing UAS policy and guidance.

SAFETY PROVISIONS:

Unmanned aircraft (UA) have no on-board pilot to perform see-and-avoid responsibilities, and therefore, when operating outside of restricted/warning/Class A airspace areas, special provisions must be made to ensure an equivalent level of safety

exists for operations had a pilot been on board. In accordance with 14 CFR Part 91, General Operating and Flight Rules, Subpart J-Waivers, 91.903, Policy and Procedures, the following provisions provide acceptable mitigation of 14 CFR Part 91.113 and must be complied with:

- Visual Observers, either ground-based or airborne, must be used.
- The applicant and/or its representatives are responsible for collision avoidance with all aircraft, other aviation operations, and the safety of persons or property on the surface.

AIRWORTHINESS CERTIFICATION PROVISIONS:

- UA must be shown to be airworthy to conduct flight operations in the NAS.
- Public Use Aircraft applications must contain one of the following:
 - A civil airworthiness certification from the FAA, or
 - A statement specifying that the Department of Defense Handbook "Airworthiness Certification Criteria" (MIL-HDBK-516), as amended, was used to certify the aircraft or equivalent method of certification.

PILOT / OBSERVER PROVISIONS:

- **Pilot Qualifications:** UA pilots interacting with Air Traffic Control (ATC) shall have sufficient expertise to perform that task readily. Pilots must have an understanding of and comply with Federal Aviation Regulations and Military Regulations applicable to the airspace where the UAS will operate. Pilots must have in their possession a current second class (or higher) airman medical certificate that has been issued under 14 CFR 67, Medical Standards and Certification, or a military equivalent. 14 CFR 91.17, Alcohol or Drugs, applies to UA pilots.
- **Observer Qualifications:** Observers must have been provided with sufficient training to communicate clearly to the pilot any turning instructions required to stay clear of conflicting traffic. Observers will receive training on rules and responsibilities described in 14 CFR 91.111, *Operating Near Other Aircraft*, and 14 CFR 91.113, *Right-of-Way Rules*. Observers must have in their possession a current second class (or higher) airman medical certificate that has been issued under 14 CFR 67, Medical Standards and Certification, or a military equivalent. 14 CFR 91.17, Alcohol or Drugs, applies to UA observers.
- **Pilot-in-Command (PIC) – Visual Flight Rules (VFR):**
 - The PIC is the person directly responsible for the operation of the UA. The responsibility and authority of the pilot in command as described by 14 CFR 91.3 (or military equivalent), applies to the UAS PIC.

- The PIC must pass the required knowledge test for a private pilot certificate, or military equivalent, as stated in 14 CFR 61.105, and must keep their aeronautical knowledge up to date.
- There is no intent to suggest that there is any requirement for the UAS PIC to be qualified as a crewmember of a manned aircraft.
- **Pilot-in-Command (PIC) – Instrument Flight Rules (IFR):**
 - The PIC is the person directly responsible for the operation of the UA. The responsibility and authority of the pilot in command as described by 14 CFR 91.3 (or military equivalent), applies to the UAS PIC.
 - The PIC must be a certified pilot of manned aircraft (FAA or military equivalent) in category and class of aircraft flown.
 - The PIC must also have an appropriate instrument rating (manned aircraft, FAA or military equivalent) for the category and class of aircraft flown.

Pilot Proficiency – VFR/IFR:

- Pilots will not act as a VFR/ IFR PIC unless they have had three qualified proficiency events within the preceding 90 days.
 - The term “qualified proficiency event” is a UAS-specific term necessary due to the diversity of UAS types and control systems.
 - A qualified proficiency event is an event requiring the pilot to exercise the training and skills unique to the UAS in which proficiency is maintained.
- Pilots will not act as an IFR PIC unless they have had six instrument qualifying events in the preceding six calendar months (an event that requires the PIC to exercise instrument flight skills unique to the UAS).
- Pilots flying UA on other than instrument flight plans must pass the required knowledge test for a private pilot certificate, or military equivalent, as stated in 14 CFR 61.105.

Flight Above 18,000 Feet MSL to FL600 Outside Active Restricted and/or Warning Areas

- UA operations in Reduced Vertical Separation Minimum (RVSM) airspace must comply with 14 CFR 91.180, *Operations Within Airspace designated as RVSM*.
- The aircraft must file / operate on an instrument flight plan.
- The pilot must obtain and follow air traffic control (ATC) clearances.
- Flight must be radar monitored throughout the portion of the flight above 18,000 feet MSL.
- The aircraft must be equipped with an operating mode C transponder (mode S preferred).
- The pilot must maintain two-way radio communication with ATC.
- Flight in FAA-controlled oceanic airspace is approved based upon the previous requirements.

PIC Responsibilities:

- Pilots are responsible for a thorough preflight inspection of the UAS. Flight operations will not be undertaken unless the UAS is airworthy. The airworthiness provisions of 14 CFR 91.7, Civil Aircraft Airworthiness, or the military equivalent, apply.
- One PIC must be designated at all times and is responsible for the safety of the UA and persons and property along the UA flight path.
- The UAS pilot will be held accountable for controlling their aircraft to the same standards as the pilot of a manned aircraft. The provisions of 14 CFR 91.13, *Careless and Reckless Operation*, apply to UAS pilots.

Pilot/ATC Instructions: The PIC will maintain direct two-way communications with ATC and have the ability to maneuver the UA per their instructions as applicable.

SPECIAL PROVISIONS:

The FAA recognizes that, by nature, UAS have no on-board pilot to perform see-and-avoid responsibilities. Therefore, when operating outside of restricted airspace, special provisions must be made to ensure an equivalent level of safety exists for operations had a pilot been on board. Listed below are the special provisions that must be complied with. All personnel connected with this UAS operation shall comply with the contents of this authorization and its special provisions.

1. The UAS transponder and position/navigation/anti-collision strobe lights shall be activated at all times during flight.
2. Global Hawk flight operations within (b) (3)
Class D airspace areas are allowed only when the appropriate tower is operating and the Class D is active.
3. Manned and unmanned operations shall be de-conflicted to the maximum extent possible while within Class D airspace.
4. The planned route of flight must be designed to avoid over flight of populated areas and heavily trafficked airways. Additionally, departure and arrival operations shall not be operated over populated areas, heavily trafficked roads or an open-air assembly of people.
5. The USN and/or its representatives are responsible at all times for collision avoidance with non-participating aircraft and the safety of persons or property on the surface with respect to the UAS.
6. A NOTAM shall be published through (b) (3)
no more than 72 hours nor less than 6 hours prior to flight describing the location, times, and altitudes associated with the departure and arrival phases of each Global Hawk flight below FL180.

7. Airspace coordination with all affected ATC facilities must occur no later than 3 days prior to operations. E-mail to the appropriate ATC facilities' primary and alternate points of contact is preferred.
8. All flight plans associated with Global Hawk shall be filed at least 2 hours prior to departure.
9. East Coast Departure/Arrival Notification and Operations.
 - a) Departure and arrival operations in the (b) (3) areas of responsibility will be in accordance with the provisions contained in the current Letter of Agreement (LOA). The LOA may be more restrictive based on ATC requirements, but cannot be less restrictive than the contents of this Certificate.
 - b) Under normal conditions, the Global Hawk will use R(b) (3) to reach FL500 before transitioning to the Atlantic warning areas.
 - 1) During high-wind conditions at altitude, Washington ARTCC may, traffic permitting, approve transitions at lower altitudes, but no lower than FL300. This also applies to transitions from the warning areas to R(b) (3)
 - 2) Global Hawk spill-outs during high-wind conditions will be handled as point-outs from (b) (3) to Washington ARTCC.
10. Enroute operations will be in accordance with flight-planned information as depicted in Attachment 1, Figures 1 through 4. The proponent shall ensure all flight operations, excluding departure and arrival operations, are conducted at or above FL510, unless previously coordinated with ATC (above FL550 in (b) (3) ARTCC airspace).
11. West Coast Departure/Arrival Notification and Operations.
 - a) The USN is responsible for scheduling all the appropriate airspace required through "Plead" scheduling office and FACSFA (b) (3) scheduling office, as required, prior to planned operations.
 - b) Radar Approach Control Facility (RATCF) (b) (3) shall be notified 90 minutes prior to scheduled launch and recovery.
 - c) To begin the arrival phase at (b) (3) the Global Hawk will reach Waypoint 68 (b) (3) at an altitude of FL510-FL600. Unless otherwise authorized by ATC, the Global Hawk will then:

- 1) Proceed at altitude (FL510 to FL600) to Waypoint 69 (b) (3) which is within the confines of W-289,
- 2) Spiral down to approximately 14,400 feet MSL at Waypoint 81 (b) (3)
- 3) Proceed inbound descending below 12,000 feet MSL by 25 DME,
- 4) Descend to 8,000 feet MSL by 10 DME,
- 5) Execute the approach to land on Runway 03 at (b) (3)

NOTE: W-289 abuts R-2519 and the (b) (3) Class D airspace area. Therefore, all arrival operations through to landing will occur in Class A, active warning, active restricted, and non-joint use Class D airspace.

- d) In the event of a missed approach, the PIC will immediately advise ATC and execute the established missed approach procedure.
- e) For departures from (b) (3) returning to (b) (3) unless otherwise authorized by ATC, the Global Hawk will depart on Runway 21, depart the (b) (3) Class D and (b) (3) enter W-289, and navigate toward Point 5 (b) (3). Upon take-off, the Global Hawk will climb and maintain 8,000 feet MSL until 10 DME, then resume climb to 12,000 feet MSL until 25 DME, then continue to approximately FL 270 at Point 5. The aircraft will then climb to an altitude at or above FL 510, then depart W-289 and proceed to Point 1200 (b) (3) also known as Waypoint 68 on the ferry mission routing. Once reaching Waypoint 68, the Global Hawk will follow the reverse routing depicted in Attachment 1, Figures 1-4.

12. UAS Emergencies/Contingency Modes:

- a) (b) (3) must notify the appropriate controlling agency in the event of any emergency with the Global Hawk UAS.
- b) Global Hawk has three primary contingency modes: C-1 (lost data link connectivity and/or communications), C-2 (loss of redundancy), and C-3 (total electrical or engine power loss requiring emergency landing).
 - 1) During a C-1 contingency squawking 7600, Global Hawk will return to (b) (3) if the Global Hawk is at, or east of, Waypoint 43 on the flight plan (Attachment 1). The Global Hawk will continue to (b) (3) if C-1 occurs west of Waypoint 43. The ATC facility communicating and controlling Global Hawk will initiate proper coordination immediately upon receiving initial notification of any C-1 category system malfunction.
 - 2) During a C-2 RTB contingency (loss of sub-system redundancy, land as soon as possible, squawking normal), Global Hawk will return to (b) (3) if the Global Hawk is at, or east of, Waypoint 43 on the flight plan (Attachment 1). The Global Hawk will continue to (b) (3) if C-2 occurs west of Waypoint 43 unless

otherwise coordinated. The PIC will initiate proper coordination with ATC immediately upon receiving initial notification of any C-2 category system malfunction.

- 3) If a C-3 contingency mode exists (catastrophic emergency), the PIC of the Global Hawk may request an emergency divert depending on the distance the Global Hawk is from the divert location (See Note 1).

NOTE 1: The Global Hawk must be within (b) (3) before an attempt can be made.

13. Divert Airfield/Controlled Ditching Point Requirements

- a) (b) (3) must have signed agreements between themselves and the affected air traffic facility allowing the divert operation to occur.
- b) The divert airfields and ditching points must conform to the following guidelines:

- 1) The (b) (3)

over

land portions of the route.

- 2) Divert fields must be non-public use airports, preferably in restricted airspace.
- 3) The divert airfields/ditch points will be located in unpopulated areas where the potential for injury of persons and property is highly unlikely.
- 4) The divert airfields/ditch points will be selected so as to pose minimum possible risk of collision with another aircraft.

NOTAM: A distance (D) Notice to Airman shall be issued when UA operations are being conducted. Contact the Automated Flight Service Station not more than 72 hours in advance, but not less than 48 hours prior to the operation and provide:

- Name and Address of the Using Facility
- Location, Altitude or the operating Area
- Time and nature of the activity

NOTE FOR PROPONENTS FILING THEIR NOTAM WITH DoD ONLY: This requirement to file with the AFSS is in addition to any local procedures/requirements for filing through DINS. The FAA Unmanned Aircraft Systems Office is working with the AFSS, and to eliminate the requirement to file a NOTAM with both the AFSS and DINS in the near future.

INCIDENT / ACCIDENT REPORTING: The following information is required to document unusual occurrences associated with UAS activities in the NAS.

- The proponent for the COA shall provide the following information to (b) (6) on a monthly/annual basis:
 - Number of flights conducted under this COA.
 - Pilot duty time per flight.
 - Unusual equipment malfunctions (hardware/software).
 - Deviations from ATC instructions.
 - Operational/coordination issues.
 - All periods of Loss of Communications.
- The following shall be submitted to (b) (6) within 24 hours:
 - Deviations from the “Special Provisions” contained in the COA.
 - All periods of Loss Link, including duration.
 - All incidents involving the UAS as defined in 49 CFR 830.
 - All accidents involving the UAS as defined in 49 CFR 830.

This COA does not, in itself, waive any Federal Aviation Regulation (FAR) nor any state law or local ordinance. Should the proposed operation conflict with any state law or local ordinance, or require permission of local authorities or property owners, it is the responsibility of the Department of the Navy to resolve the matter. This COA does not authorize flight within Special Use Airspace without approval from the Using Agency. The Department of the Navy is hereby authorized to operate the Global Hawk UAS in the operations area depicted in “Activity” above and at Attachments 1 and 2 below.

Attachments:

1. Global Hawk Ferry Route of Flight Charts (Figures 1-4)
2. West Coast Operations: (b) (3) Departure Chart

(b) (3)

(b) (3)

(b) (3)

(b) (3)

ATTACHMENT 2

(b) (3)