

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

CERTIFICATE OF WAIVER OR AUTHORIZATION

ISSUED TO

Department of the Navy

ADDRESS

Program Executive Officer
Strike Weapons and Unmanned Aviation
47123 Buse Road, Building 2272
Patuxent River, MD 20670-1547
(b) (6)

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

See Attached 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.

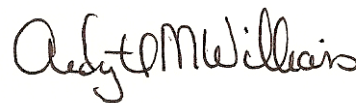
Note-This certificate constitutes a waiver of those Federal rules or regulations specifically referred to above. It does not constitute a waiver of any State law or local ordinance.

SPECIAL PROVISIONS

Special Provisions are set forth and attached.

This certificate is effective from August 6, 2010, through August 5, 2011, and is subject to cancellation at any time upon notice by the Administrator or his/her authorized representative.

By Direction of the Administrator



FAA Headquarters, AJR-36
(Region)

Ardyth Williams
(Signature)

August 6, 2010
(Date)

Air Traffic Manager, Unmanned Aircraft Systems
(Title)

ATTACHMENT to FAA FORM 7711-1

ISSUED TO: Department of the Navy
Program Executive Officer
Strike Weapons and Unmanned Aviation
47123 Buse Road, Building 2272
Patuxent River, MD 20670-1547
(b) (6)

NAME: Certificate of Authorization (COA) for the USN Global Hawk Unmanned Aircraft System (UAS)

ACTIVITY: Operation of the USN Global Hawk UAS within:

- Class A airspace directly to/from Warning Areas (b) (3) at or above FL500.
- Over-water Class A and oceanic airspace delegated to FAA control from FL510 to FL600 with the following boundaries: the U.S. coastline (west) to the outer Contiguous U.S. ADIZ (east), to the Canadian ADIZ (north), to W-465, inclusive, (south). Any flights outside of the eastern boundary will require prior approval by the affected FAA facility(s).
- Overland Class A airspace across the panhandle of Florida (b) (3)
- Over-water Class A and oceanic airspace delegated to FAA control from FL510 to FL600 in the Gulf of Mexico. Any flights outside FAA control (south) will require prior approval by the affected FAA facility(s).
- A signed Letter of Agreement (LOA) between (b) (3)

and affected air traffic control facilities must be in effect prior to operations approved under this COA. The LOA may be more restrictive based on ATC requirements, but cannot be less restrictive than the contents of this Certificate.

- Flight profiles in other areas will require additional COAs.

PURPOSE: To prescribe UAS operating requirements in the National Airspace System (outside of restricted and/or warning area airspace) for the purpose of training and/or operational flights.

DATES OF USE: This COA (2008-ESA-33) is valid from August 6, 2010, through August 5, 2011. 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 read and comply with the contents of this authorization and its special provisions.
- This COA will be reviewed and amended as necessary to conform to changing Unmanned Aircraft Systems (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 active 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 below Class A airspace.
- UAS pilots will ensure there is a safe operating distance between manned and unmanned aircraft at all times in accordance with 14 CFR Part 91.111, *Operating Near Other Aircraft*, and 14 CFR Part 91.113, *Right-of-Way Rules*. Additionally, UAS operations are advised to operate well clear of all known manned aircraft operations.
- Sterile cockpit procedures must be observed during critical phases of flight.
- 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.

- The holder of the COA, or delegated representative, is responsible for cancelling or halting activity in the operations area if, at any time, the safety of persons or property on the ground or in the air is in jeopardy or if there is a failure to comply with the terms or conditions of this COA.

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.
 - The Department of the Navy has made its own determination on the Airworthiness and safety of the Global Hawk UAS. The Global Hawk must be operated in strict compliance with all provisions and conditions contained in the Airworthiness Release, including all appendices.

PILOT / OBSERVER PROVISIONS:

- **Pilot Qualifications:** UA pilots interacting with 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 Part 67, *Medical Standards and Certification*, or a military equivalent. 14 CFR Part 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 Part 91.111, *Operating Near Other Aircraft*, and 14 CFR Part 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 Part 67, *Medical Standards and Certification*, or a military equivalent. 14 CFR Part 91.17, *Alcohol or Drugs*, applies to UA observers.

- **Training:** All crewmembers, including PIC and visual observers, must receive training under the direct supervision of a qualified instructor.
- **Pilot-in-Command (PIC) – Visual Flight Rules:**
 - 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 Part 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 Part 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:**
 - 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 Part 91.3 (or military equivalent), applies to the UAS PIC.
 - The PIC must be a certified pilot of manned aircraft (Federal Aviation Administration (FAA) or military equivalent) in category or aircraft flown.
 - The PIC must also have a current/appropriate instrument rating (manned aircraft, Federal Aviation Administration (FAA) or military equivalent) for the category of aircraft flown.

Pilot Proficiency – Visual / Instrument Flight Rules (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).

Flight Above 18,000 Feet MSL, to and including Flight Level (FL) 600 outside Active Restricted, Warning Areas

- UA operations in airspace designated as Reduced Vertical Separation Minimum (RVSM) airspace must comply with 14 CFR Part 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 (HF may be required).
- Communication relay through the UA is preferred.
- 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 Part 91.7, *Civil Aircraft Airworthiness*, or the military equivalent, apply.
- The PIC must conduct a pre-takeoff briefing which includes, but is not limited to, the contents of the COA, the maximum altitude to be flown, initial heading, frequencies, lost link procedures, parameters for the use of a ditch point, hazards unique to the flight being flown, emergency landing procedures on takeoff and landing, and the amount of fuel including a reserve on the UA.
- 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 standard as the pilot of a manned aircraft. The provisions of 14 CFR Part 91.13, *Careless and Reckless Operation*, apply to UAS pilots.

Pilot/ATC Instructions: The PIC will maintain direct two-way radio communications with Air Traffic Control and have the ability to maneuver the UAS 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. Operations shall not be operated over populated areas, heavily trafficked roads, or an open-air assembly of people.
3. The use of cell phones or other telephonic communication is restricted to the operational control of the UA and any required communication/coordination with ATC. Cell phones or other telephonic communication shall not be used as the primary communication with ATC in lieu of direct two-way radio contact.
4. A NOTAM shall be published through (b) (3) Air Operations no more than 72 hours or 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.
5. All operations shall be conducted in accordance with the provisions contained in signed Letter(s) of Agreement (LOA). The LOA(s) must include specific responsibilities and/or procedures to ensure a smooth operation. Examples include, but are not limited to, the following:
 - Flight planning, airspace scheduling and activation, and pre-launch notification procedures.
 - The coordination process/procedures between the proponent and (1) the appropriate ARTCC military operations specialists (or designated representative), (2) (b) (3)

- and (3) Using Agencies of Special Use Airspace and Air Traffic Control Assigned Airspace (ATCAAs).
 - Departure and arrival routes and other procedures to gain access to the over-water operating areas. The approved routes are at Attachment 1.
 - All known flight profile descriptions with accompanying route of flight charts. The charts depicting the (b) (3) are at Attachments 2, 3, and 4, respectively.
 - The “local flying area” includes the (b) (3) restricted areas, the departure and arrival routes (Atch 1), and (b) (3)
 - Any special provisions based on Air Traffic control requirements, as required.
6. Air Traffic Control Assigned Airspace (ATCAAs) will be established and defined in the LOA and will be in accordance with, and a subset to, the airspace described in the paragraph “Activity” above. The ATCAAs are depicted in Attachment 5. The ATCAAs will be in ZDC, ZNY, and ZBW airspace. GH missions in ZJX, ZMA, and ZHU airspace will use flight plan routing. The communications plan for the ATCAAs will also be delineated in the LOA.
- The ATCAAs will be used for GH missions using the “Northern Route.”
 - Flights on the “Southern Route” will use a combination of ATCAA airspace and flight-planned routing. Flight plan routing will be used once the GH reaches ZJX airspace. The ATCAAs end on the demarcation line between ZDC and ZJX.
 - The “Gulf of Mexico Route” will be an extension of the “Southern Route.” The GH will have the option to fly overland across Florida between the Atlantic Ocean and the Gulf of Mexico. (b) (3) will be used as a ditching point in case of a catastrophic failure. Additionally, the GH will have the option of flying over water, around Florida, to gain access to the Gulf of Mexico.
7. The proponent shall ensure all flight operations, excluding departure and arrival maneuvers, are conducted at or above FL510, unless previously coordinated. Under normal conditions, the Global Hawk will use (b) (3) to reach FL500 before transitioning to the warning areas. However, if weather conditions dictate (i.e., 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 (b) (3).

8. 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.
9. UAS Emergencies/contingency modes:
 - Global Hawk has three primary contingency modes: C-1 Lost data link/communications, C-2 Return to base, and C-3 Emergency landing.
 - During C-1 contingency squawk ^{(b) (3)}, or a C-2 return to base contingency (squawking normal) Global Hawk will return to ^{(b) (3)}. The ATC facility having communications and control with Global Hawk will initiate the proper coordination immediately upon receiving notification of any C-1/2 category system malfunction.
 - If a C-3 contingency mode exists, Global Hawk will squawk ^{(b) (3)} and make an emergency landing.
 - ^{(b) (3)} (see Attachment 1). If Global Hawk is operating west of the ^{(b) (3)} the aircraft will return to ^{(b) (3)} for landing. If Global Hawk is over or east of the ^{(b) (3)}, Global Hawk shall proceed to ^{(b) (3)}
 - ^{(b) (3)}. If Global Hawk is operating at or west of the ^{(b) (3)} (see Attachment 1), the aircraft will return to NHK for landing maintaining FL 500 to the maximum extent possible, going no lower than FL 410 before ^{(b) (3)}. If Global Hawk is east of ^{(b) (3)} ^{(b) (3)} Global Hawk shall proceed to ^{(b) (3)} for landing.
 - Any other potential divert bases must be evaluated and approved by HQ FAA and must be attached to this Certificate.
10. Lost link procedures will be contained in the Letter of Agreement, as required.

INCIDENT / ACCIDENT REPORTING: The following information is required to document unusual occurrences associated with Unmanned Aircraft Systems activities in the National Air Space System.

- The proponent for the COA shall provide the following information to ^{(b) (6)} as soon as possible and no later than 7 days from the conclusion of the mission or expiration of this COA:
 - 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 USN to resolve the matter. This COA does not authorize flight within Special Use Airspace without approval from the Using Agency. The USN is hereby authorized to operate UAS in the Operations Area described in the “Activity” section of this attachment, subject to the appropriate Letter of Agreement.

Attachment 1:	(b) (3)	(2 Charts)
Attachment 2:	(b) (3)	(2 Charts)
Attachment 3:	(b) (3)	(2 Charts)
Attachment 4:	(b) (3)	(2 Charts)
Attachment 5:	(b) (3)	(2 Charts)

(b) (3)

(b) (3)

(b) (3)

(b) (3)

(b) (3)

(b) (3)

(b) (3)

(b) (3)

(b) (3)

(b) (3)