

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

CERTIFICATE OF WAIVER OR AUTHORIZATION

ISSUED TO

United States Special Operations Command

ADDRESS

100 Bartley Street
Suite 110S
Hurlburt Field, Florida 32544

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 Raven UAS in Class G airspace at or below 700 feet MSL in Operations Area A and at or below 1000 feet MSL in Operations Area B as depicted in Attachment 1. Operations will be under the jurisdiction of Norfolk ATCT and Oceana NAS (NTU). 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, 2011-ESA-19-COA, is effective from October 3, 2011 through October 2, 2012 and is subject to cancellation at any time upon notice by the Administrator or his/her authorized representative.

BY DIRECTION OF THE ADMINISTRATOR



for

FAA Headquarters
(Region)

Dean E. Fulmer
(Signature)

September 15, 2011
(Date)

Acting Manager, ATO, UAS Group, AJV-13
(Title)

ATTACHMENT to FAA FORM 7711-1

Issued To: United States Special Operation Command

Address: 100 Bartley Street
Suite 110S
Hurlburt Field
Florida 32544

Activity: Operation of the Raven UAS in Class G airspace at or below 700 feet MSL in Operations Area A and at or below 1000 feet MSL in Operations Area B as depicted in Attachment 1. Operations will be under the jurisdiction of Norfolk ATCT and Oceana NAS (NTU).

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

Dates of Use: This Certificate of Authorization (COA) (2011-ESA-19) is valid from October 3, 2011 through October 2, 2012. Should a renewal become necessary, the proponent shall advise the Federal Aviation Administration (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 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 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 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 91.111/91.113 and must be complied with:

- For the purpose of see-and-avoid, visual observers must be utilized at all times except in Class A airspace, restricted areas, and warning areas. The observers may either be ground based, aboard a watercraft, or in a chase plane. If the chase aircraft is operating more than 100 feet above/below and/or ½ nm laterally, of the UA, the chase aircraft PIC will advise the controlling ATC facility.
- In order to comply with the see and avoid requirements of Title 14 of the Code of Federal Regulations sections 91.113 and 91.111, the pilot-in-command and visual observers must be able to see the aircraft and the surrounding airspace throughout the entire flight; and be able to determine the aircraft's altitude, flight path and proximity to traffic and other hazards (terrain, weather, structures) sufficiently to exercise effective control of the aircraft to give right-of-way to other aircraft, and to prevent the aircraft from creating a collision hazard.
- UAS pilots will ensure there is a safe operating distance between manned and unmanned aircraft at all times in accordance with 14 CFR 91.111, *Operating Near Other Aircraft*, and 14 CFR 91.113, *Right-of-Way Rules*. Cloud clearances and VFR visibilities for Class E airspace will be used regardless of class of airspace. Additionally, UAS operations are advised to operate well clear of all known manned aircraft operations.
- The dropping or spraying of aircraft stores, or carrying of hazardous materials (included ordnance) outside of active Restricted, Prohibited, or Warning Areas is prohibited unless specifically authorized in the Special Provisions of this COA.

Airworthiness Certification Provisions:

- UA must be shown to be airworthy to conduct flight operations in the NAS.
- Public Use Aircraft 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 UA 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.
- Aircraft and Operations Requirements:
 - Flight Below 18,000 Feet Mean Sea Level (MSL).
 - UA operations below 18,000 feet MSL in any airspace generally accessible to aircraft flying in accordance with visual flight rules (VFR) require visual

- observers, either airborne or ground-based. Use of ATC radar alone does not constitute sufficient collision risk mitigation in airspace where uncooperative airborne operations may be conducted.
- Flights At or Above 18,000 Feet Mean Sea Level (MSL)
 - When operating on an instrument ATC clearance, the UA pilot-in-command must ensure the following:
 1. An ATC clearance has been filed, obtained and followed.
 2. Positional information shall be provided in reference to established NAS fixes, NAVAIDS, and waypoints. Use of Latitude/Longitude is not authorized.
 - **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*, 14 CFR Part 91.113, *Right-of-Way Rules*, cloud clearance, in-flight visibility, and the pilot controller glossary including standard ATC phraseology and communication. 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.
 - **Pilot-in-Command (PIC) –**
 - **Visual Flight Rules (VFR) as applicable:**
 - 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 operating a UA in line of sight must pass at a minimum 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.
 - Pilots flying a UA on other than instrument flight plans beyond line of sight of the PIC must possess a minimum of a current private pilot certificate, or military equivalent in the category and class, as stated in 14 CFR Part 61.105.
 - **Instrument Flight Rules (IFR) as applicable:**
 - 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 (minimum of private pilot) of manned aircraft (FAA or military equivalent) in category and class of aircraft flown.
 - The PIC must also have a current/appropriate instrument rating (manned aircraft, FAA or military equivalent) for the category and class of aircraft flown.

- **Pilot Proficiency – VFR/IFR as applicable:**
 - 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).

- **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.
 - 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 Part 91.13, *Careless and Reckless Operation*, apply to UAS pilots.

- **Pilot/Observer Task Limitations:**
 - Pilots and observers must not perform crew duties for more than one UA at a time.
 - Chase aircraft pilots must not concurrently perform either observer or UA pilot duties along with chase pilot duties.
 - Pilots are not allowed to perform concurrent duties both as pilot and observer.
 - Observers are not allowed to perform concurrent duties both as pilot and observer.

Standard Provisions: These provisions are applicable to all operations unless indicated otherwise in the Special Provisions section.

- The UA PIC will maintain direct two-way communications with ATC and have the ability to maneuver the UA per their instructions. The PIC shall comply with all ATC instructions and/or clearances.
- If equipped, the UA shall operate with an operational mode 3/A transponder, with altitude encoding, or mode S transponder (preferred) set to an ATC assigned squawk.
- If equipped, the UA shall operate with position/navigation lights on at all times during flight.
- The UA PIC shall not accept any ATC clearance requiring the use of visual separation or sequencing.

- VFR cloud clearances and visibilities for Class E airspace will be used regardless of class of airspace the UAS is operating in, except when operating in Class A airspace where 14 CFR Part 91.155 will apply.
- Special VFR is not authorized.
- Operations (including lost link procedures) shall not be conducted over populated areas, heavily trafficked roads, or an open-air assembly of people.
- Operations outside of restricted areas, warning areas, prohibited areas (designated for aviation use) and/or Class A airspace may only be conducted during daylight hours.
- Operations shall not loiter on Victor airways, Jet Routes, Q Routes, T Routes, IR Routes, or VR Routes. When necessary, transit of airways and routes shall be conducted as expeditiously as possible.
- Operations conducted under VFR rules shall operate at appropriate VFR altitudes for direction of flight (14 CFR Part 91.159).
- The UA PIC or chase plane PIC (whichever is applicable) will notify ATC of any in flight emergency or aircraft accident as soon as practical.
- All operators that use GPS as a sole source must check all NOTAMs and Receiver Autonomous Integrity Monitoring (RAIM). Flight into GPS test area or degraded RAIM is prohibited without specific approval.
- At no time will TCAS be used in any mode while operating an unmanned aircraft.
- Only one UA will be flown in the operating area.
- The UA PIC will have a copy of the COA on hand for reference during the flight.
- The United States Special Operation Command and/or its representatives, is 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.

Special Provisions:

1. The proponent shall submit a proposed flying schedule to Norfolk ATCT and NAS Oceana ATC Facility no later than one week prior to planned flight operations.
2. The proponent shall notify Norfolk ATCT and NAS Oceana ATC Facility of planned flight operations no later than 30 minutes prior to take-off.
3. The PIC will maintain direct two-way communications with NAS Oceana ATC on 323.05/124.825 or Norfolk ATC on 126.05/370.92, as appropriate, and have the ability to maneuver the UA per their instructions.
4. Lost Link/Emergency Procedures.
 - The proponent shall coordinate the lost link profile with Norfolk ATCT and NAS Oceana ATC Facility prior to each flight or as required by the ATC facility.
 - During the lost link profile, the UA will fly to a predetermined “rally point” at a predetermined altitude (typically 300 ft AGL). The “rally point” is automatically set 20 meters to the east of the “home” waypoint. “Home” is located at the same point as the location of the ground control station (GCS). During the

return flight, if link is reestablished, the pilot will make a determination on whether to continue with the mission or land the aircraft. If link is not reestablished, the Raven will continue to the “rally point” and automatically execute the “auto-land” function upon arrival at “home.” For over-water operations, the GCS will be located on the watercraft. Therefore, the “rally” and “home” points will continuously change as the GCS moves with the watercraft.

- In the event of a fly-away, the UAS pilot will immediately notify Norfolk Approach or NAS Oceana Approach Control depending on the direction of flight. If radio communications are not possible, the backup phone numbers for both are as follows: (1) NAS Oceana Approach is (757) 433-2968 and (2) Norfolk Approach is (757) 363-5864. Additionally the pilot will provide the following.
 - UA last known location
 - UA altitude
 - Direction of flight/heading
 - Fuel on board
 - Pilots intentions
 - During situations where a severe malfunction or a catastrophic failure occurs, the pilot has the option of terminating engine power and force the Raven to land.
 - If lost link occurs within a restricted or warning area, or the lost link procedure above takes the UA into the restricted or warning area – the aircraft will not exit the restricted or warning areas until the link is re-established.
 - The UA lost link mission will not transit or orbit over populated areas.
 - When outside of restricted/warning area airspace, lost link programmed procedures will avoid unexpected turn-around and/or altitude changes and will provide sufficient time to communicate and coordinate with ATC.
 - Lost link orbit points shall not coincide with the centerline of Victor airways.
5. UA operations inside the final approach fix/glide slope intercept point for the over water primary instrument approaches for Norfolk and Oceana airports are prohibited.
 6. The Department of the Air Force, Special Operations Command, has determined the airworthiness and safety of the Raven UAS and submitted a letter stating such dated March 15, 2011. The aircraft must be operated in strict compliance with all provisions and conditions in this Airworthiness Release. In addition, all normal and emergency procedures as outlined in the COA on-line application must be followed.
 7. A Pilot-in-command (PIC) must be designated prior to launch of the aircraft and must be at the controls of have access to the controls of the unmanned aircraft at any position during the flight.
 8. The PIC must conduct a pre-takeoff briefing on the contents of the COA, maximum altitude to be flown, frequencies to be used, lost link procedures, hazards unique for flight to be flown, emergency procedures on takeoff and landing, and any special provisions.

9. For over-water operations where Ground Control Station moves with the watercraft, the lost link procedures must be programmed and the lost link (rally and home) waypoints continuously updated during the unmanned aircraft operations in accordance with the proponent's COA on-line application. If continuous updating is not possible and for all other operations, the lost link (rally and home) waypoints must be preprogrammed before unmanned aircraft flight begins.
10. The PIC and visual observer(s) must receive training under direct supervision of a qualified instructor.
11. The proponent or delegated representative is responsible for halting or cancelling unmanned aircraft activity if, at any time, the safety of persons or property on the ground or in the air is jeopardized, or if there is a failure to comply with the provisions of the authorization.
12. A frequency integrity check must be conducted prior to the launch of the Raven unmanned aircraft.
13. Sterile cockpit procedures must be observed during all critical phases of flight to include all ground operations involving taxi, takeoff, landing, and all other flight operations in which safety of mission accomplishment might be compromised by distractions.
14. The use of cell phones or other electronic devices is restricted to communications pertinent to the operational control of the unmanned aircraft and any required communications with air traffic control (ATC).
15. ATC must be immediately notified in the event of any emergency, loss and subsequent restoration of command link or any other malfunctions or occurrence that would impact air traffic safety or operations.
16. The Federal Aviation Administration has the authority to cancel this COA or delay any activities if the safety of persons or property on the ground or in the air is in jeopardy, or if there is a violation of the terms specified.

NOTAM: A distance (D) Notice to Airman shall be issued when UA operations are being conducted. This requirement may be accomplished through your local base operations or NOTAM issuing authority. You may also complete this requirement by contacting Flight Service Station at 1-877-4-US-NTMS (1-877-487-6867) not more than 72 hours in advance, but not less than 48 hours prior to the operation and provide:

- Name and Address of pilot filing NOTAM request
- 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 and Normal Reporting Provisions: The following information is required to document routine and unusual occurrences associated with UAS activities in the NAS.

- The proponent for the COA shall provide the following information to Donald.E.Grampp@faa.gov on a monthly 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 link (telemetry, command and/or control)
- The following shall be submitted via email, COA On-line or phone (202-385-4542, cell 443-569-1732) to Donald.E.Grampp@faa.gov **within 24 hours and prior to any additional flight under this COA:**
 - All accidents or incidents involving UAS activities, including lost link.
 - Deviations from any provision contained in the COA.

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 United States Special Operation Command to resolve the matter. This COA does not authorize flight within Special Use Airspace without approval from the Using Agency. The United States Special Operation Command is hereby authorized to operate the Raven Unmanned Aircraft System UAS in the operations area depicted in "Activity" above and attachment 1 below.

Attachment 1: Flight Operations Area

