

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

CERTIFICATE OF WAIVER OR AUTHORIZATION

ISSUED TO

United States Marine Corps

ADDRESS

USMC- VMU-4
Commanding Officer, VMU-4
PO Box 99220
Yuma, Arizona 85369-9220

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 RQ-7B Shadow UAS in Class G and E airspace at or below 2300' feet Mean Sea Level (MSL) under the jurisdiction of the MCAS Yuma ATC Radar Approach Control to transit directly to/from R-2301W as depicted in Attachment 1. 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 2010-WSA-75-COA effective from March 1, 2011 through February 29, 2012 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, AJV-13

(Region)

Ardyth Williams

(Signature)

February 11, 2011

(Date)

Air Traffic Manager, Unmanned Aircraft Systems

(Title)

ATTACHMENT to FAA FORM 7711-1**Issued To:** United States Marine Corps**ADDRESS:** USMC- VMU-4
Commanding Officer, VMU-4
PO Box 99220
Yuma, Arizona 85369-9220**Activity:** Operation of the RQ-7B Shadow UAS in Class G and E airspace at or below 2300' feet Mean Sea level (MSL) under the jurisdiction of the MCAS Yuma ATC Radar Approach Control to transit directly to/from R-2301W as depicted in Attachment 1.**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) (2010-WSA-75) is valid from March 1, 2011 through February 29, 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/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.

- 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 or in a chase plane. If the chase aircraft is operating more than 100ft 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.

- At no time will the UA be operated at a distance from the visual observer that prevents the pilot from having sufficient time to maneuver the aircraft to avoid a potential collision
- 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*. 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.
- The USMC has made its own determination on the Airworthiness and safety of the RQ7B Shadow 200 Unmanned Aircraft System (UAS). The RQ-7B Shadow 200 UA must be operated in strict compliance with all provision and conditions contained in the Airworthiness (Flight) Release, including all appendices. All warnings as contained in the Airworthiness (Flight) Release, including any manufacture warnings not contained in the Airworthiness (Flight) Release must be followed.

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 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.

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.
- 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. (see Special Provisions)
- 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 the pilot of the chase plane (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.
- 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 PIC of the UA will have a copy of the COA on hand for reference during flight.
- The United States Marine Corps, 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. All UA takeoffs and landings will occur at the Cannon Defense Air Complex depicted in Attachment 1.
2. Transit to/from R-2301W will be contained in the operations area depicted in Attachment 1.
3. Only one UA will be flown at a time in the operations area depicted in Attachment 1.
4. MCAS Yuma ATC Approach Control Coordination Requirements:
 - a) PIC will send flight schedule via fax (Comm: (928) 269-9034) (3) days prior to beginning flight operations.
 - b) PIC will contact MCAS Yuma ATC Approach Control via landline (928) 269-9090 (30) minutes prior to flight to obtain discrete beacon code and ATC requirements.
 - c) PIC will establish and maintain radio communications with MCAS Yuma ATC Approach Control on (UHF 274.0 or VHF 124.15) as soon as practical after airborne and while operating within the operations area.
5. Additional requirements for nighttime flights between sunset and sunrise:

- a) Night operations restricted to 30 minutes after sunset until 30 minutes prior to sunrise.
- b) Visual Observers will be in place a minimum of 30 minutes before night operations commence to ensure night vision adaptation has occurred.
- c) Visual Observers will undergo additional training on the lighting configuration of the Shadow UAS to ensure proper recognition during night operations.
- d) Visual Observers will be in direct communication with the PIC at all times.
- e) UAS will operate with navigation and anti-collision lights on at all times.
- f) UAS will operate with transponder on set to ATC assigned discrete beacon code.
Note: (If navigation lights, anti-collision lights, and/or transponder is inoperative, night flights are prohibited)
- g) As a supplement to visual observers, the PIC will be receiving radar services from MCAS Yuma Approach Control while operating outside R-2301W.
- h) If loss of control link or loss of communications occurs within R-2301W, UA shall not exit R-2301W unless link/communications have been reestablished.
- i) Operations area shall only be used for takeoff, landing and for transit to/from R-2301W.
- j) UAS traffic pattern training operations, ex: practice touch-and-go's, at the Cannon Air Defense Air Complex are prohibited.

6. Lost Link Procedures

- In the event of a lost link, the UA PIC will immediately notify Yuma Approach Control by the most expeditious means (backup phone #:Comm: (928) 269-9090), and state pilot intentions.
- If lost link occurs in the operations area, the UA will proceed to Loiter Point 1 or Loiter Point 2 within R2301W as depicted in Attachment 1.
- If lost link occurs within R-2301W or if the lost link procedure above takes the UA into R-2301W, the UA will not exit the restricted area until the link is re-established.
- If link cannot be re-established flight termination will take place within R-2301W.
- 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 center line of Victor airways.

7. Any visual observer, sensor operator, or other person charged with providing collision avoidance for the RQ-7B Shadow 200 UA must have immediate communication with the pilot in command (PIC).
8. A PIC must be designated prior to launch of the RQ-7B Shadow 200, and must be at the controls of the UA during all phases of flight.

9. The PIC shall not engage in any activity not directly related to flying the aircraft. Such activities include, but are not limited to, operating UAS sensors or other payload systems.
10. All crewmembers, including the PIC and visual observer must read and adhere to the contents and special provisions of this COA.
11. A maximum of one UA will be flown and controlled at one time by each ground control station.
12. A copy of the COA including the special provisions must be at the operations site whenever UA operations are being conducted.
13. Daisy chaining of visual observers is not authorized.
14. All crewmembers, including the PIC and visual observers must receive training from a qualified instructor.
15. The use of cell phones or other telephonic communication devices while UA flights are being conducted are restricted to the operational control of the UA, and any required communications with Air Traffic Control.
16. The PIC must conduct a pre-takeoff briefing which includes a briefing on the contents of the COA, the maximum altitude to be flown, initial heading, frequencies to be used, lost link procedures, the parameters for the use of a ditch point, a risk analysis for the flight being flown, emergency landing procedures on takeoff and landing, and a briefing on the amount of fuel including a reserve on the UA.
17. As per the UAS Shadow System Radio Frequency Authorization (RF A) RQ-7B Shadow 200 serial numbers MC085282m, MC-8524, MC095124, MC095101, MC095102, MC095103, MC095104, MC095105, and MC095106 are the only RQ-7B Shadow 200 unmanned aircraft authorized to operate under this COA.
18. A frequency integrity check must be conducted prior to the launch of the RQ-7B Shadow 200.
19. Sterile cockpit procedures must be observed during all phases of flight.
20. The holder of this COA, or delegated representative, is responsible for halting or cancelling UAS 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 authorization.

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 operator 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 online, 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 Marine Corps to resolve the matter. This COA does not authorize flight within Special Use Airspace without approval from the appropriate Using Agency. The United States Marine Corps is hereby authorized to operate the Shadow Unmanned Aircraft System UAS in the operations area depicted in "Activity" above and at Attachment 1 below.

Attachment 1: UAS Operations Area (tan shaded area within green-dashed lines to include runway at Cannon Air Defense Complex): surface to 2300' Mean Sea Level (MSL)

