

## CERTIFICATE OF WAIVER OR AUTHORIZATION

ISSUED TO

National Aeronautics and Space Administration

ADDRESS

NASA Ames Research Center  
Aviation Management Office  
Building 158, Mail Stop 158-1  
Moffett Field, CA 94035-1000

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 SIERRA UAS in Class E and G airspace at or below 2,500 feet above ground level at Crows Landing under the jurisdiction of Northern California Tracon (NCT). 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 (2007-AHQ-58) is effective from March 5, 2008, through March 4, 2009, 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)

March 5, 2008  
(Date)

Air Traffic Manager, Unmanned Aircraft Systems  
(Title)

**ATTACHMENT to FAA FORM 7711-1****ISSUED TO:** National Aeronautics and Space Administration**ADDRESS:** NASA Ames Research Center  
Aviation Management Office  
Building 158, Mail Stop 158-1  
Moffett Field, CA 94035-1000**NAME:** Federal Aviation Administration (FAA) Certificate of Authorization (COA) for Scientific Instrumentation Evaluation Remote Research Aircraft SIERRA Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) outside of restricted/warning area airspace.**ACTIVITY:** Operation of the SIERRA UAS in Class E and G airspace at or below 2,500 feet above ground level at Crows Landing under the jurisdiction of Northern California Tracon (NCT).**PURPOSE:** To prescribe operating requirements in the NAS (outside of restricted and/or warning area airspace) for the purpose of training and/or operational flights.**DATES OF USE:** This COA (2007-AHQ-58) is valid from March 5, 2008, through March 4, 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 third 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 third 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 Proficiency – VFR:**

- Pilots will not act as a 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 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.

**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. All UAS operations shall be conducted under Visual Flight Rules (VFR) in Visual Meteorological Conditions (VMC) in accordance with CFR 14 Part 91.
2. For the purpose of see-and-avoid, visual observers must be utilized at all times when operating outside of restricted, prohibited or warning area airspace. The visual observers must remain within 1 mile laterally and/or 2,500 feet vertically of the UAS during all operations. Pilot/observers must not operate the SIERRA at a distance beyond that at which see-and-avoid responsibilities can be exercised.

The visual observers may be either ground based or in a chase aircraft. The observer(s) must keep the UAS in sight at all times.

3. Operations outside of restricted airspace may only be conducted during daylight hours.
4. The UAS transponder and position/navigation/anti-collision strobe lights shall be activated at all times during flight, if equipped.
5. In the event of a lost link:
  - The pilot will immediately contact NTC Operations at 916-366-4019 and notify them of the lost link situation, the UAS last known location, direction of flight and altitude.
  - The aircraft will engage the system failsafe feature which is set to reduce throttle to idle and move the aerodynamic controls to neutral positions.

Loss of the primary 900 MHz telemetry link will cause the aircraft to return to and circle the home waypoint which is the takeoff/landing location. The 2.4 GHz RC link can then be used to land the aircraft.

6. Operations shall not be conducted over populated areas, heavily trafficked roads, or an open-air assembly to include the towns of Patterson, Crows Landing, and Stomar and all lost link procedures.
7. Special VFR operations are not authorized.
8. When possible, flight operations should be conducted east of airway V109.

**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

**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 [Donald.E.Grampp@faa.gov](mailto:Donald.E.Grampp@faa.gov) 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 [Donald.E.Grampp@faa.gov](mailto:Donald.E.Grampp@faa.gov) 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 National Aeronautics and Space Administration to resolve the matter. This COA does not authorize flight within Special Use Airspace without approval from the Using Agency. The National Aeronautics and Space Administration is hereby authorized to operate the SIERRA UAS in the operations area depicted in "Activity" above and attachment 1 below.

