

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

CERTIFICATE OF WAIVER OR AUTHORIZATION

ISSUED TO

National Aeronautics and Space Administration

ADDRESS

NASA ARC
Aviation Management Office
Mail Stop 158-1
Moffett Field, CA 94035
Attn: Mark Sumich

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 Sig Rascal 110 UAS in Class E & G airspace from the surface to 1,000ft AGL under the jurisdiction of the Northern California TRACON. 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-WSA-39, is effective from December 1, 2008 through November 30, 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)

November 24, 2008
(Date)


Aron Williams
(Signature)

Air Traffic Manager, Unmanned Aircraft Systems
(Title)

ATTACHMENT to FAA FORM 7711-1

ISSUED TO: National Aeronautics and Space Administration

ADDRESS: NASA ARC
Aviation Management Office
Mail Stop 158-1
Moffett Field, CA 94035
Attn: Mark Sumich

NAME: Federal Aviation Administration (FAA) Certificate of Authorization (COA) for Sig Rascal 110 Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) outside of restricted/warning area airspace.

ACTIVITY: Operation of the Sig Rascal 110 UAS in Class E & G airspace (see attachment 1), from the surface to 1,000 above ground level (AGL) under the jurisdiction of the Northern California TRACON.

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 2008-WSA-39 is valid from December 1, 2008, through November 30, 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.
- 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*. Additionally, UAS operations are advised to operate well clear of all known manned aircraft operations.
- 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 dropping or spraying of aircraft stores, or carrying of hazardous materials 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 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 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 in visual meteorological conditions (VMC) in compliance with title 14 of the Code of Federal Regulations (CFR) part 91.155, *Basic Weather Minimums*. Special visual flight rules (VFR) operations are not authorized.
- 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 nautical mile laterally and/or 1,000 feet vertically of the UAS during all operations. Pilot/observers must not operate the Sig Rascal 110 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. Although the COA application is within policy guidelines, the size of this particular UA may not allow for adequate observation at the specified limit. It should be understood that this limit is the maximum range allowed and that a practical distance may be something less, with the determination of such at the discretion of the applicant. Therefore, it will remain the responsibility of the applicant to ensure the safety of flight and adequate visual range coverage to mitigate any potential collisions
- 3) Operations outside of restricted and/or warning areas 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 or emergency the Pilot will notify the Northern California TRACON @ 916-366-4019, the controlling agency of lost link or emergency condition and provide the following:
 - a. UA last known location
 - b. UA altitude
 - c. Direction of flight/heading
 - d. Fuel on board
 - e. Pilots intentions
- 6) Operations to include lost link procedures will not be conducted over populated areas, heavily trafficked roads, or open-air assemblies of people.
- 7) Due to the limitations of UAS, the following ATC procedures are not authorized:
 - a. Application of visual separation when the pilot of the UAS would be required to apply and maintain the visual separation

- 8) There will not be manned and unmanned traffic in an airport traffic pattern at the same time. In addition, UA pilots will ensure there is a safe operating distance between manned and unmanned aircraft at all times.

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

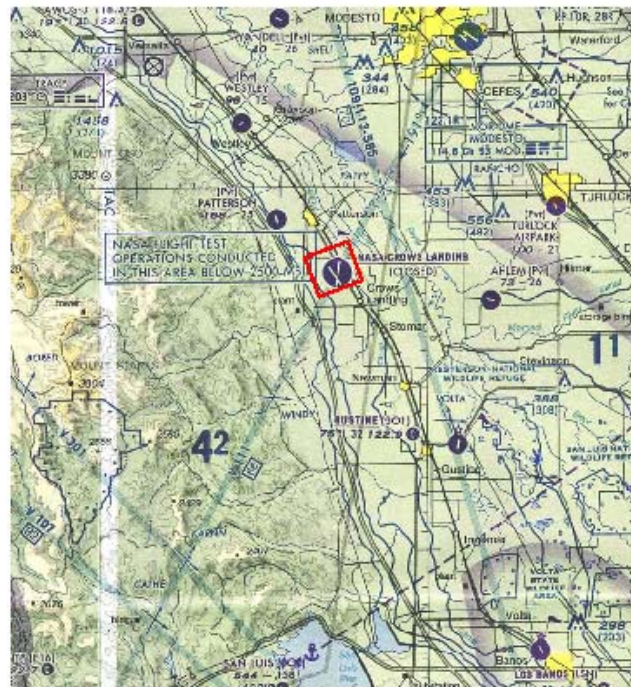
NOTE FOR PROPONENTS FILING THEIR NOTAM WITH DoD ONLY: This requirement to file with the AFSS is in addition to any local procedures/requirements for filing through DINS. The FAA Unmanned Aircraft Systems Office is working with the AFSS, and to eliminate the requirement to file a NOTAM with both the AFSS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

INCIDENT / ACCIDENT 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 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 link (telemetry, command and/or control)
- The following shall be submitted via email or phone (202-385-4542, cell 443-569-1732) to Donald.E.Grampp@faa.gov within 24 hours:
 - All accidents or incidents involving UAS activities
 - Deviations from the “Special Provisions” 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 NASA to resolve the matter. This COA does not authorize flight within Special Use Airspace without approval from the Using Agency. The NASA is hereby authorized to operate the Sig Rascal 110 UAS in the operations area depicted in “Activity” above and attachment 1 below.

Attachment 1

NASA Crows Landing UAS Flight Operations Area

UAS flight operations will be conducted in an area within approximately two nautical miles of the runways, excluding any areas within one mile of Interstate 5 or the towns of Crows Landing and Patterson. The maximum altitude will be 1,000 feet MSL.