

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

**CERTIFICATE OF WAIVER OR AUTHORIZATION**

ISSUED TO

United States Air Force

Airspace Management Office – 432<sup>nd</sup> OG

4550 Tyndall Ave

Nellis AFB, NV 89191

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 MQ-9 Reaper Unmanned Aircraft System (UAS) in Class D and E airspace at Creech Air Force Base (INS) and Desert Rock Airport (NV65/DRA), NV at or below 2,500 feet Above Ground Level (AGL) as depicted in Attachment 1. See Special Provisions.

LIST OF WAIVED REGULATIONS BY SECTION AND TITLE

N/A

**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-WSA-43 is effective from July 26, 2011 to July 25, 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)

July 26, 2011  
(Date)



Dean E. Fulmer  
(Signature)

Acting Manager, Unmanned Aircraft Systems  
(Title)

**ATTACHMENT to FAA FORM 7711-1**

**Issued To:** United States Air Force

**Address:** Airspace Management Office – 432<sup>nd</sup> OG  
4550 Tyndall Ave  
Nellis AFB, NV 89191

**Activity:** Operation of the MQ-9 Reaper Unmanned Aircraft System (UAS) in Class D and E airspace at Creech Air Force Base (INS) and Desert Rock Airport (NV65/DRA), NV at or below 2,500 feet Above Ground Level (AGL) as depicted in Attachment 1. See Special Provisions.

**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-WSA-43 is valid from July 26, 2011 through July 25, 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 91.111/113 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 91.111 and 91.113, 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 67, Medical Standards and Certification, or a military equivalent. 14 CFR 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 91.111, *Operating Near Other Aircraft*, 14 CFR 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 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) 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 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 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 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 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 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/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, unless specified otherwise in the Special Provisions section. 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, unless authorized in the Special Provisions section.
- Operations shall not loiter on Victor airways, Jet Routes, Q 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 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 in the special provisions.
- 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 unless indicated otherwise in the Special Provisions.
- A copy of this COA will be maintained on site by the PIC or designated representative.
- The United States Air Force, 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. In the event of a lost link, the UAS pilot will immediately notify Creech AFB (INS) Tower or Desert Rock Tower at NV65/DRA on ATC radios or by telephone, calling Nellis Air Traffic Control Facility (NATCF) at (702) 652-4222 and/or Creech AFB Tower at (702) 404-0108, state pilot intentions, and comply with the following provisions:
  - The aircraft will comply with the lost link provisions depicted in Attachment 2 of this document.
  - 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.
2. Operations approval and coordination will be completed IAW Department of the Air Force internal communications procedures and requirements. (NV65-DRA ops, reference DOE PPR )
  3. At no time will the lost link procedures leave the assigned airspace of DRA/NV65 or INS Airport Traffic Control Towers.
  4. The mixing of civil manned aircraft and the UA is prohibited.
  5. Air Traffic Controllers that are on shift as UA observers must be dedicated and have no other operational responsibilities.
  6. All UAS operations in Class D airspace shall be conducted only when the control tower is open and the Class D airspace is active.
  7. All UAS operations in Class E airspace shall be conducted only when the control tower is open. See CFR 91.127 Class E Tower ops requirements for NV65/DRA.
  8. The Department of the Air Force has made its own determination on the Airworthiness and safety of the MQ-9 Reaper UA. The MQ-9 Reaper must be operated in strict compliance with all provisions and conditions contained in the Airworthiness Release/Flight Release including all appendices and flight restrictions.
  9. The PIC and the visual observer must read the COA including the special provisions, and must adhere to the contents and special provisions of the COA.
  10. All crewmembers including the PIC and visual observers must receive training under the direct supervision of a qualified instructor.
  11. The use of cell phones or other telephonic communication is restricted to the operational control of the UA and any required communications with Air Traffic Control.
  12. A frequency integrity check must be conducted prior to the launch of the UA.
  13. Sterile cockpit procedures must be observed during critical phases of flight.

14. The PIC must have at least a Current FAA private pilot certificate or the FAA accepted agency equivalent, based on the application or 14 CFR Part 61 for any operations in Class E/D and above 400' AGL in Class G airspace.
15. A Pilot-in-Command (PIC) means the person who has final authority and responsibility for the operation and safety of the flight and has been designated as PIC before or during the flight and holds the appropriate category, class and type rating, if appropriate, for the conduct of flight. The PIC must control the aircraft (or override authority to assume control) during all UAS operations.
16. The PIC must conduct a pre-takeoff briefing which includes a briefing on the contents of the COA, the maximum altitudes to be flown, initial heading, frequencies to be used, lost link procedures, the parameters for the use of a ditch point, hazards unique for the flight being flown, emergency procedures on launch and recover, the amount of fuel carried including reserve fuel, and any special provisions.
17. The use of cell phones or other telephonic communication is restricted to the operational control of the UAS, and any required communications with ATC.
18. Night operations are prohibited. UAS night operations are those operations that occur between the end of evening civil twilight and the beginning of morning civil twilight, as published in the American Air Almanac, converted to local time. (Note: this is equal to approximately 30 minutes after sunset until 30 minutes before sunrise).
19. The holder of this COA, or delegated representative, is responsible for halting or canceling activity in the operating 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.
20. 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 Airmen 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

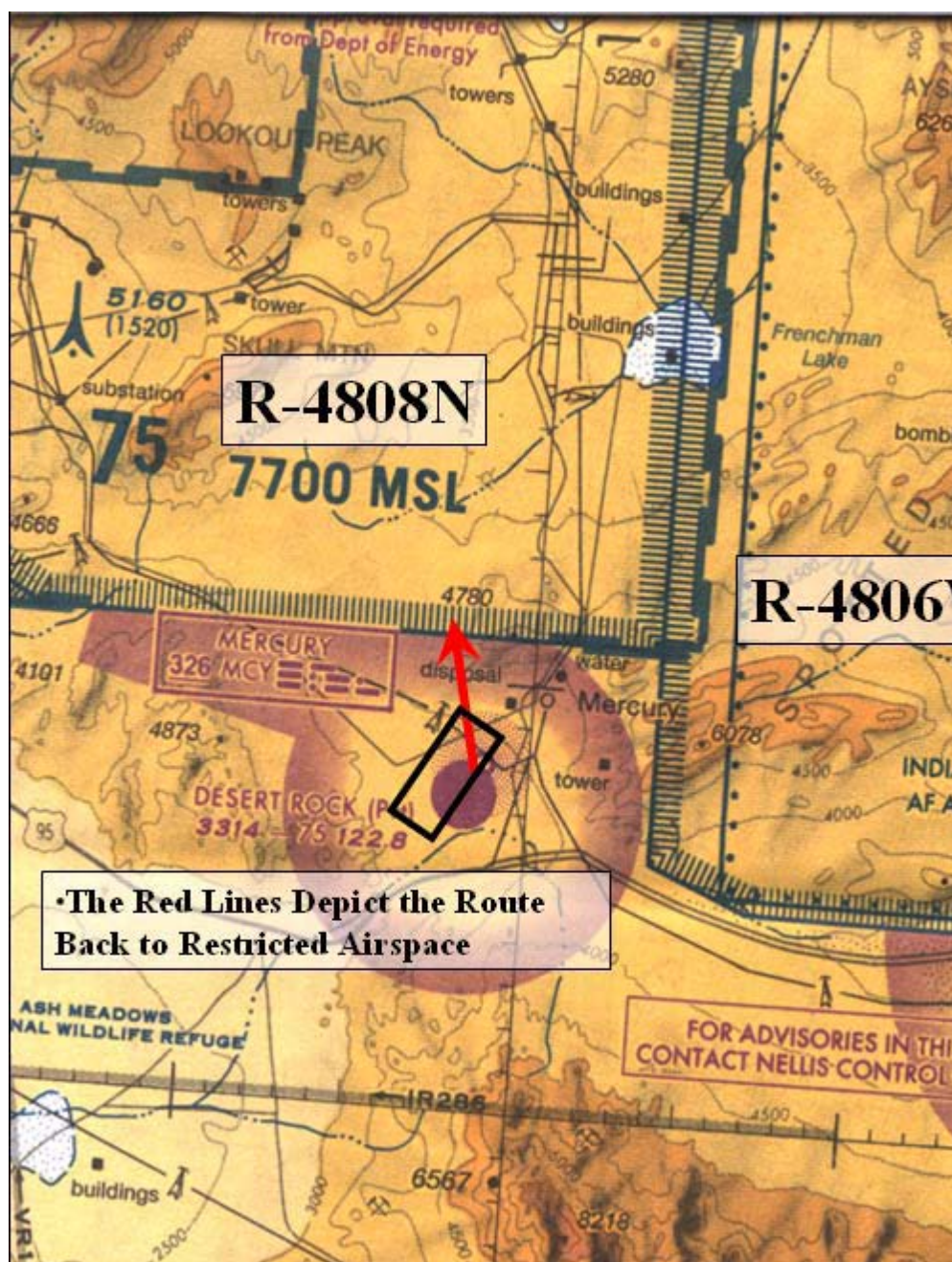


NOTE FOR PROPONENTS FILING THEIR NOTAM WITH DoD ONLY: This requirement to file with the AFSS is in addition to any local procedures/requirements for filing through DINS. The FAA Unmanned Aircraft Systems Office is working with the AFSS, and to eliminate the requirement to file a NOTAM with both the AFSS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

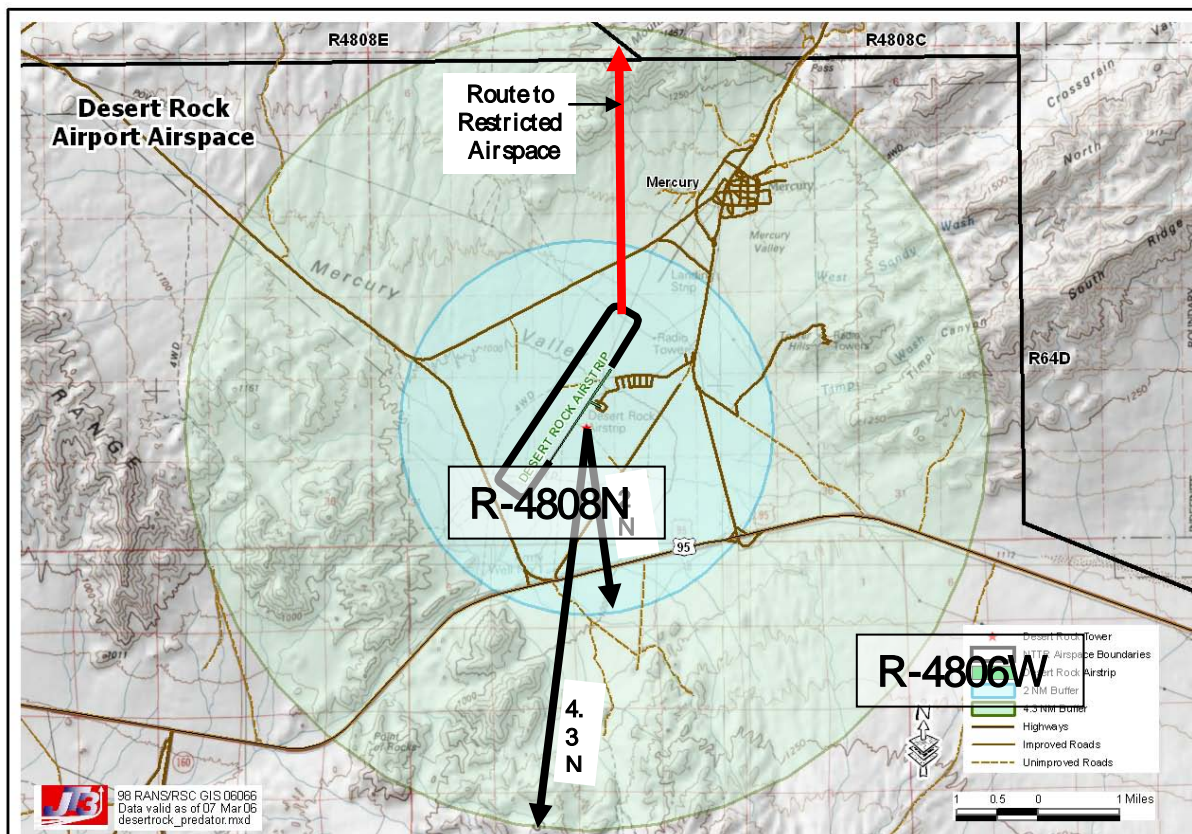
**Incident / Accident and Normal Reporting Provisions:** The following information is required to document routine and unusual occurrences associated with UAS activities in the NAS.

- 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 COA Online, email 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 Air Force to resolve the matter. This COA does not authorize flight within Special Use Airspace without approval from the Using Agency. The United States Air Force is hereby authorized to operate the MQ-9 Reaper Unmanned Aircraft System in the operations area depicted in "Activity" above and attachment 1 below.

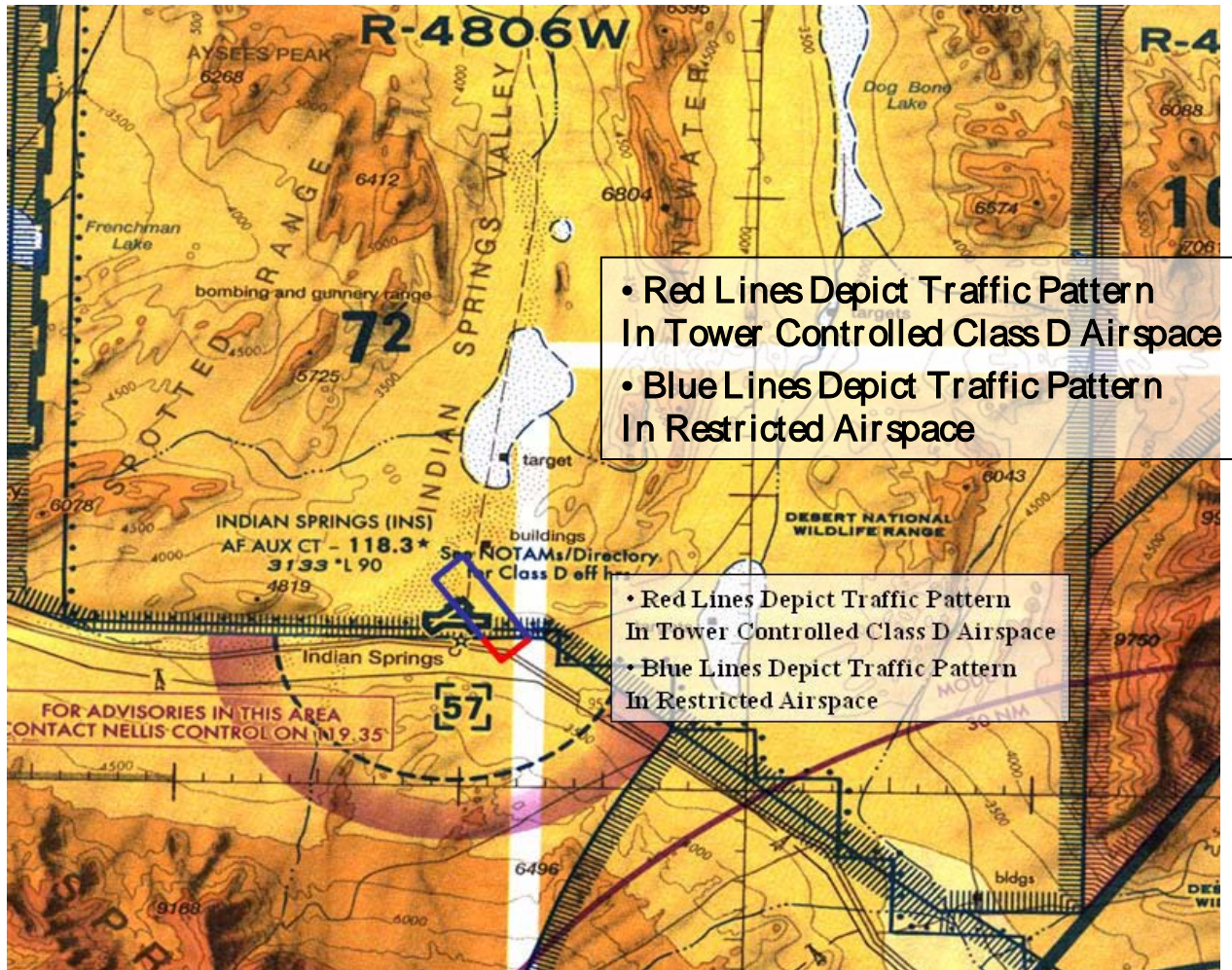
**Class E airspace**

## Desert Rock Traffic Pattern





## INS Traffic Pattern



### **Lost Link Procedures**

a. Lost link and Airspace Description for **Creech AFB Operations**:

Creech AFB, NV (lat. 36°35'14"N., long. 115°40'24"W) Class D airspace is that airspace extending upward from the surface to and including 5,700 feet MSL within a 5-mile radius of Creech AFB, excluding Restricted Area R-4806W. This Class D airspace area is effective during the specific dates and times established in advance by a Notice to Airmen. The effective date and time will thereafter be continuously published in the Airport/Facility Directory and IFR Supplement. The UAS traffic patterns are 3,900' MSL. Lost link and Mission Procedures differ depending on the area the mission is flown. All lost link procedures fly the flight plan route back to Creech AFB where line of sight is restored. Per local instructions and the UAS is in the NTTR or in the local Creech AFB traffic pattern, the UAS will remain on the assigned mission squawk in restricted airspace if lost link occurs. It's very unlikely that loss of line of sight or Lost Link will occur while in the local traffic pattern, however, if the UAS is in the Runway 13/31 traffic pattern and in restricted airspace, the UAS will remain in restricted airspace and proceed to one of the published Lost Link Orbits north of Creech AFB in restricted airspace. If the UAS is on base or final legs to Runway 31, it will continue with the pattern, fly runway heading until in restricted airspace and then fly directly to one of the published Lost Link Orbits. When the link or line of sight is restored, the UAS will continue in the local traffic pattern or land. Creech Tower can see MQ-1 and MQ-9 aircraft throughout all the traffic patterns for all the runways from the control tower. In addition, the tower controllers do not mix manned A/C and UAS traffic in the 13/31 traffic pattern or in the Class D airspace (DoD or Civil). In addition, IAW 14 CFR Part 91.129 requires A/C to establish radio communications prior to an aircraft entering Class D airspace and maintain communications. Therefore, if Creech tower receives a call from an A/C prior to entering Class D airspace on a through clearance request and there is an MQ-1 or MQ-9 in the Class D traffic pattern, the A/C is instructed to remain out of Class D airspace. Therefore, there is never a civil A/C in the Class D airspace while a UAS is in the Class D.

b. Lost link and Airspace Description for **Desert Rock Airport Operations**:

Desert Rock Airport, NV (lat. 36°37'10"N, long. 116°01'58"W) Class E airspace is that airspace extending 700 feet from the surface within a 4.3-mile radius of Desert Rock Airport, excluding R-4808S, R-4808N, and R-4806W. Desert Rock Airport is a private airport owned by the Department of Energy (DOE). However, IAW USAF Instructions, when Desert Rock Airport is used for USAF operations, the airport is managed and controlled by the USAF using USAF procedures. The Desert Rock Control Tower is normally unmanned, however, when the USAF uses the airport for

special operations, exercises, and in this case UAS operations, the tower is manned and a NOTAM is disseminated with the times of use, frequencies, and special notices and/or advisories. The UAS traffic pattern is 4,300' MSL and remains within 2.5 NM of the tower.

Lost link and Mission Procedures differ depending on the area the mission is flown. All lost link procedures fly the flight plan route back to Creech AFB where line of sight is restored. The UAS will remain on the assigned mission squawk in Desert Rock traffic pattern or in restricted airspace if lost link occurs. It's very unlikely that loss of line of sight or Lost Link will occur while in the local traffic pattern. However, if the UAS is in Desert Rock traffic pattern experiences loss of link or line of sight, the UAS will fly north bound to restricted airspace and proceed to one of the published Lost Link Orbits north of Creech AFB. Desert Rock Tower controllers can see MQ-1 and MQ-9 aircraft throughout all the traffic patterns for both runways (up to 3 miles) from the control tower. In addition, the tower controllers do not mix manned A/C and UAS traffic in the traffic pattern or in the published Class E airspace (DoD or Civil). In addition, IAW 14 CFR Part 91.127 ***Operating on or in the vicinity of an airport in Class E airspace communications with control towers.*** Unless otherwise authorized or required by ATC, no person may operate an aircraft to, from, through, or on an airport having an operational control tower unless two-way radio communications are maintained between that aircraft and the control tower. Communications must be established prior to 4 nautical miles from the airport, up to and including 2,500 feet AGL (5,813' MSL at Desert Rock Airport). Therefore, if Desert Rock tower receives a call from an A/C prior to 4 NM from the airport on a through clearance request and there is an MQ-1 in the traffic pattern, the A/C is instructed to remain at least 4 NM from the Desert Rock airport. Using this procedure, there is never a civil A/C closer than 4 NM from the airport or 2 NM from a UAS while a UAS is in the traffic pattern.