

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION**CERTIFICATE OF WAIVER OR AUTHORIZATION**

## ISSUED TO

California Air National Guard  
163<sup>rd</sup> Reconnaissance Wing

## ADDRESS

ATTN: (b) (6)  
1620 Graeber Street  
March Air Reserve Base, CA. 92518-1633

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-1 Unmanned Aircraft System (UAS) as described in accompanying Attachment to FAA Form 7711-1.

## 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-30 is effective from September 22, 2010 through September 21, 2011, 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)

(Signature)

September 22, 2010  
(Date)Air Traffic Manager, Unmanned Aircraft Systems  
(Title)

**ATTACHMENT to FAA FORM 7711-1**

**Issued To:** California Air National Guard  
163<sup>rd</sup> Reconnaissance Wing

**Address:** ATTN: (b) (6)  
1620 Graeber Street  
March Air Reserve Base, CA 92518-1633

**Activity:** Operation of the MQ-1 Unmanned Aircraft System (UAS) as described below and depicted in attachment 1:

- Southern California Logistics Airport (VCV) Class D airspace under the jurisdiction of VCV Airport Traffic Control Tower (ATCT)
- Creech AFB (INS) Class D airspace under the jurisdiction of Creech AFB Control Tower
- Nellis Air Traffic Control Facility (NATCF) Class A
- Class G, E and A airspace under the jurisdiction of High Desert Terminal Radar Approach Control (E10) and Los Angeles Air Route Traffic Control Center (ZLA)
- Transit between VCV and El Mirage (99CL) and Gray Butte (04CA)
- Transit between VCV and R-2501, R-2515 and R4806W
- Transit of Barstow West/East Military Operating Areas enroute to restricted airspace

**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-30 is valid from September 22, 2010 through September 21, 2011. 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 91.113 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. **The UA must remain within a lateral distance of no more than two (2) nautical miles laterally and 3,000 feet vertically from the visual observer.** The distances listed are the maximum distance; at no time will the UA be operated at a distance beyond the visual line of sight for the visual observer. If the chase aircraft is operating more than 100ft above/below the UA altitude, the chase aircraft PIC will advise the controlling ATC facility.
- 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 California Air National Guard, 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 the controlling ATC facility, state pilot intentions, and comply with the following provisions:
  - Telephone notification to ZLA shall be made to (661) 265-8205 or (661) 265-8287. Telephone notification to E10 shall be made to (661) 277-3843. Telephone notification to NATCF shall be made at (702) 652-4172. Telephone notification to SCLA shall be made to (760) 246-7827.
  - After Lost Link timer expires, aircraft will squawk 7600 and execute Lost Link Procedures as described below.

- Lost Link Procedures:
    - 1) If lost link occurs while in **transit to R2508** the aircraft will continue to R2508 with airborne observer and proceed to its R2508 lost link termination orbit. (attachment 1, pg. 13)
    - 2) If lost link occurs while in **transit to R2501** the aircraft will loiter in R2501 Lost Link Orbit until link regained. (attachment 1, pg. 13)
      - Below Class A will proceed to R2501 with chase aircraft
      - In Class A will proceed to R2501
    - 3) If lost link occurs while in **transit to El Mirage, Gray Butte or VCV**, the UA will proceed with chase and loiter in VCV Class D lost link loiter airspace. (attachment 1, pg. 15) If link cannot be restored, the UA shall exit VCV with airborne observer and transit to R-2508 and R2508 lost link termination orbit. (attachment 1, pg. 13)
    - 4) If lost link occurs while in **transit to R4806**.
      - Prior to BTY210018, the aircraft will reverse course to the EDW091015 and then to the R2515 Lost link termination orbit to regain link. (attachment 1, pg. 13)
      - After the BTY210018, the aircraft will continue to R4806 and establish in the R4806 lost link orbit until link is regained. (attachment 1 pg 14)
    - 5) If lost link occurs while in **transit from R-4806**, the UA will proceed on flight plan to the EDW091015 and then to the R2515 Lost link termination orbit to regain link. (attachment 1 pg 13)
    - 6) If lost link occurs while **established in VCV Class D airspace**.
      - Aircraft will climb to 5000' MSL;
      - Then proceed to the VCV Class D lost link loiter airspace. and attempt to re-establish link. (attachment 1, pg. 15)
      - If link cannot be re-established, the UA shall exit VCV with airborne observer and transit to R-2515 and R2515 Lost link termination orbit.
    - 7) If lost link occurs while **established in a restricted airspace R2502, R2515, R2508, R2501 or R4806**, the aircraft will proceed to the established lost link termination orbit to regain link. The aircraft will not exit the restricted or warning areas until the link is re-established.
    - 8) If lost link occurs while **established in INS Class D airspace**, the aircraft will proceed to the established lost link termination orbit in R4806 to regain link.
  - If link is restored/ reestablished after aircraft squawks 7600, aircraft pilot will notify ATC but will execute the Lost Link recovery procedures and return to base for recovery, unless otherwise coordinated with and approved by ATC.
  - 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.
2. Prior to commencing operations, the proponent shall enter into a written Letter of Agreement with the KVCV Air Traffic Control Tower and the KVCV Airport

Management. The LOA, as a minimum, shall cover notification, communication, coordination, schedule deconfliction and ATC operational segregation requirements.

3. Operations shall remain within the confines of the KVCV traffic pattern when conducting local operations and shall remain within the observer distances specified in Safety Provisions.
4. All operations conducted under this COA shall be VFR for delivery flights from 99CL El Mirage and/or 04CA Gray Butte, transit to R2508, transit to R2501 when below Class A .
5. The PIC shall utilize ATC flight following services when outside Class D and/or restricted airspace. If the controlling ATC facility is unable to provide the service, the PIC shall maintain a listening watch on the ATC frequency until established in Class D and/or restricted airspace.
6. For delivery flights that originate from 99CL El Mirage and/or 04CA Gray Butte, the operator shall contact E10 at 661-277-3843 no later than one hour prior to flight and request a discrete beacon code.
7. Pre/in-flight coordination with E10 for flights transiting to and remaining in R-2515 and/or R-2502 will be accomplished via Letter of Agreement. For all other routing the CA ANG will complete the FAA Coordination Checklist and call E10 no later than 1 hour prior to departure from VCV Class D airspace
8. Issuance of NOTAM is only required for operations below Class A outside of active Restricted airspace.
9. An IFR flight plan shall be filed for all operations in Class A airspace. The operator shall request altitudes in Class A airspace between FL190 and FL230. The UA shall be level at the ATC assigned altitude for transit of Class A airspace prior to exiting restricted airspace. The UAS operator shall remain in continuous two-way radio communication with ATC and comply with all ATC instructions.
10. For IFR flights outside of restricted airspace to R2501, that will enter Los Angeles Air Route Traffic Control Center (ZLA) airspace, coordination shall be accomplished a minimum of two days prior with Military Operations Specialist (MOS) at (661) 265-8287 or DSN 640-1290.
11. IFR Routes of flight to be filed:
  - From R2515 to R2501 is: EDW091015..DAG..HEC..HEC150006 RMKS R2501, request FL190 to R2501.
  - From R2501 to R2515 is: HEC156006..HEC..DAG..EDW091015 RMKS R2515, Request FL200 for return to R2515.



- Routing to R4806 is: EDW091015..NID126015..NID052019..BTY210018..BTY102016..BTY086040..INS, request FL190 to R4806.
  - Routing from R4806 is: INS..BTY086040..BTY102016..BTY210018..NID052019..EDW091015, request FL200 from R4806.
12. Chase aircraft based visual observers must be positioned within standard formation criteria (one nautical mile laterally and 100 feet vertically) to exercise see-and-avoid responsibilities required by Title 14, Right-of-Way Rules. Nonstandard formation may be flown when the chase aircraft PIC requests and ATC approved; or when operating in airspace specifically designed for special activity.
  13. Chase aircraft operations shall only be conducted during daylight hours with at least 3 statute miles visibility.
  14. Daisy chaining of ground based visual observers is not authorized.
  15. The visual observer must be in direct communication with the PIC and not accomplish PIC/Vehicle Operator or Mission Operator duties for the flight.
  16. The United States Air Force Materiel Command, Aeronautical Systems Center (USAF AFMC/ASC) has made its own determination on the airworthiness and safety of the UA. The UAS must be operated in strict compliance with all provisions and conditions contained in the Airworthiness Statement.
  17. A PIC must be designated prior to the launch of the UA and be at the controls of the UA during all phases of flight.
  18. A copy of the COA must be at the site during UA operations. All crewmembers, including the PIC and visual observers, must read and adhere to its contents and special provisions.
  19. All crewmembers, including the PIC and visual observers, must receive training from a qualified instructor who has, at all times, operational control of the UA.
  20. Use of cell phones or other telephonic communication is restricted to the operational control of the UA and required communication with ATC.
  21. The PIC must conduct a pre-takeoff briefing which includes a briefing on the contents of the COA, maximum altitude to be flown, initial heading, frequencies to be used, lost link procedures, parameters for use of a ditch point, hazards unique to the flight being flown, emergency landing procedures on takeoff and landing, the amount of fuel including a reserve on the UA, and additional topics deemed appropriate by the proponent.
  22. Sterile cockpit procedures must be observed during critical phases of flight.

23. The holder of this COA, or designated representative, is responsible for halting or canceling activity in the confinement area, if at any time, the safety of persons or property on the ground or air is in jeopardy, or if there is a failure to comply with the terms or conditions of this waiver.

**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.

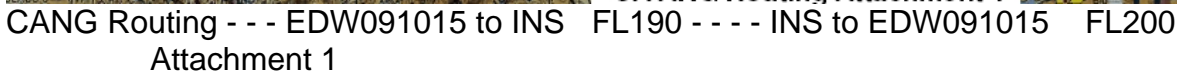
**Incident / Accident and Normal Reporting Provisions:** The following information is required to document routine and unusual occurrences associated with UAS activities in the NAS.

- The proponent for the COA shall provide the following information to [Donald.E.Grampp@faa.gov](mailto: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](mailto: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 California Air National Guard to resolve the matter. This COA does not authorize flight within Special Use Airspace without approval from the Using Agency.

The California Air National Guard is hereby authorized to operate the MQ-1 Unmanned Aircraft System in the operations area depicted in "Activity" above and attachment 1 below.

Attachment 1



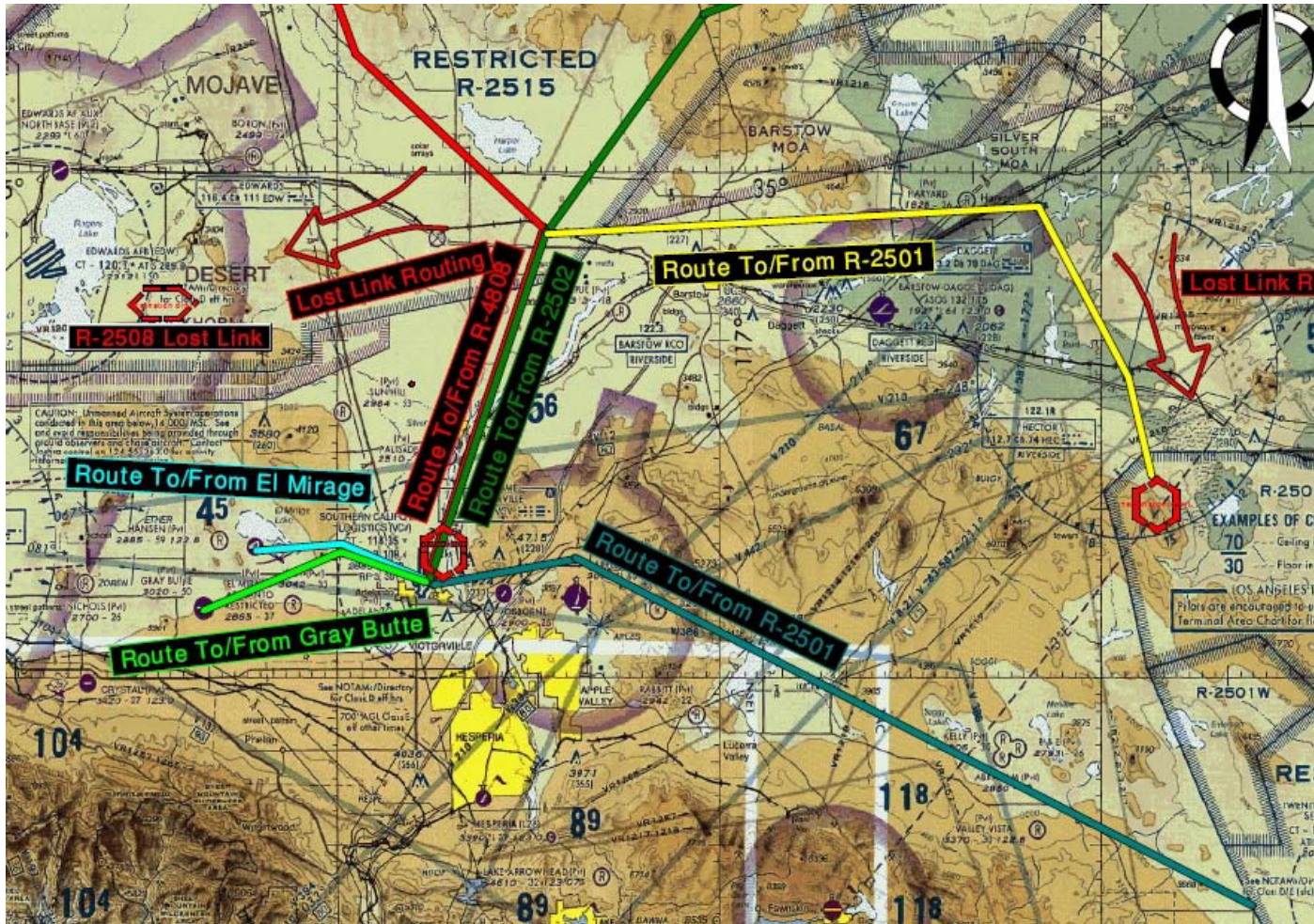
CANG Routing - - - EDW091015 to INS FL190 - - - - INS to EDW091015 FL200  
Attachment 1





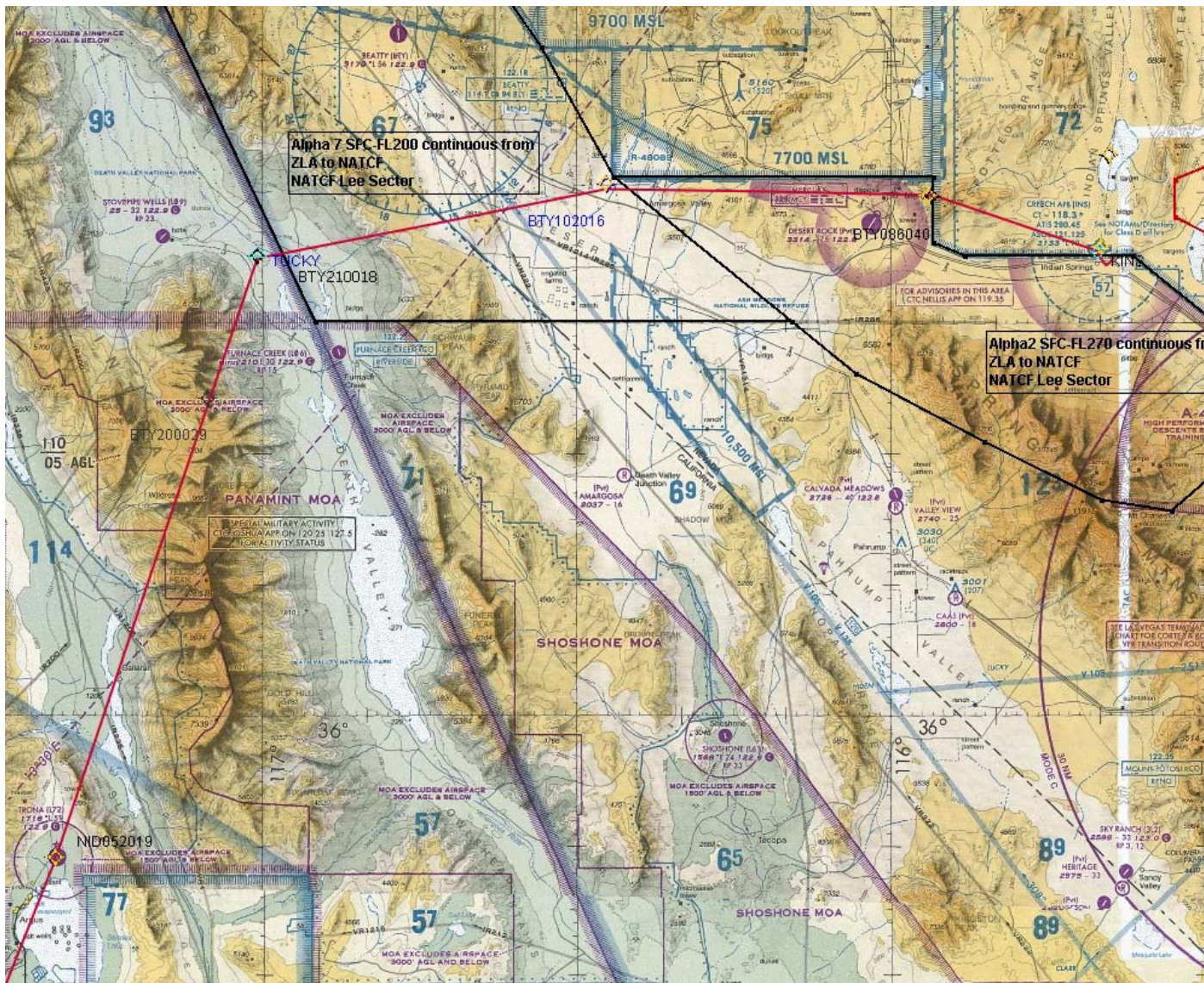


# R2508 and R2501 Lost Link Orbit



## R4806 Lost Link Orbit





MQ-1 VCV Lost Link Loiter



# MQ-1 Predator Lost Link Loiter

