DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

CERTIFICATE OF WAIVER OR AUTHORIZATION

ISSUED TO HQ Air Force Special Operations Command

ADDRESS
304 Terry Avenue
Bldg 90137
Hurlburt Field, Florida 32544

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 Predator-A Unmanned Aircraft System (UAS) in Class A airspace defined as the MQ-1 Main Operations Area/Jordan ATCAA, as depicted in attachment 1 under the jurisdiction of the Albuquerque Air Route Traffic Control Center (ZAB) and/or Cannon AFB Approach Control. When authorized by ATC, operations may be conducted from Flight Level (FL) 180 B FL230, in the Main MQ-1 Operations Area/Jordan ATCAA. 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-CSA-42-COA, is effective from August 1, 2011 through July 31, 2012 and is subject to cancellation at any time upon notice by the Administrator or his/her authorized representative.

BY DIRECTION OF THE ADMINISTRATOR

Dean E. Fulmer

FAA Headquarters
(Region)

Dean E. Fulmer
(Signature)

June 29, 2011
(Date)

Acting Manager, ATO, UAS Group, AJV-13
(Title)

ATTACHMENT to FAA FORM 7711-1

Issued To: HQ Air Force Special Operations Command

Address: 304 Terry Avenue
Bldg 90137
Hurlburt Field, Florida 32544

Activity: Operation of the MQ-1 Predator-A Unmanned Aircraft System (UAS) in Class A airspace defined as the MQ-1 Main Operations Area/Jordan ATCAA, as depicted in attachment 1 under the jurisdiction of the Albuquerque Air Route Traffic Control Center (ZAB) and/or Cannon AFB Approach Control. When authorized by ATC, operations may be conducted from Flight Level (FL) 180 B FL230, in the Main MQ-1 Operations Area/Jordan ATCAA.

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 COA (2010-CSA-42) is valid from August 1, 2011, through July 31, 2012. 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 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, 14 CFR 91.903, Policy and Procedures, the following provisions provide acceptable mitigation of 14 CFR 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 100 ft 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.
- 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 (including live 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 Department of the Air Force has made its own determination on the Airworthiness and safety on the MQ-l UA. The MQ-l UA must be operated in strict compliance with all provisions and conditions contained in the Flight Certificate, including all appendices.

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 otherwise indicated 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 and anti-collision (strobe) lights on at all times during flight.

- The UA PIC shall not accept any ATC clearance requiring the use of visual separation, sequencing or visual approach.
- Special VFR is not authorized.
- Flight in Reduced Vertical Separation Minima (RVSM) airspace is not authorized.
- The UA shall not be operated (including lost link procedures) over congested areas, heavily trafficked roads, or an open-air assembly of persons.
- 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.
- 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 NOTAM's 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.
- A copy of this COA including the special provisions will be maintained on site by the PIC or designated representative whenever operations are being conducted.
- HQ Air Force Special Operations Command 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. This COA only applies to operations conducted in the Class A airspace identified in attachment 1 (Main MQ-1 Operations Area/Jordan ATCAA) on an IFR flightplan. It does not apply to transit flights to/from Cannon AFB.

2. VFR transit flights to/from Cannon AFB to the Main MQ-1 Operations Area/Jordan ATCAA will be done during daylight hours only and in accordance with the Provisions listed in FAA issued COA 2010-CSA-11-COA and its renewal.

3. All operations must be conducted while Cannon RAPCON is open.

4. All climb and descent transitions to/from Class A airspace will take place wholly within R-5104.

5. Night operations are permitted in the Main MQ-1 Operations Area/Jordan ATCAA with the following condition:

a. All transit flights between Cannon AFB Class D airspace and R-5104A will be VFR and conducted during daylight hours in accordance with the Provisions listed in FAA issued COA 2010-CSA-11-COA and its renewal.

6. The Pilot in Command (PIC) shall file an IFR flightplan no later than (2) hours prior to any flight.

7. 27 SOW will schedule the Main MQ-1 Operations Area/Jordan ATCAA) via the SAMS/MADE system per requirements stipulated in the Albuquerque ARTCC/27 SOW Letter of Agreement.

8. The requested route in the IFR flightplan shall be filed as follows:

    a. R5104..JRDN/D+00..R5104. After JRDN put the delay time in hours.

        i. All operations in the Main MQ-1 Operations Area/Jordan ATCAA shall be limited to FL180B230 as assigned by ATC.

    b. Unless otherwise approved by ZAB, all IFR flight plans will be filed using fix/radial/distance off nearest navaid.

    c. All IFR flight plans originate and terminate within Restricted Area R-5104.

9. Contingency Operations: PIC will comply with all provisions of attachment 2

    a. Lost Link Points (LLP) are defined as those points where the UA shall proceed to and hold at a specified altitude, for a specified period of time, in the event the command and control link to the aircraft is lost.

    b. Lost link general requirements: In the event of a lost link, the PIC will immediately notify ZAB Operations Manager (505-856-4500), or the Southeast Front Line Manager (505) 856-4573 and/or Cannon AFB Approach Control (575-784-2465), state pilot intentions, and comply with the following:

        I. Lost link procedures in Attachment 2.

        II. 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.

        III. The UA lost link mission will not transit or orbit over populated areas.

        IV. 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.

V. Lost link orbit points shall not coincide with the centerline of Victor airways, Jet routes or Q routes.

10. A PIC must be designated prior to the launch of the UA, and must be at the controls of the UA during all phases of flight.

11. For flights 400 feet above ground level, The UA pilot-in-command (PIC) shall hold, at a minimum, a Federal Aviation Administration (FAA) Current FAA private pilot certificate, the FAA accepted the agency equivalent, based on the application or 14 CFR Part 61. . For flights in Class A airspace, the PIC must hold, in addition to a private pilot certificate or military equivalent, an instrument rating or, the FAA accepted the agency equivalent, based on the application or 14 CFR Part 61 and must be current for operations under Instrument Flight Rules.

12. All crewmembers including the PIC and visual observers must receive training under the direct supervision of a qualified instructor.

13. A frequency integrity check must be conducted prior to the launch of the MQ-l UA and must be recorded to insure "interference free" frequency utilization.

14. Sterile cockpit procedures must be observed during critical phases of flight.

15. The PIC must conduct a pre-takeoff briefing which includes a briefing of the contents of the COA, maximum altitude to be flown, initial heading, frequencies to be used, lost link procedures, the parameters of a flight termination point, hazards unique to the flight being flown, emergency procedures on takeoff and landing, amount of fuel as well as any other components critical for the safe conduct of the flight.

16. The use of cell phones or other telephonic communication must not be used unless required for the operational control of the UA and any required communications with Air Traffic Control.

17. HQ Air Force Special Operations Command has stated the proposed operation includes several risk mitigators that have or will be taken to ensure operations are conducted at an acceptable level of safety. The holder of this COA, or delegated representative, is responsible for halting or canceling activity in the COA flight 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 waiver.

18. The Federal Aviation Administration has the authority to cancel this COA or delay any activities if in their judgment, the safety of persons or property on the ground or in the air is in jeopardy, or upon observing or receiving a reported violation of the terms specified.

NOTAM: A distance (D) Notice to Airman shall be issued when UA operations are being conducted outside Class A airspace or Restricted/Warning areas. 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)

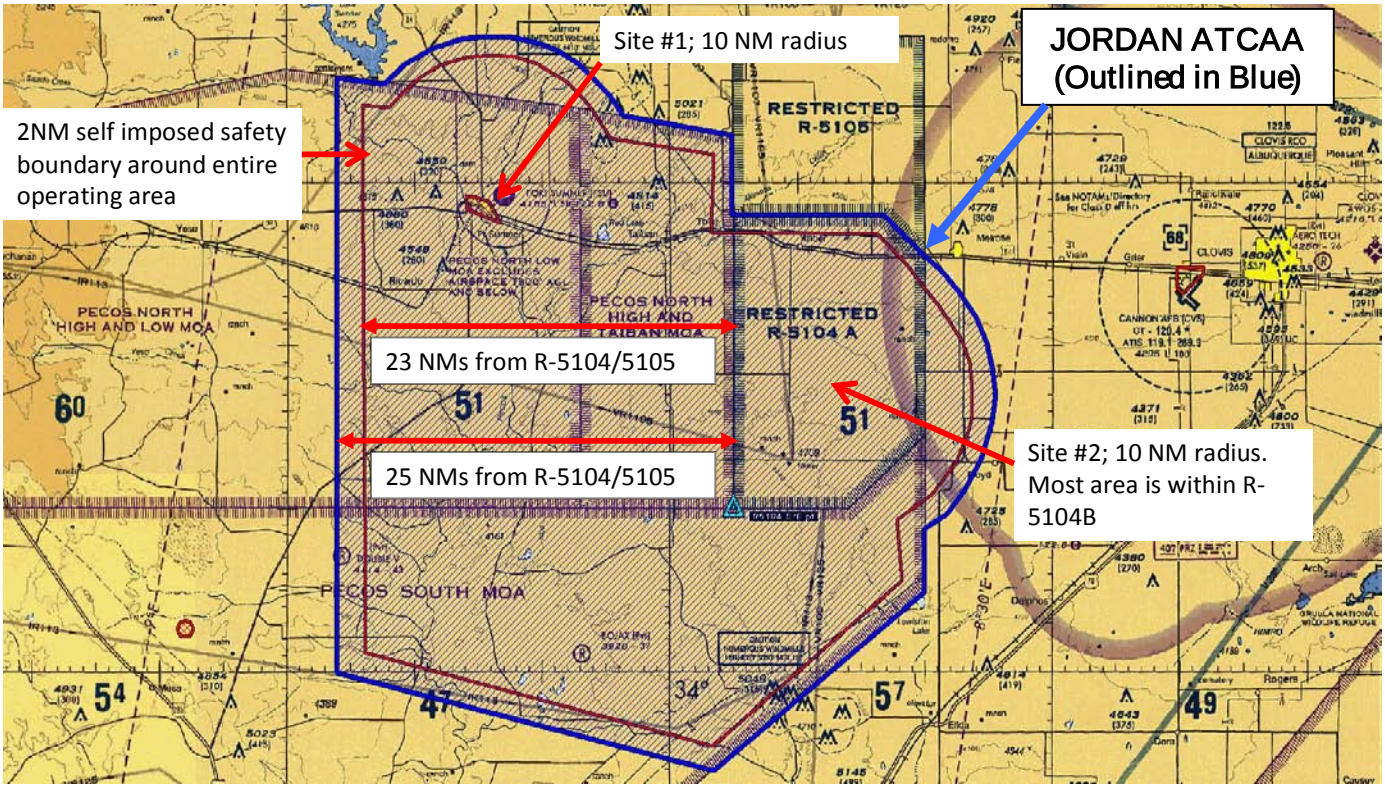
- The following shall be submitted via email, COA On-line or phone (202-385-4542, cell 443-569-1732) to Donald.E.Grampp@faa.gov **within 24 hours and prior to any additional flight under this COA**:
  - All accidents or incidents involving UAS activities, including lost link.
  - Deviations from any 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 HQ Air Force Special Operations Command to resolve the matter. This COA does not authorize flight within Special Use Airspace without approval from the Using Agency. The HQ Air Force Special Operations Command is hereby authorized to operate the MQ-1 Predator A Unmanned Aircraft System UAS in the operations area depicted in “Activity” above and Attachment 1 below.

Attachment 1 Main MQ-1 Operations Area /JORDAN ATCAA

Main MQ-1 Operating Area

FL180B230



Attachment 2

CONTINGENCY PROCEDURES

Emergency Flight Termination: Unable to sustain flight

In the event of Flight Termination, the PIC must:

1. Declare an IFE (In Flight Emergency)
2. Command the UA to squawk 7700 and attempt to navigate the UA to R-5104, avoiding over flight of populated or congested areas if possible.
3. Provide ATC with intended FTP location within R-5104 (In Navigational Aid, radial, distance format)
4. Provide other available information as time/workload permits

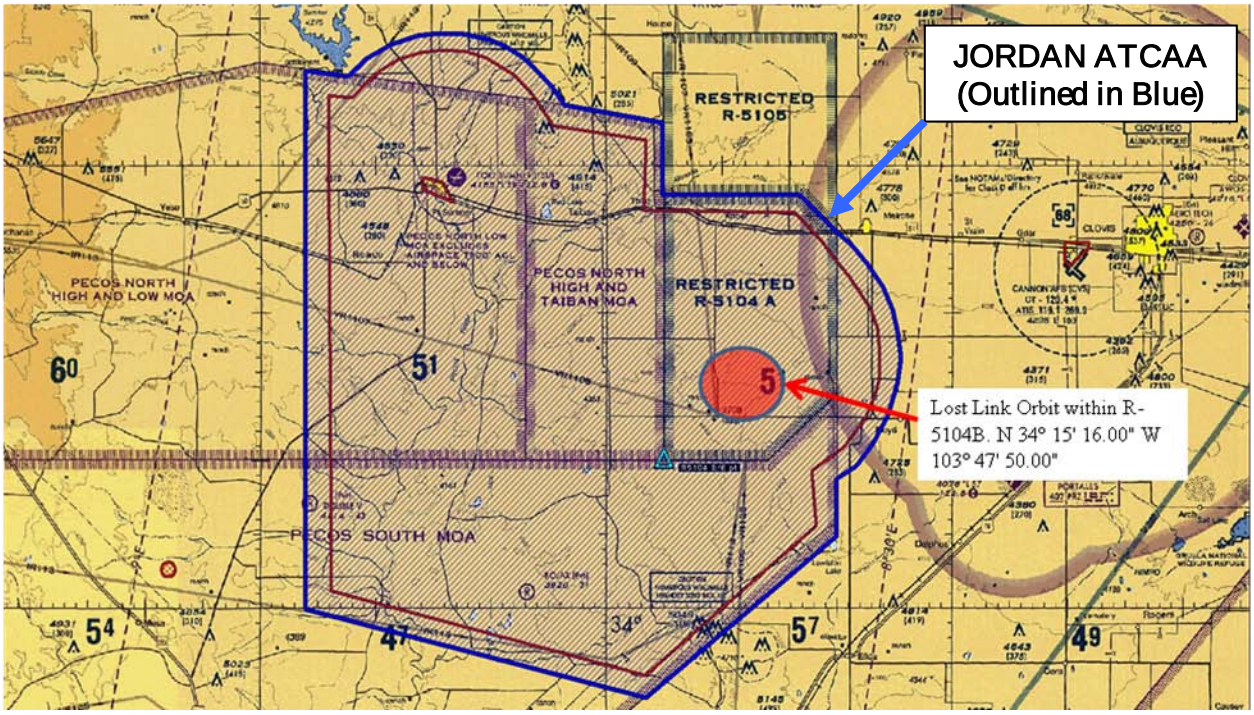
Lost Link: Loss of command uplink, downlink, or both links between the ground control station and the UA.

In the event of a Lost Link condition, the PIC must:

1. Declare an IFE (In Flight Emergency)
2. If ATC communications are lost, re-establish ATC communications via alternate means (e.g., alternate radio frequencies or telephone).
3. Squawk 7600.
4. Provide ATC with last known position (in navaid, radial, distance format), altitude, and heading
5. Lost Link profile will be at last altitude assigned by ATC.
6. Comply with the lost link procedures listed below.

Automated UA Flight Procedures: *Note: The PIC shall ensure the emergency mission profile is continually updated throughout the flight so that, in the event of a Lost Link situation, the UA remains at the last assigned altitude and routing and proceeds as follows:*

Lost link In Main MQ-1 Operations Area and R-5104 A/B (JORDAN ATCAA):



7. UA will squawk 7600 and orbit in a 1.5 NM circular orbit for 30 minutes within the operating area at last assigned altitude.

8. If unable to obtain link within 30 minutes, the UA will proceed direct to the identified Lost Link Orbit Point within R-5104A/B at the last ATC assigned altitude**.**

9. PIC will contact ZAB or Cannon Approach and notify them of the lost link condition. Information will include the UA's position, altitude, and direction of flight.

10. When the UA arrives in R-5104A/B, the UA will enter a six waypoint lost link orbit (3 NM radius centered on N 34° 15' 16.00" W 103° 47' 50.00"). This six waypoint lost link orbit will provide an area in the event link cannot be re-established. The UA will orbit in the last six waypoints until link is regained or fuel exhaustion. At fuel exhaustion, the UA will lower the landing gear and continue to fly the orbit while descending (engine out) until ground impact.

Lost Communications: Loss of radio communications between the PIC and ATC.

In the event of Lost Radio Communications between the PIC and ATC, the PIC must:

11. Squawk 7600, remain within the MQ-1 Main Operations Area/Jordan ATCAA, maintain last assigned altitude and course, and attempt to re-establish communications with ATC via alternate means (e.g., alternate radio frequencies or telephone).

12. Once alternate communications is established, coordinate the recovery altitude and route of flight with ATC.