

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

CERTIFICATE OF WAIVER OR AUTHORIZATION

ISSUED TO

United States Special Operations Command

ADDRESS

100 Bartley Street
Suite 110S
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 Shadow UAS within Class G and Class E airspace at and near the Pinon Canyon Airport (0CD5), at or below 4,000 feet Above Ground Level (AGL), not to exceed 10,000 feet Above Mean Sea Level (MSL), as described in Attachment 1, under the jurisdiction of the Denver Air Route Traffic Control Center (ARTCC). 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.

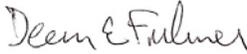
SPECIAL PROVISIONS

Special Provisions are set forth and attached.

This certificate, 2011-WSA-28-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

FAA Headquarters
(Region)


Dean E. Fulmer
(Signature)

July 29, 2011
(Date)

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

ATTACHMENT to FAA FORM 7711-1

Issued To: United States Special Operations Command

Address: 100 Bartley Street
Suite 110S
Hurlburt Field
Florida 32544

Activity: Operation of the Shadow UAS within Class G and Class E airspace at and near the Pinon Canyon Airport (0CD5), at or below 4,000 feet Above Ground Level (AGL), not to exceed 10,000 feet Above Mean Sea Level (MSL), as described in Attachment 1, under the jurisdiction of the Denver Air Route Traffic Control Center (ARTCC). 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-28) is valid from August 1, 2011, through July 31, 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 91.113 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 feet 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 (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.
- US Special Operations Command has made its own determination on the Airworthiness and Safety of the RQ-7 Shadow and must be operated in strict compliance with all provisions and conditions contained in the Airworthiness Release, including all documents referenced in the COA application and applicable Department of Defense publications.

Pilot / Observer Provisions:

1. **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.

2. 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.

3. **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. 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.
- Operations shall not loiter on Victor airways, Jet Routes, Q Routes, T 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.
- At no time will TCAS be used in any mode while operating an unmanned aircraft.
- Only one UA at a time will be flown in the operating area.
- The PIC of the UA will have a copy of the COA on hand for reference during the flight.
- The United States Special Operation 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

Operational:

1. **Flight Operations Area Details:**
 - a. Small Pinon Area is defined as:
 - 1) 37-31-30.14N; 104-07-38.52W
 - 2) 37-30-26.04N; 104-05-05.45W
 - 3) 37-28-12.44N; 104-05-14.43W
 - 4) 37-26-49.18N; 104-06-34.66W

- 5) 37-26-49.39N; 104-10-05.80W
- 6) 37-29-20.03N; 104-10-19.33W

b. Small Pinon Area Restrictions:

- 1) One UA at a time.
- 2) Altitude: At or below 8000' MSL.
- 3) Ground Observers approved for operations below 2000'AGL.
Ground Observers may be stationed anywhere within the Small Pinon area provided all observers have direct and immediate radio contact with the PIC. If an observer loses sight of the UA, the observer shall notify the PIC, the PIC shall direct the UA to proceed to the Pinon Canyon Airport OCD5 until visual contact is regained. If visual contact is not regained, the UA PIC will immediately initiate flight termination.
- 4) Airborne Observers required for operations at and above 2000'AGL.
- 5) Night operations are confined to the Pinon Small Area (as defined in Special Provision 1 a.) below 2,000 feet AGL, and in accordance with the requirements listed in Special Provision # 5.

c. Large Pinon Area is defined as:

- 1) 37-22-52.11N; 104-09-44.32W
- 2) 37-22-53.55N; 104-07-28.27W
- 3) 37-21-00.13N; 103-57-26.90W
- 4) 37-21-33.75N; 103-54-05.93W
- 5) 37-32-47.11N; 103-42-38.18W
- 6) 37-38-16.13N; 103-48-34.01W
- 7) 37-33-24.22N; 103-58-10.42W
- 8) 37-32-29.12N; 104-02-21.44W
- 9) 37-32-30.48N; 104-06-22.29W
- 10) 37-29-20.09N; 104-10-20.02W
- 11) 37-26-50.77N; 104-10-05.89W

d. Large Pinon Area Restrictions:

- 1) One UA at a time.
 - 2) Altitude: At or below 10,000' MSL.
 - 3) Airborne Observers required.
 - 4) Night operations are not authorized.
 - 5) **Maximum operating altitude when operating within 4.0 nm of the centerline of V-81 is 9,500' MSL.**
 - 6) Concurrent operations between the Small and Large Pinon Area are not authorized.
2. Use of visual observers in a linear fashion away from the control station (daisy chaining) is prohibited.
 3. The Shadow UA shall squawk 1200 code when operations are being conducted.

4. Chase aircraft operations will adhere to the following:
 - a. A chase aircraft with dedicated airborne visual observer is required at all times when operating at or above 2,000 feet AGL in the Small Pinon area or, at any altitude within the Large Pinon area.
 - b. Chase PIC will be trained in formation/chase operations with emphasis on chasing slow moving aircraft.
 - c. Chase must maintain a safe distance from the UA should the UA experience a malfunction.
 - d. Chase operations must be conducted during daylight hours only.
 - e. In-flight visibility must be 5 statute miles.
 - f. Chase must maintain close enough to provide visual detection of conflicting aircraft in the path of the UA to advise the UA PIC of the situation.
 - g. The chase pilot and observer must maintain direct radio voice contact with the UA pilot. The UA pilot will announce any abrupt or unplanned maneuvers with acknowledgement from the chase pilot prior to maneuver execution. For added safety, all UA maneuvers should be announced prior to execution.
 - h. Should the chase pilot and observer lose sight of the UA, the chase will immediately notify UA pilot. The chase pilot will immediately ensure positive altitude separation, notify ATC or range control as applicable. The UA and chase aircraft will then proceed to the Pinon Canyon Airport 0CD5 for rejoin. If visual contact is not regained, the UA PIC will immediately initiate flight termination.
 - i. Should the chase pilot and observer lose communications with the UA pilot, the chase pilot and UA pilot will immediately notify ATC or range control as applicable. If communications cannot be immediately restored, the UA PIC will direct the UA to recover to a Tactical Automatic Landing System (TALS) point of recovery.
5. Night operations are authorized in the small area only, provided all daylight provisions are adhered to and, the following are met:
 - a. 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)

- b. Night operations are confined to the Small Pinon area below 2,000 feet AGL.
- c. Ground-based visual observers are utilized. Use of airborne chase observer is prohibited.
- d. Visual observers must be in place thirty minutes prior to night operations to ensure dark adaptation.
- e. Use of night vision electronic devices will not be used as a primary means to execute observer duties.
- f. Observers will undergo additional training on the lighting configuration of the UA to ensure proper recognition during night flights.
- g. The UA must have working navigational/position and anti-collision lights on at all times.

Coordination and Communication:

- 6. One hour prior to commencing operations, the PIC will contact Call Denver ARTCC at (303) 651-4252 and provide start/stop times and NOTAM number.
- 7. The PIC will report completion of operations within one hour to Denver ARTCC at telephone (303) 651-4252.
- 8. The PIC will describe the airspace as listed below when coordinating a Notice to Airman (NOTAM):
 - a. UAS operations at or below 8,000 MSL within 3 nm of TBE 289029/0CD5 and within the boundaries of Pinon Canyon MOA.
 - b. UAS operations at or below 10,000' MSL within 12 nm of TBE 300021 and within the boundaries of Pinon Canyon MOA.
- 9. As part of the Mission Planning/Brief process in conjunction with a NOTAM submission, ATC will be notified if a chase aircraft will be used.
- 10. The Pinon Canyon MOA shall not be activated solely for UAS operations authorized in this COA. Proponent will notify Denver ARTCC during the 1 hour prior call if UA operations will be flown concurrently with the Pinon Canyon MOA activation for other aircraft flight operations.
- 11. The PIC will contact Pinon Canyon Range Control at (719) 524-0577 for MOA status coordination.

12. The PIC will contact the 27th OSS, Cannon AFB (Primary: 27.soss.osoa@cannon.af.mil), Secondary: (575) 784-2521) for de-confliction with possible Low Altitude Tactical Navigation operations.
13. The PIC will contact 140th OG/CC Buckley ANGB at (720) 847-9472 for de-confliction with IR-409 and VR-1427, both of which pass through the area of operations.
14. Direct ATC radio communications with Denver ARTCC is not required.

Contingencies: Lost Link, Emergency and Lost Communications:

15. The following Lost Link Procedures shall be adhered to:
 - a. The Shadow UA will remain within assigned Flight Operations Areas identified in Attachment 1, above 500' AGL and below the highest mission profile altitude.
 - b. After a 15-second timeout, the UA will maintain 2000'AGL or current mission assigned altitude below 2000'AGL, proceed direct the Lost-Link Holding and Ditch Point and enter a holding pattern identified in Attachment 2.
 - c. If after 1 hour the UA has not regained link, the Flight Termination System (FTS) will engage and terminate the flight.
 - d. This procedure shall be committed to the flight mission profile through the Mission Planner prior to launch of every flight.
16. In the event of a fly-away condition, the PIC shall contact ATC and/or Range Control as appropriate, and provide last known position, direction of flight, fuel time remaining and last known altitude.

Other:

17. All crewmembers associated with the operation of the UA, including chase operations, must be qualified or must be receiving formal training under the direct supervision of a qualified instructor who has, at all times, responsibility for the operation of the UA.
18. Sterile cockpit procedures must be observed; no crewmember may perform any duties during a critical phase of flight not required for the safe operation of the aircraft. No crewmember may engage in, nor may PIC permit, any activity during a critical phase of flight which could distract any crewmember from the performance of his/her duties or which could interfere in any way with the proper conduct of those duties. Critical phases of flight include all ground operations involving taxi (movement of an airplane under its own power on the surface of an

airport), take-off and landing, and all other flight operations in which safety or mission accomplishment might be compromised by distractions.

19. Crew Resource Management practices will be used during UA operations.
20. The use of cell phones or other electronic devices are restricted to the operational conduct of the UA and any required communications with Air Traffic Control.
21. A frequency integrity check must be conducted prior to the launch of the UA to ensure any electromagnetic interference does not adversely affect control of the UA.
22. For operations above 400' AGL in Class G and all other classes of airspace, the PIC must hold, at a minimum, a current FAA private pilot certificate or FAA accepted agency equivalent, based on the application or 14 CFR Part 61.
23. The holder of this COA, or delegated representative, is responsible for halting or canceling activity in the approved 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 COA. It is the responsibility of U.S. Special Operations Command to provide for the safety of flight in the National Airspace System and provide for the safety of persons and property on the ground.

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 1 hour 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.

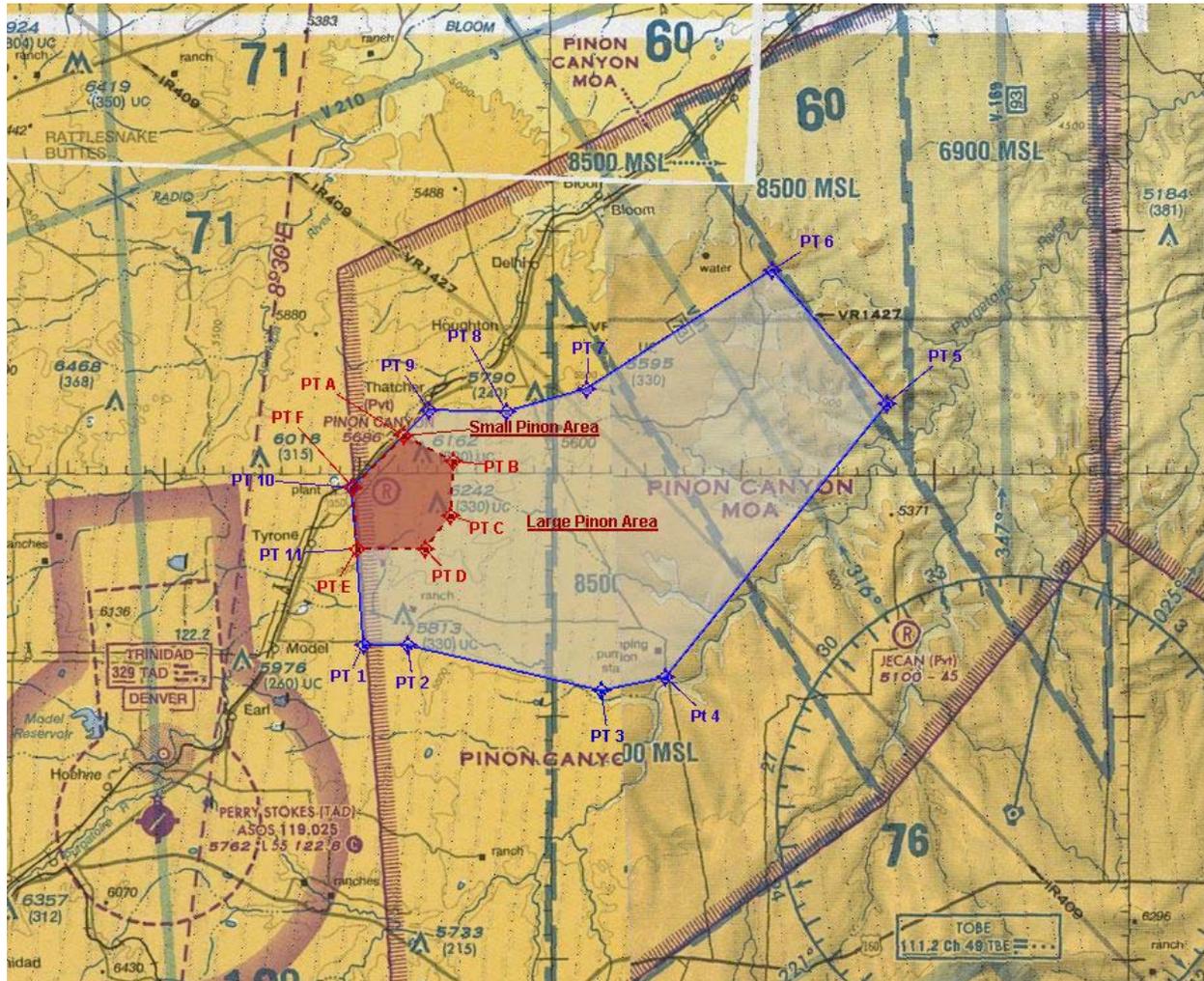
Incident / Accident and Normal Reporting Provisions: The following information is required to document routine and unusual occurrences associated with UAS activities in the NAS.

- 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 United States Special Operation Command to resolve the matter. This COA does not authorize flight within Special Use Airspace without approval from the Using Agency. The United States Special Operation Command is hereby authorized to operate the Shadow Unmanned Aircraft System UAS in the operations area depicted in "Activity" above and attachment 1 and 2 below.

Attachment 1

Flight Operations Area: Flight Operations areas **do not** include any part of the Pinon Canyon MOA outside the lateral and vertical dimensions of the identified Flight Operations Area below. Activation of the Pinon Canyon MOA is not required or authorized for the sole purpose of UAS operations described in this COA.



Large Pinon Area:

- Point 1: 37-22-52.11N; 104-09-44.32W
- Point 2: 37-22-53.55N; 104-07-28.27W
- Point 3: 37-21-00.13N; 103-57-26.90W
- Point 4: 37-21-33.75N; 103-54-05.93W
- Point 5: 37-32-47.11N; 103-42-38.18W
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Point 10: 37-29-20.09N; 104-10-20.02W

Point 11: 37-26-50.77N; 104-10-05.89W to the point of beginning

Altitudes: Surface to 10,000 feet MSL, except; surface to 9,500' MSL within 4.0nm of the centerline of V-81.

Small Pinon Area:

Point A: 37-31-30.14N; 104-07-38.52W

Point B: 37-30-26.04N; 104-05-05.45W

Point C: 37-28-12.44N; 104-05-14.43W

Point D: 37-26-49.18N; 104-06-34.66W

Point E: 37-26-49.39N; 104-10-05.80W

Point F: 37-29-20.03N; 104-10-19.33W to the point of beginning

Altitudes: Surface to 8,000 feet MSL

Attachment 2

Contingencies: Lost Link, Lost Communications, Emergencies

