CANNON AFB LAUNCH AND RECOVERY PROCEDURES

General:

The MQ-1 Predator follows a conventional launch sequence from a semi-prepared surface under direct line-of-sight control.

A Launch and Recovery Element (LRE) will be used for taxiing, launching, recovering, and traffic pattern operations within Cannon's Class D Airspace. All communications for launch, recovery and pattern work will be accomplished on designated ATC frequencies. Redundant UHF/VHF LOS voice radio with telephone communications are available as backup.

Weather minimums for departures and operations within the Cannon Class D must be at least basic VMC and forecasted VMC for the operating period in accordance with USAF basic weather minimums. Operations will not take place if forecast or reported turbulence at the airport is greater than moderate. Pilots will limit exposure to turbulence to the maximum extent practical. Pilots will comply with the wind limits specified in the MQ-1 flight manual. A Supervisor of Flying (SOF) will normally be in the tower to oversee all operations prior to the MQ-1 taxiing. ATC and the MQ-1 unit will maintain standard operating procedures that define the SOF's role in this function.

Ground observers must be in place and have accomplished communication checks prior to the aircraft taxing or exiting restricted airspace.

The following apply during taxi operations:
- If the pilot loses sight of the taxiway centerline, the aircraft will be stopped until visual contact with the centerline is reacquired. If the pilot cannot regain sight of the centerline, a wing walker must be in place with two-way communication established before moving the aircraft any further.
- The SO will use the sensor ball to clear for obstructions during taxi operations and prior to all turns. The SO will advise the pilot prior to releasing the sensor ball from position mode.
- If the pilot is using the sensor ball as the only video source for taxi and a requirement arises to use it for obstacle scanning, the pilot will bring the aircraft to a stop before releasing the sensor ball from position mode.
- Maximum taxi speed is 10 knots ground speed (KGS) on a taxiway, 20 KGS on a runway, and 5 KGS in a turn.
- ATC ground controller and/or observer will have eyes on the aircraft during all ground movements.

CANNON AFB LAUNCH AND RECOVERY PROCEDURES

Runway Requirements:
- Minimum runway length is 5000 feet.
- Minimum runway width is 75 feet.
- Minimum taxiway width is 50 feet.

Takeoff:
- The PIC will ensure take off and landing data (TOLD) are calculated prior to takeoff. TOLD will include the following as a minimum: rotate speed, lift-off speed, climb speed, and glide speed (engine out situations).
- Pilots will not taxi or takeoff over a raised cable or takeoff into a raised webbing-type barrier. Pilots may takeoff beyond or between raised cables provided there is 5000 ft of runway beyond or between barriers.
- The sensor ball will be in position mode when the aircraft is below 500 ft Above Ground Level (AGL).

Airborne:
- The Pilot will always have flight graphics displayed.
- The aircrew will perform operations checks at least once per hour. These checks will include fuel level, oil level, propeller pitch operation, and engine parameters at a minimum.
- An oil level check will be conducted every 30 minutes.
- The conduct of operations and oil level checks will not interfere with tactical or safety-of-flight operations. If required, these checks may be postponed until such time as they may be accomplished without mission degradation.

Approach and Landing:
- The PIC will ensure the approach and landing speeds have been calculated and briefed prior to commencing the approach.
- The sensor ball will be placed in position mode and flight graphics will be displayed on both PSO racks prior to descending below 500 feet AGL.
- The pilot will normally accomplish a 3 degree approach.
- The desired touchdown zone for a visual approach is 500 to 1500 feet from the threshold, or the precision approach glide path interception point. When local procedures

or unique runway surface conditions require landing beyond these points, the desired touchdown zone will be adjusted accordingly and all crewmembers briefed.
- Crewmembers will not attempt landing or touch-and-goes over raised webbing-type barriers. Pilots may land or accomplish touch-and-goes beyond raised cables provided there is 5000 feet remaining to the runway end or the next raised cable.
- Pilots will comply with wake turbulence avoidance criteria for a small aircraft (category 1) to the maximum extent possible.
- Pilots will not attempt practice night EO nose-camera landings. Low approaches are authorized. Pilots will not exceed 1200 feet per minute (FPM) descent rate on final approach and will establish normal glide path by 200 feet AGL. Descent rates greater than 600 FPM from threshold to flare require a go-around.

Chapter 2

SUPERVISON REQUIREMENTS

2.1. Squadron Supervision. The purpose of the Launch and Recovery Element (LRE) at Cannon AFB is to allow continuation training for RPA crews to maintain proficiency and currency, and to allow training in Melrose Range. Therefore it shall be the sole responsibility of the respective Operations Officer (DO) to ensure the safe and proper execution of all RPA operations at Cannon AFB. The respective DO may delegate this responsibility and authority to a Launch and Recovery (LR) Flying Operations Supervisor (FOS). The LR FOS shall have direct oversight of all RPA operations at Cannon AFB and Melrose Range. Squadron Commanders will determine which members may perform LR FOS duties.

2.1.1. Before performing LR FOS duties members will complete a squadron training program and be certified by the Squadron and Operations Group Commanders.

2.1.2. Squadrons will document "certified" LR FOS qualified members on the squadron "Letter of X" and will differentiate MCE and LRE FOS certifications.

2.2. Flying Operations Supervisor Duties.

2.2.1. Complete a LR FOS Training Program and be approved by both the 3 and 33 SOS Commanders.

2.2.2. Be on duty during all RPA flying operations.

2.2.3. Be Launch and Recovery (LR) qualified instructor pilot in either the MQ-1 or MQ-9.

2.2.4. Attend LR briefings, led by the PIC, with the flight crew if possible.

2.2.5. Be able to visually monitor the RPA's flight while in the local VFR pattern.

2.2.6. Be able to monitor all communications available to the RPA crew and observers; however, the FOS shall not transmit on any ATC frequency without first coordinating with the ATC watch supervisor.

2.2.7. NOT be on the crew's flight orders.

2.2.8. NOT act as a Mission Commander during any deliberate planning or range missions.

2.2.9. Assign Lost Link holding patterns.

2.2.10. Ensure that visual observers are in the appropriate locations.

2.3. Authority and Responsibilities. The LR FOS shall have the following authority and responsibilities:

2.3.1. The LR FOS has the authority to:

2.3.1.1. Cancel any flight(s) prior to takeoff.

2.3.1.2. Remove any flight crew member(s) prior to takeoff. Addition of flight crewmembers will be conducted through normal squadron Flight Authorization procedures.

2.3.1.3. Initiate weather recalls.

2.3.2. The LR FOS has the responsibility to:

2.3.2.1. Act as the primary point of contact between the aircrew and all other agencies not available to the aircrew directly by the RPA's radio.

2.3.2.2. Coordinate extension/cancelation of Melrose range times with the 27 SOW/A3.

2.3.2.3. Maintain copies of ORM sheets, flight orders, daily schedule, NOTAMS, Form 40 & weather briefings.

2.3.2.4. Ensure that the mission is planned IAW the most current FAA COA on file.

2.3.2.5. Ensure post mission paperwork is completed by the landing LRE crew (i.e. Form 40).

2.3.2.6. Inform Cannon ATC when RPA operations are complete.

Chapter 3

MISSION PLANNING

3.1. Primary point of contact (POC) for command and control of RPA missions is the Pilot in Command (PIC).

3.2. Scheduling authority for RPA operations is the 27 SOSS/OSOS.

3.3. Flight Plans. All MQ-1 and MQ-9 missions will file a flight plan with Cannon AMOPS and meet the requirements of AFI 13-204V3 paragraph 3.10.2.7. Cannon AMOPS does not currently maintain stereo flight plans for RPA operations. The crew will file by telephone and provide the following information: takeoff time, altitude, route, and duration. A DD Form 175 will be filed at Cannon AMOPS prior to departure. If a change to the flight plan is required after the aircraft is airborne, the PIC will contact the controlling agency and request an amendment to the RPA's clearance.

3.4. Stereo Flight Plans. Stereo flight plans will be incorporated in future revisions of this operating instruction.

3.5. Notification of RPA Operations.

3.5.1. Notices to Airmen (NOTAM).

3.5.1.1. CLASS D. Squadrons will request the issuance of a Distance (D) NOTAM a minimum of 24 hours prior to RPA operations by contacting AMOPS.

3.5.1.2. Class E Corridor. NOTAM will be issued by the 27 SOSS Current Operations Personnel (27 SOSS/OSO) through the Flight Service Station at 877-487-6867 not more than 72 hours in advance, but not less than 48 hours prior to the operation. 27 SOSS/OSO personnel will issue the NOTAM based on the weekly schedule signed by the 27 SOW/CC.

3.5.2. ATIS. Cannon Tower will include notice of RPA operations on the ATIS broadcast prior to approving an RPA for taxi, or 15 minutes prior to the estimated time of arrival if an RPA is operating outside of the terminal airspace. ATIS phraseology will be "Unmanned Aircraft Operations Are In-Progress." Cannon Tower will terminate the ATIS advisory when notified by the LRE FOS that RPA operations are complete, the RPA will not return to Cannon Class-D for over one hour, or when the RPA lands, exits the runway, and no longer poses a potential impact to taxi operations.

3.5.3. The 27 SOSS will ensure appropriate Flight Information Publications reflect RPA operations within the Cannon Class D Airspace IAW AFI 13-204 V3 paragraph 3.10.2.5.

3.6. Frequencies.

3.6.1. UHF and VHF Radio Frequencies. All Cannon AFB based RPAs equipped with UHF

and VHF radios are channelized as outlined in **Table 1.1**. Air traffic controllers may assign channel numbers to locally based aircraft.

Table 1.1 RPA Local Standard Radio Presets

Channel	UHF	VHF	Agency
1	269.9	119.1	Cannon AFB ATIS
2	275.8	121.9	Cannon AFB Ground
3	270.25	120.4	Cannon AFB Tower
4	307.175	125.05	Cannon AFB Approach Control
5	293.225	120.2	Cannon AFB Clearance Delivery
6		141.9	RPA Common frequency/LRE FOS
7	285.6	126.85	Albuquerque Center (Cannon, Clovis, Portales)
8	376.15	122.7	Melrose Range Frequency
9	311.0		Cannon AFB Command Post - Trail boss
10		122.8	Clovis / Portales / Ruidoso / Ft Sumner Muni Unicom
11	269.125	127.75	Cannon AFB Radar
12	279.55		Cannon AFB Radar
13	343.1	TBD	Cannon AFB PMSV Metro
14	TBD	TBD	Reserved
15	273.5		Holloman AFB ATIS
16	269.225	120.6	Holloman AFB Approach Control
17	255.9	119.3	Holloman AFB Tower
18	346.55		Holloman AFB PMSV Metro
19			Holloman AFB Command Post – Raymond 14
20	257.6	132.65	Albuquerque Center (Holloman AFB)

3.6.2. Controlling Agencies.

Table 1.2 Controlling Agency Frequencies

Agency	UHF	VHF
Unicoms / CTAF		122.8
ABQ Center (Cannon)	285.6	126.85
ABQ Center (Tucumcari)		134.6
ABQ Center (Ruidoso)		132.65
ABQ Center (Holloman)	257.6	132.65
Ft Worth Center	316.1	126.45

Chapter 4

GROUND OPERATIONS

4.1. Ground Communications.

4.1.1. The pilot and ground crew will conduct radio checks to ensure two-way communications are established prior to all ground checks and anytime the aircraft's engine is operating on the ground. Two-way communication will be maintained until the pilot releases the ground crew.

4.1.2. Prior to engine start, the pilot will conduct a radio check and establish two-way communications with all observers. The primary and back up communications shall be checked. Observers will be in communication with the pilot and will follow procedures as specified in **Chapter 5**.

4.1.3. Intercom communications will be limited to flight-critical information from commencement of the "Engine Start" checklist until completion of the "Climb" checklist and from initiation of "Arrival" checklist until completion of "Shutdown" checklist.

4.2. Call-sign/Transponder. Aircraft will be assigned a call-sign and transponder code for the duration of the flight. In the event of transfer of control from one control station to another, the aircraft will retain the same call-sign, transponder code and emergency mission. Change of call-sign requires re-filing a new flight plan. Transponder "OFF" operations are prohibited.

4.3. Ground Control Station (GCS) Entry. The GCS is to be considered a cockpit environment. Entry & exit of the GCS and personnel within will be limited to aircrew and mission essential ground crew. During in-flight troubleshooting and emergencies, additional personnel will be limited to the minimum personnel required. The PIC has final authority for the entry/exit and number of personnel in the GCS. Squadrons may establish more restrictive policies, but in general, adhere to the following procedures:

4.3.1. Tours of the GCSs will be coordinated with the LR FOS and PIC.

4.3.2. All communications with the crew not directly associated with the mission will be routed through the LR FOS.

4.3.3. Crew Changeovers. Crew changeovers are a critical time when crews are easily distracted from safe aircraft operations. Crew changeovers will only occur at altitudes above 2,000 ft. AGL (6,300 ft. MSL).

4.3.4. Seat swaps within the crew will occur at altitudes above 800 ft. AGL (5,100 ft. MSL). When the seat swap will put an unqualified pilot in control, delay the seat swap until at least 2,000 ft. AGL (6,300 ft. MSL).

4.3.5. Traffic pattern operations are considered a critical phase of flight. Noise, light, and

additional personnel entering the GCS may easily distract aircrew. Entry/exit must be limited when the aircraft is in the traffic pattern.

4.3.6. No personnel shall enter or exit the GCS unless approved by the PIC. For entrance, see paragraph 4.3.8.

4.3.7. If maintenance or other support personnel are already in the GCS when the aircraft departs the Base Turn, Low Key, FAF or within 3 miles for a straight-in approach, they shall remain still and quiet in the rear of the Control Station, until the aircraft climbs through 800 ft. AGL (5,100 ft. MSL) or slows to taxi speed (for full stop landings).

4.3.8. Entrance to a GCS will be gained by knocking twice on the Sensor Operator's (SO) side of the GCS. The SO will respond with the PIC's intentions by the following actions:

4.3.8.1. One knock: Personnel requesting entry must wait outside.
4.3.8.2 Two knocks: Personnel requesting entry are cleared to enter.
4.3.8.3. No response from the SO means entrance is not authorized. Contact via landline or radio if communication with crew is required.

4.4. Prior to applying power to the Ground Data Terminal (GDT), aircrew will make an advisory call "GCS XX GDT Power Coming ON" to notify Maintenance and de-conflict with other GCSs on the RPA Common Frequency.

Chapter 6

MELROSE RANGE OPERATIONS

6.1. Tower Duties - Departures.

6.1.1. Upon initial taxi of the RPA, contact Clearance Delivery for a discrete beacon code and provide notification of taxiing aircraft.

6.1.2. When the RPA is ready for departure, contact RAPCON for approval to enter the transition corridor. If approval is received, tower shall launch the aircraft and direct the RPA to proceed to point Alpha (entry point into corridor, **Figure 13**), and climb to 6,800 ft. MSL.

6.1.3. If notified that the RPA cannot enter the corridor after airborne, tower will notify the pilot to hold at DODGE (**Figure 13**) at 6,800 ft. MSL until permission can be given to enter the corridor. The RPA will remain within Class-D airspace until cleared into the corridor.

6.1.4. Notify RAPCON when the RPA is level at 6,800 ft. MSL; if no traffic conflicts are observed, Tower will have the RPA contact RAPCON.

6.2. Tower Duties - Arrivals.

6.2.1. When RAPCON notifies Tower that the RPA is 15 minutes prior to return from restricted airspace, clear all non-participating aircraft out of Class-D airspace. If unable to comply, notify RAPCON immediately.

6.2.2. After inbound notification and before the RPA exits restricted airspace, inform RAPCON that the RPA is cleared to enter Class-D airspace. If unable, provide reason(s) and estimated time of delay.

6.3. RAPCON Duties – Departures.

6.3.1. Upon receiving notification from Tower that the RPA is taxiing, contact Melrose Range Control, or Command Post as applicable, for clearance into the restricted airspace and provide Tower with a discrete beacon code and any restrictions passed from Melrose Range Control.

6.3.2. Ensure the follow conditions are met prior to releasing the RPA into the corridor:

6.3.2.1. Approval to enter restricted airspace is attained from Melrose Range Control (Class-A Operations), or Command Post (Class-B Operations) as applicable.

6.3.2.2. The corridor is clear of any conflicting traffic not currently in contact with RAPCON.

6.3.2.3. Received verification from the RPA pilot that they have no observed traffic

within the corridor using the RPA sensor(s) or reported by the ground observers.

6.3.2.4. After these conditions are met, RAPCON will clear the RPA to climb to 7,300 ft. MSL and approve the RPA into the corridor.

6.3.3. Monitor the RPA track throughout the entire transition as depicted in **Figure 13**. If conflicting traffic is observed after the RPA is in the corridor and RAPCON has no communication with the traffic, RAPCON will notify the RPA pilot and determine a plan of action, i.e., continue on course, return to DODGE holding area, hold over a specific observer location, etc.

6.3.4. Advise Melrose Range Control when the RPA enters the corridor, and transfer RPA communications to Melrose Range Control, or Command Post as applicable, one mile prior to the RPA reaching Point Bravo (**Figure 13**).

6.4. RAPCON Duties – Arrivals.

6.4.1. Notify Tower when the RPA is approximately 15 minutes from exiting the restricted airspace.

6.4.2. Ensure the follow conditions are met prior to releasing the RPA into the corridor:

6.4.2.1. Approval from Tower for Class-D entry.

6.4.2.2. The corridor is clear of any conflicting traffic not currently in contact with RAPCON.

6.4.2.3. Received verification from the RPA pilot that they have no observed traffic within the corridor using the RPA sensor(s) or reported by the ground observers.

6.4.2.4. After these conditions are met, RAPCON will authorize the RPA into the corridor at 7,300' MSL.

6.4.2.5. If the RPA cannot be authorized into the corridor, RAPCON will notify Melrose Range Control or Command Post as applicable, and hold the RPA inside the Restricted Airspace at the FORDD (**Figure 13**) holding area at 7,300 ft. MSL until approval is received.

6.4.3. Provide Tower an inbound notification on the RPA when the aircraft is established in the corridor and enroute to Cannon AFB.

6.4.4. Notify Melrose Range Control or Command Post as applicable, when the RPA is clear of the restricted airspace.

6.4.5. Monitor the RPA track throughout the entire transition as depicted in **Figure 13**. If conflicting traffic is observed after the RPA is in the corridor and RAPCON has no

communication with the traffic, RAPCON will notify the RPA pilot and determine a plan of action, i.e., continue on course, return to FORDD holding area, hold over a specific observer location, etc.

6.4.6. One mile prior to Point Alpha, transfer communication and control to tower.

6.5. RPA Aircrew Duties.

6.5.1. Utilize the discrete beacon code assigned by ATC throughout the entire flight.

6.5.2. Conduct primary and backup communication checks with ATC and all observers prior to takeoff.

6.5.3. Notify ATC if the RPA is unable to comply with any ATC instructions.

6.5.4. Prior to climbing through 6,800 ft. MSL in Class-D airspace or leaving the restricted airspace, verify that the observers' areas of responsibility are clear via the radio.

6.5.5. Use the Multi-Spectral Targeting System (MTS) pod to scan the corridor for potential traffic.

6.5.6. Approximately 15 minutes prior to exiting the Restricted Airspace, notify Range Control, observers and RAPCON of intentions to exit.

6.5.7. Prior to exiting the DODGE/FORDD holding areas for entry into the corridor, announce RPA entry into corridor on Land Mobile Radio (LMR).

6.5.8. Only proceed to the entry, exit, or associated holding patterns as directed by ATC or Range Control.

6.5.9. Announce to the observers when entering and exiting each observer location with the observer number, i.e., "Entering Watchman 8, Exiting Watchman 7".

6.5.10. Remain within the corridor at all times except in the event of an emergency (IAW 14 CFR Part 91.3).

6.5.11. If conflicting traffic is called from either the RAPCON or observers when the RPA is in the corridor, the RPA shall hold at their present position and remain within the corridor until traffic is no longer a factor or proceed as directed by RAPCON. **Figure 14** is an example of the holding pattern if the RPA receives a traffic call for an aircraft flying through an observer's area of responsibility.

6.5.12 Receive a positive radio acknowledgement from each observer prior to entering the corridor. Alternate communication is authorized.

6.5.13 In the event of a non-emergency unscheduled RTB (i.e. mission completion, wx, non-emergency maintenance, etc), contact observers to ensure they are in place prior to the RTB.

Figure 13 - Corridor Route with Lost Link/Holding Orbit Profiles

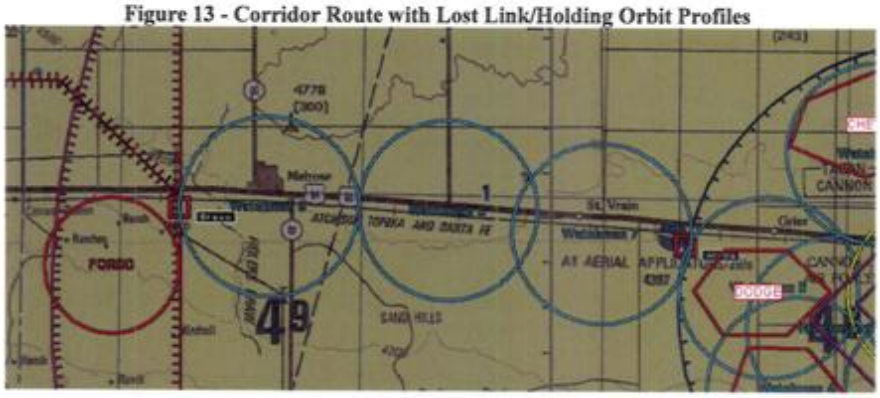
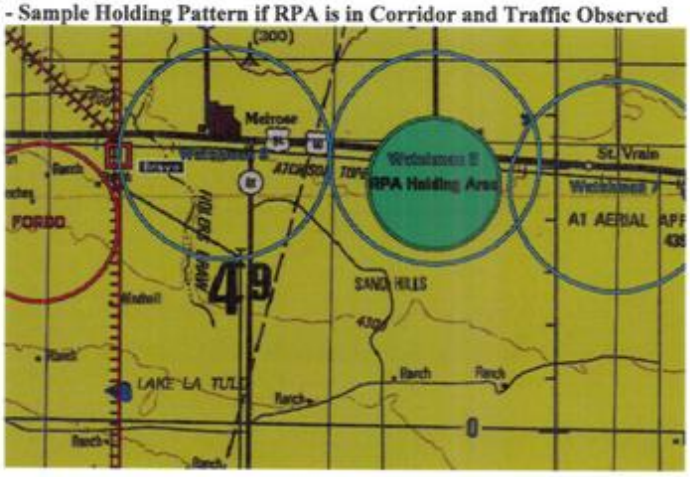


Figure 14 - Sample Holding Pattern if RPA is in Corridor and Traffic Observed



6.6. Melrose Range Control Duties.

6.6.1. Notify RAPCON during Class-A operations if the RPA is unable to enter the restricted airspace. If unable, provide reason and estimated time of delay.

6.6.2. Notify RAPCON when the range switches between Class-A and Class-B operations.

6.7. Observer Duties.

6.7.1. Be in position one hour prior to the RPA scheduled takeoff/RTB time. Additionally, all observers will continuously monitor the RPA Common Frequency throughout the flight period.

6.7.2. Relay to the RPA Pilot any traffic advisories that occur in each observer's area of responsibility.

6.7.3. Relay to the RPA Pilot when the traffic has cleared the observer's area of responsibility.

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