Cannon RPA Observer Training

101

Lesson 1

Medical Qualifications and Basic Knowledge

Medical Qualifications

- Observers must obtain a valid FAA Second Class Airman Medical Certificate or "military equivalent"
  - 14 CFR Part 67 describes FAA Second Class Airman Medical Certificate requirements
    - List of available doctors http://www.faa.gov/pilots/amelocator/

Basic Knowledge

- Know the following:
  - 14 CFR 91.111, Operating Near Other Aircraft
    - No person may operate an aircraft so close to another aircraft as to create a collision hazard.
  - 14 CFR 91.113, Right-of-Way Rules
    - (b) *General.* When weather conditions permit, regardless of whether an operation is conducted under instrument flight rules or visual flight rules, vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft.

– 14 CFR 91.113, Right-of-Way Rules (cont)

- When a rule of this section gives another aircraft the right-of-way, the pilot shall give way to that aircraft and may not pass over, under, or ahead of it unless well clear.
- (c) *In distress.* An aircraft in distress has the right-of-way over all other air traffic.
- d) *Converging.* When aircraft of the same category are converging at approximately the same altitude (except head-on, or nearly so), the aircraft to the other's right has the right-of-way. If the aircraft are of different categories—cont…

- 14 CFR 91.113, Right-of-Way Rules (cont)
  - (1) A balloon has the right-of-way over any other category of aircraft;
  - (2) A glider has the right-of-way over an airship, powered parachute, weight-shift-control aircraft, airplane, or rotorcraft.
  - (3) An airship has the right-of-way over a powered parachute, weight-shift-control aircraft, airplane, or rotorcraft.
  - However, an aircraft towing or refueling other aircraft has the right-of-way over all other engine-driven aircraft.
- (e) *Approaching head-on.* When aircraft are approaching each other head-on, or nearly so, each pilot of each aircraft shall alter course to the right.
- (f) *Overtaking.* Each aircraft that is being overtaken has the right-of-way and each pilot of an overtaking aircraft shall alter course to the right to pass well clear.

- 14 CFR 91.113, Right-of-Way Rules (cont)
  - (g) *Landing.* Aircraft, while on final approach to land or while landing, have the right-of-way over other aircraft in flight or operating on the surface, except that they shall not take advantage of this rule to force an aircraft off the runway surface which has already landed and is attempting to make way for an aircraft on final approach. When two or more aircraft are approaching an airport for the purpose of landing, the aircraft at the lower altitude has the right-of-way, but it shall not take advantage of this rule to cut in front of another which is on final approach to land or to overtake that aircraft.
- Bottom line: You are the eyes for the pilot. Provide the pilot with enough information so that they can take necessary action.

Cloud Clearance/In Flight Visibility

- Both Class D and Class E (corridor)
  - Minimum cloud clearance:
    - 500 feet below clouds
    - 2000 feet horizontal from clouds
    - Note: Flying the RPA above the clouds is not permitted when using ground observers
  - Minimum flight visibility
    - 3 SMs
  - So how do you know the distance?
    - Develop/Use ground reference points, i.e., know distance of a house, tree, water tower, etc. from your location
    - Ask Watchman #1 for a weather update

Observer Limitations

- Observers can ONLY observe one RPA at a time
- Observers must remain within 2 miles laterally and 3,000 feet vertically of the MQ-1 (MQ-9 TBD)

Note: positions have been site surveyed along the corridor that ensures the observer is within the required distance

Standard Phraseology

– The following are the most commonly used phraseology that an observer should know:
  - *AFFIRMATIVE – Yes*
  - *ACKNOWLEDGE - Let me know that you have* received my message
  - *ABEAM- An aircraft is "abeam" a fix, point, or* object when that fix, point, or object is approximately 90 degrees to the right or left of the aircraft track. Abeam indicates a general position rather than a precise point
  - BEARING- The horizontal direction to or from any point usually measured clockwise from true north, magnetic north, or some other reference point through 360 degrees.
  - CEILING- The heights above the earth's surface of the lowest layer of clouds or obscuring phenomena that is reported as "broken," "overcast," or "obscuration," and not classified as "thin" or "partial."

- CORRECTION- An error has been made in the transmission and the correct version follows
- DIRECTLY BEHIND- An aircraft is considered to be operating directly behind when it is following the actual flight path of the lead aircraft over the surface of the earth except when applying wake turbulence separation criteria
- *EMERGENCY- A distress or an urgency condition*
- ESTABLISHED-To be stable or fixed on a route, route segment, altitude, heading, etc
- *HOW DO YOU HEAR ME?- A question relating to* the quality of the transmission or to determine how well the transmission is being received
- *I SAY AGAIN- The message will be repeated*
- *IMMEDIATELY- Used by ATC or pilots when such* action compliance is required to avoid an imminent situation

- *OVER- My transmission is ended; I expect a* response
- *ROGER- I have received all of your last* transmission. It should not be used to answer a question requiring a yes or a no answer
- *SAY AGAIN- Used to request a repeat of the last* transmission. Usually specifies transmission or portion thereof not understood or received; e.g., “Say again all after ABRAM VOR”
- TRAFFIC ADVISORIES- Advisories issued to alert pilots to other known or observed air traffic which may be in such proximity to the position or intended route of flight of their aircraft to warrant their attention. Such advisories may be based on Visual Observation.
- Note 1:The word “traffic” followed by additional information, if known, is used to provide such advisories; e.g., “Traffic, 2 o'clock, one zero miles, southbound, eight thousand.”
- *TRAFFIC ALERT (aircraft call sign), TURN (left/right) IMMEDIATELY, (climb/descend) AND MAINTAIN (altitude).*

- *TRAFFIC NO FACTOR- Indicates that the traffic* described in a previously issued traffic advisory is no factor.
- *TRAFFIC NO LONGER OBSERVED- Indicates* that the traffic described in a previously issued traffic advisory is no longer depicted on radar, but may still be a factor.
- TRAFFIC PATTERN- The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport. The components of a typical traffic pattern are upwind leg, crosswind leg, downwind leg, base leg, and final approach.

  a. Upwind Leg- A flight path parallel to the landing runway in the direction of landing.

  b. Crosswind Leg- A flight path at right angles to the landing runway off its upwind end.

  c. Downwind Leg- A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg.

d. Base Leg- A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline.

e. Final Approach. A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. An aircraft making a straight-in approach VFR is also considered to be on final approach.

– *VERIFY- Request confirmation of information;* e.g., “verify assigned altitude.”

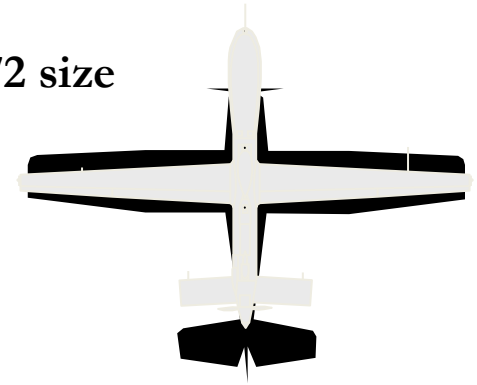
Use of Alcohol or Drugs

- 14 CFR 91.17;
  - a) No person may act or attempt to act as a crewmember…
  - (1) Within 8 hours after the consumption of any alcoholic beverage;
  - (2) While under the influence of alcohol;
  - (3) While using any drug that affects the person's faculties in any way contrary to safety

MQ-1 Flight Characteristics

Wingspan: 48.7 ft
Length: 27 ft
Max Speed: 120 KTAS
Operating Speed: 70 KTAS
Max Altitude: 25,000 ft MSL
Endurance: >20 hrs
Gross Weight: 2250 lbs
Payload Capacity: 300 lbs (2 hard points)
WX Limitations: Icing & winds

C-172 size



Lighting

- **WINGTIP STROBE AND NAVIGATION LIGHTS**
  - The strobe lights protrude from the side of the wingtip assembly. They are white in color and flash 50 times a minute when activated. The side navigation lights are located at the front of the wingtip assembly. The left wing navigation light is red in color and the right wing navigation light is green in color. The rear navigation lights are located at the rear of the wingtip assembly and are white in color. The red warning strobe is located on the top rear of the fuselage. It flashes 50 times a minute when activated.

Communication with Pilot

- Clear concise communications
  - Directive then descriptive
    - Directive – clearly tell pilot if RPA must change current path to avoid conflict
    - Descriptive – identify conflict with a direction and range then, extra information that will help in decision making
  - Clock positions, Headings, or direction from observer locations; decide before hand and work as a team
  - Practice together
  - Sample “Continue current pattern, light aircraft north, three miles, heading west, no factor.”

When traffic happens

- This will not be common
- Best to practice traffic calls prior to flight
- Figure out what works best for your team
- Stay calm
- Speak clearly
- Listen for conformation
- If no conformation then speak again

Scan Plan

- Put yourself in a position to look through the RPA to area of greatest concern
- Like an instrument scan plan
- Through RPA, Right, Through RPA, Left, Through RPA, Behind, Through RPA
- Don’t stare for long periods
- Listen for traffic

What to do when you lose sight

- Admit it
- Advise the pilot
- Ask pilot for the location of the RPA in reference to your location
- Listen

Lesson 2

Observer Local Operating Procedures

Observer LOP

Communications:

- Observers will be in pre-coordinated locations, to include one in the air traffic control (ATC) tower, and accomplish communications checks prior to the RPA getting airborne
- RPA pilots/observers shall monitor Cannon's RPA common frequency
- Communications will be limited to flight-critical information

Observer LOP

Communications (cont):

- Corridor ops -- will relay traffic directly to the pilot
- Class D -- will communicate with observer in Cannon Tower
- Prior to engine start, the pilot will conduct a radio check and establish two way communications with all observers on the Cannon RPA common frequency
- Primary and back up communications will be checked

Observer LOP

Operations within Class D:

- Observer positions and duties: Observer call sign; “Watchman” with numerical position designation, i.e. position 3 is “Watchman 03”. Control Tower observer is always “Watchman 01”
- Control tower observer: “Watchman 01” is the Team Leader for the day’s operations and in charge of all observers. He will coordinate with the control tower watch supervisor for any relays to the local controller in the event of a potential conflict or advisories relayed by the observers. Will observe the RPA within the local traffic pattern. Will recall all observers when operations are terminated.

Observer LOP

Operations using the Corridor:

- Corridor observers: Callsign “Watchman 2-5” will position themselves in the predetermined location for observer duties.
- All observers will communicate with each other, “Watchman 01” and/or the RPA (when required)
- Observers will provide advisories only since they are not air traffic controllers
- Pilot will ensure any advisories received by an observer is relayed to ATC

Observer LOP

Operations using the Corridor (cont):

- After ATC grants climb clearance within Class D, the following must take place before it releases the RPA into the corridor:
  - ATC must verify that they are communicating with any radar observed traffic (primary or secondary) surrounding the corridor
  - Pilot will direct the Sensor Operator to use the MTS ball to scan the corridor for potential traffic to visually confirm that the corridor and surrounding airspace is clear
  - Ground observers 2, 3, 4, and 5 shall verify that they have no traffic within their corridor sectors
- Only after all three of the above are accomplished, will the pilot be granted clearance to enter the corridor by ATC

Observer LOP

Operations using the Corridor (cont):

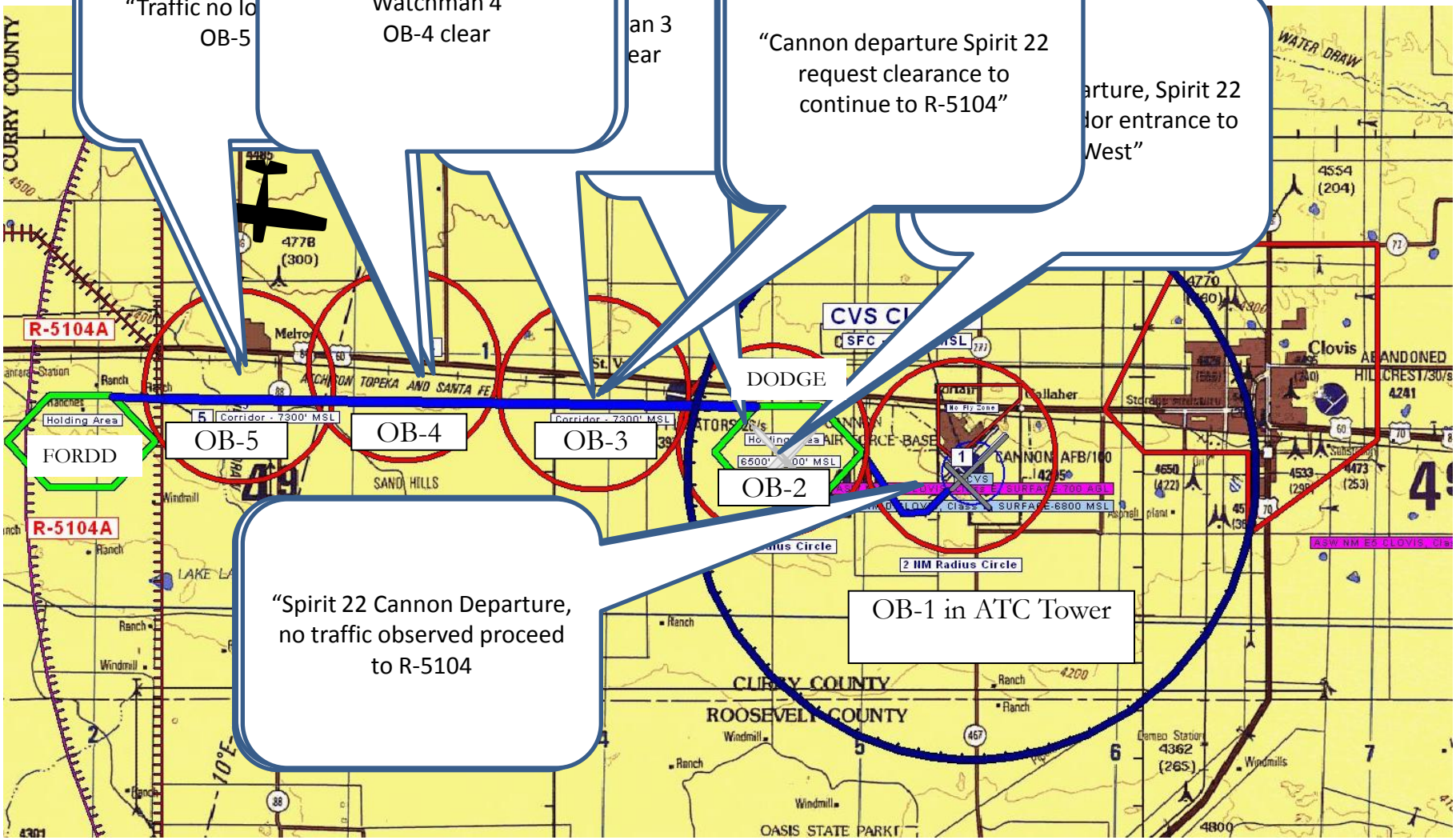
- Observers ahead of the pilot will broadcast on the RPA common frequency the status of their sector each time the pilot reports over the observer location
  - The pilot will not proceed to the next sector until they have received a clear call from the observers
- If an observer sees potential conflicting traffic, they will broadcast the traffic on the RPA common frequency and provide advisories to the pilot--pilot will relay the traffic to the RAPCON
- RAPCON controller will verify if they observe the potential conflicting traffic on radar
  - If they do and are in communications with the traffic, they will direct the pilot of the conflicting traffic to avoid the corridor
  - If they are not in communications with the traffic or do not observe the traffic on radar, they will hold the MQ-1 pilot in the non-conflicting observer location until resolved

Observer LOP

Class D departure into corridor (to R-5104):

- The pilot will, upon receiving corridor clearance:
  - Maintain 6800’ MSL until departing Class D airspace via Class D entry/exit waypoint “A”
  - The pilot will climb to and maintain 7300’ MSL while proceeding direct to R-5104A entry/exit waypoint “B”
- R-5104 departure into corridor (back to Cannon):
- The pilot will, upon receiving corridor clearance:
  - Climb/descend to 7300’ MSL while proceeding direct to R-5104A entry/exit waypoint “B”
  - Maintain 7300’ MSL while proceeding direct from waypoint “B” to Class D entry/exit waypoint “A”
  - Descend to 6800’ MSL prior to reentering Class D airspace
- The Pilot will transmit on the RPA common frequency each time he reaches the center or designated point in each observer sector

Example of Corridor Ops



Observer LOP

Lost Link:

- In the event of a “lost link” situation, “Watchman 01” and/or the pilot will notify all observers. For Class D operations, the RPA will proceed to a predetermined orbit (normally in the vicinity of OB-2). For corridor operations, the RPA will proceed to the FORDD holding area within R-5104A or DODGE holding area within Class D. Actions to follow will be determined by “Watchman 01” which may include converging to provide security, assistance or any action determined by “Watchman 01” to assist in preventing damage or injury to equipment, property or people.

Observer LOP

Lost Link (cont):

- In corridor – While transitioning from the Cannon Class-D airspace to Melrose Range (R-5104A), the pilot will change the assigned lost link mission from the local lost link orbit (CHEVY, DODGE, or JEEPP) to FORDD using current assigned altitude once cleared by ATC to transition to R-5104A, AND the RPA has crossed Point Alpha. When transitioning from R-5104A to Class-D, the pilot will change the lost link entrance point from FORDD to DODGE once cleared by ATC to fly back to Cannon class-D.
- Within Class D – RPA will execute the pre-planned lost link route and proceed to one of the "published" orbit areas within the Cannon Class D airspace (DODGE, CHEVY, JEEPP). Orbit areas will be pre-selected depending on which traffic patterns the pilot is flying.

Observer LOP

Accident/Incident:

- In the event of RPA accident/incident, first observer on scene will take an immediate weather observation and attempt to secure the area, but will not touch the RPA nor will he put himself in harm's way.

Observer LOP

Night Operations:

- Night operations may be conducted concurrently with military manned aircraft in the Class D (night ops are not authorized in the corridor)
  - ATC radar must be available to augment observer situational awareness of participating and non-participating aircraft
  - There is a two hour timeframe when RPA operations at night are not authorized
    - 1-hour after official sunset
    - 1-hour prior to official sunrise
  - Observers must be in place minimum of 1-hour prior to beginning of operations

Observer LOP

Traffic Conflict Resolution:

- Observers provide traffic advisories via the RPA common frequency:
  - Within Class D: to Watchman #1 who notifies the tower watch supervisor who, in turn, will direct deconfliction
  - Within corridor: to the pilot who notifies the RAPCON controller; both parties work together to resolve conflict
- At no time will any observer direct the pilot to change heading or altitude – observers will NOT provide ATC services

Lesson 3

Training Documentation

JOB QUALIFICATION STANDARD CONTINUATION/COMMAND JQS

CRITICAL TASK	TASK NUMBER	TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	CERTIFICATION				
			START DATE	COMPLETION DATE	TRAINEE'S INITIALS	TRAINER'S INITIALS	CERTIFIER'S INITIALS (IF REQUIRED)
☐	1.	Demonstrate a knowledge of the requirements for aircraft operating near other aircraft TR: 14 CR 91.111					
☐	2.	Demonstrate a knowledge of the requirements for aircraft right-of -way-rules TR: 14 CR 91.113					
☐	3.	Explain cloud clearance and flight visibility requirements for operating within Class D and Class E airspace. TR:					
☐	4.	Apply basic standard phraseology. TR: FAAO JO 7110.65; Pilot/Controller Glossary					
☐	5.	Demonstrate a knowledge of the use of alcohol and/or drugs while performing observer duties. TR: 14 CFR 91.17					
☐	6.	Obtain an FAA Secind Class Airman Medical Certificate or Military Equivalant. TR: FAA Certificate of Waiver or Authorization and/or AFI48-123					
☐	7.	Complete the Cannon RPA Observer Training 101. TR: Cannon Observer Training 101					
☐	8.	Demonstrate ability to pass traffic advisories to pilot. TR: FAAO JO 7110.65					
☐	9.	Demonstrate a knowledge of the MQ-1 lost link procedures. TR: FAA Certificate of Waiver or Authorization for Class D MOA COA and Corridor COA					
☐	10.	Explain observer duties/requirements during night operations within the Class D. TR: FAA Certificate of Waiver or Authorization for Class D MOA COA and Cannon MQ-1 Class D LOP					
☐	11.	Demonstrate knowledge of the MQ-1 Flight Charateristics. TR: Cannon Observer Training 101					
☐	12.	Demonstrate knowledge of the MQ-1 Lighting. TR: Cannon Observer Training 101					

TRAINEE NAME	CFETP/JQS NUMBER	PAGE NO.

AF IMT 797, 20020801, V3 PREVIOUS EDITIONS ARE OBSOLETE