

PRIVATE PILOT

VI. AREA OF OPERATION: GROUND REFERENCE MANEUVERS

A. TASK: RECTANGULAR COURSE

OBJECTIVE

To determine that the applicant:

1. Exhibits knowledge of the elements related to a rectangular course.
2. Selects a suitable reference area.
3. Plans the maneuver so as to enter a left or right pattern, 600 to 1000 feet AGL (180 to 300 meters) at an appropriate distance from the selected reference area, 45° to the downwind leg.
4. Applies adequate wind-drift correction during straight-and-turning flight to maintain a constant ground track around the rectangular reference area.
5. Divides attention between airplane control and the ground track while maintaining coordinated flight.
6. Maintains altitude +/-100 feet (30 meters), and maintains airspeed +/-10 knots.

ELEMENTS

1. The maneuver simulates the conditions encountered in an airport traffic pattern.
2. Altitude and airspeed should be held constant.
3. Develops division of attention.
4. Develops ability to recognize drifts toward or away from an airport runway during the various legs of the airport traffic pattern.
5. Select a square or rectangular field with sides about one mile in length (roads work well).
6. Fly to the outside of the rectangle field boundaries by $\frac{1}{4}$ to $\frac{1}{2}$ mile. This aids visibility.
7. All turns should be started when the airplane is abeam the corner of the field boundaries.
8. Bank normally should not exceed 45°.
9. Choose the downwind leg to be with the wind (tailwind) and the upwind leg to be against the wind (headwind).
10. Enter the downwind leg from a 45° angle (a standard traffic pattern entry).
11. The tailwind results in the maximum groundspeed on the downwind leg, so the turn to the base leg is with the fastest roll rate and steepest bank. As the turn progresses, gradually reduce the bank angle.
12. To compensate for drift, make the turn to the base leg more than 90° (the airplane will be turned slightly toward the field).
13. The side wind results in decreasing groundspeed on the base leg, so the turn to the upwind leg is with a medium roll rate and medium bank. As the turn progresses, gradually reduce the bank angle.
14. The headwind results in the minimum groundspeed on the upwind leg, so the turn to the crosswind leg is with the slowest roll rate and shallowest bank. As the turn progresses, gradually increase the bank angle.
15. To compensate for drift, make the turn to the base leg less than 90° (the airplane will be turned slightly away the field).
16. The side wind results in increasing groundspeed on the upwind leg, so the turn to the downwind leg is with a medium roll rate and medium bank. As the turn progresses, gradually increase the bank angle.

NOTE: Since the selected rectangular field will not be exactly lined up with the wind, small crab angles on the downwind and upwind legs will also be needed.

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COMMON ERRORS

- a. Failure to adequately clear the area.
- b. Failure to establish proper altitude prior to entry (typically entering the maneuver while descending).
- c. Poor planning, orientation, or division of attention.
- d. Failure to establish appropriate wind correction angle resulting in drift.
- e. Uncoordinated flight control application.
- f. Poor coordination (typically skidding in turns from a downwind heading and slipping in turns from an upwind heading).
- g. Abrupt control usage.
- h. Failure to maintain selected altitude or airspeed.
- i. Inability to adequately divide attention between airplane control and maintaining ground track.
- j. Improper timing in beginning and recovering from turns.
- k. Inadequate visual lookout for other aircraft.
- l. Selection of a ground reference where there is no suitable emergency landing area within gliding distance.

REFERENCES

1. FAA-H-8083-3A, Airplane Flying Handbook, Chapter 6.