

National Emergency Services Academy, CIVIL AIR PATROL  
Mission Aircrew School Flight Syllabus  
**FLIGHT #5: EXPANDING SQUARE SEARCH TRAINING FLIGHT**

**Objective:** To practice route search techniques.

**Duration:** 1.5 hours or less

### SCENARIO

Mr. Maier's Taylorcraft was located by the Sheriff's Office in an isolated wilderness area at the coordinates specified in your Area Specific Targets sheet. Unfortunately, there is no sign of Mr. Maier inside of the aircraft. You have now been directed to fly an expanding square search of the area in the hopes of locating him.

### PRE-EXERCISE PLANNING

This exercise requires that the trainee plan an expanding square search prior to the exercise (i.e., homework). The trainee should use a sectional chart to plan this exercise. The trainee should have planned for:

1. A expanding square search beginning at the coordinates listed on the Area Specific Targets sheet.
2. Search should be conducted at 1000' AGL, 1 NM track spacing, and 90-100 kts.
3. Determine the Latitude/Longitude of the entry and exit points. In addition, the entry and exit points should be determined using VOR cross-radials and VOR-DME.
4. Determine the magnetic heading and distance (NM) from BAK to the entry point.
5. Determine the VOR cross-radials and VOR-DME to the entry point.
6. Determine the inbound course from the exit point to a nearby VOR.
7. Mark the sectional accordingly.

### PRE-FLIGHT BRIEFING

1. Complete a pre-flight briefing using the appropriate section of the flight guide. Highlight differences from the previous flights; already-briefed items can be abbreviated and reviewed only as necessary. The mission pilot candidate should ride in the left front seat, the observer track trainee in right front seat, and the mission instructor will ride in the rear left seat. The instructor will:
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing
3. Discuss purpose of the flight:
  - a. How to plan and execute an expanding square search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.

5. Review the trainee's planning and correct as necessary.
6. Initiate a CAPF-104. Have the trainees enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

### **EXPANDING SQUARE SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids. The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).*

1. Enroute to the expanding square search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal expanding square search pattern, but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials and VOR-DME.
4. Have the trainee transfer a VOR cross radial and GPS Latitude/Longitude position onto the sectional chart.

### **RETURN TO BASE (Land at an outbase within your area for a break)**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.
3. Practice air-to-ground coordination techniques by using a vehicle on a highway. Keep up with it for a period of time, then demonstrate how you would tell it to turn at an intersection. Advance the complexity as proficiency improves.

### **DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (CAPF-104).
3. Sign the trainees' specialty qualification training record.