

ASSIST IN PLANNING AND PERFORMING A POINT-BASED SEARCH**CONDITIONS**

You are a Mission Observer trainee and must assist a Mission Pilot in planning and performing a point-based search.

OBJECTIVES

Assist a Mission Pilot in planning and performing a point-based search (expanding square or sector).

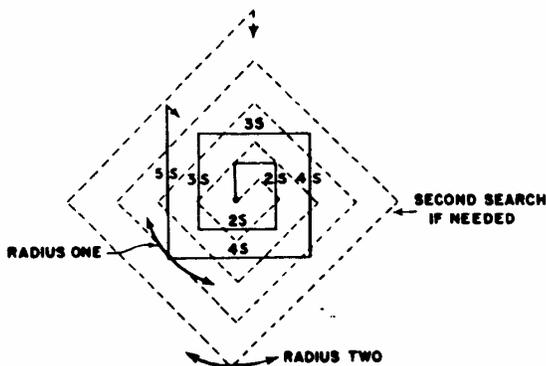
TRAINING AND EVALUATION**Training Outline**

1. As a Mission Observer trainee, the ability to assist the Mission Pilot in planning and performing a point-based search pattern is essential. The observer learns to plan the search pattern in order to better assist the mission pilot and to more effectively direct scanners.

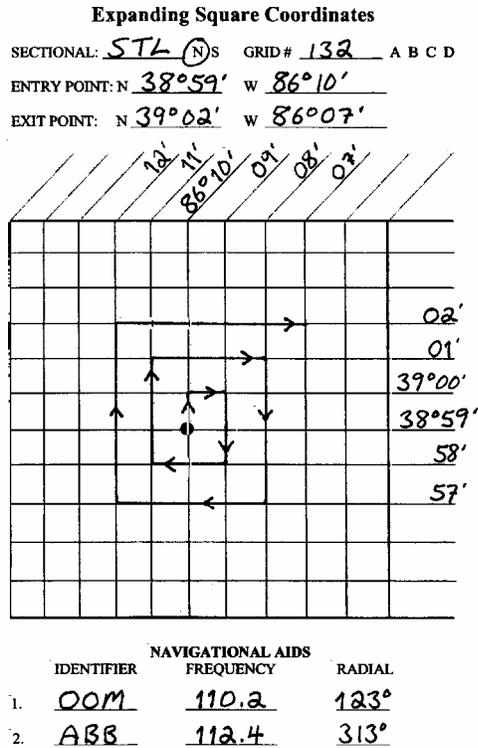
Point-based searches are organized around a point on the ground. These patterns are used when the approximate location of the target is known and are not intended to cover large areas. Examples are the expanding square, sector and circle search patterns.

2. Expanding Square search pattern. The expanding square search pattern is used when the search area is small (normally, areas less than 20 miles square), and the position of the survivors is known within close limits. This pattern begins at an initially reported position and expands outward in concentric squares. If error is expected in locating the reported position, or if the target were moving, the square pattern may be modified to an expanding rectangle with the longer legs running in the direction of the target's reported, or probable, movement.

If the results of the first square search of an area are negative, the search unit can use the same pattern to cover the area more thoroughly. The second search of the area should begin at the same point as the first search; however, the first leg of the second search is flown diagonally to the first leg of the first search. Consequently, the entire second search diagonally overlays the first one. The bold, unbroken line in the figure illustrates the first search, while the dashed line represents the second search. Track spacing indicated in the figure is "cumulative," showing the total width of the search pattern at a given point on that leg. Actual distance on a given leg from the preceding leg on the same side of the pattern is still only one "S," the value determined by the incident commander or planning section chief.



- The GPS is used because this pattern requires precise navigation and is affected by wind drift. Even using the GPS, it is helpful for the pilot to orient the expanding square pattern along the cardinal headings to reduce confusion during turns. [Or, you can enter the pattern as a flight plan and it will direct your turns.]
- You may use a worksheet to draw the pattern and to log coordinates and distinctive features. As a backup, note applicable VOR radials and cross-radials.



5. Fill the worksheet with the lat/longs that describe the expanding square. Starting at the entry point (e.g., a 483' AGL tower), draw the square by going one mile north, then one mile east, then two miles south, and so on. You set it up this way because it is best to fly the square by first flying due north and then making all subsequent turns to the right; right turns are used because they allow the observer and scanner(s) to see the ground during the turns. You use cardinal headings because they are easiest for the pilot to fly. Length and width of the pattern may be modified to suit the requirements and conditions of the individual search.

Enter the lat/long of the starting point (N 38° 59' W 86° 10') into the GPS and save it as a waypoint. As you fly to the entry point, the pilot should set up at search altitude and speed about 3-5 miles out (this ensures a stabilized entry so that you can begin searching immediately). The pilot should fly the pattern using the heading indicator and continuously displayed latitude and longitude on the GPS.

Note: If the aircraft doesn't have an operable GPS the first leg should be flown directly into or directly with the wind. Every other leg will thus be affected by the wind in a relatively consistent manner.

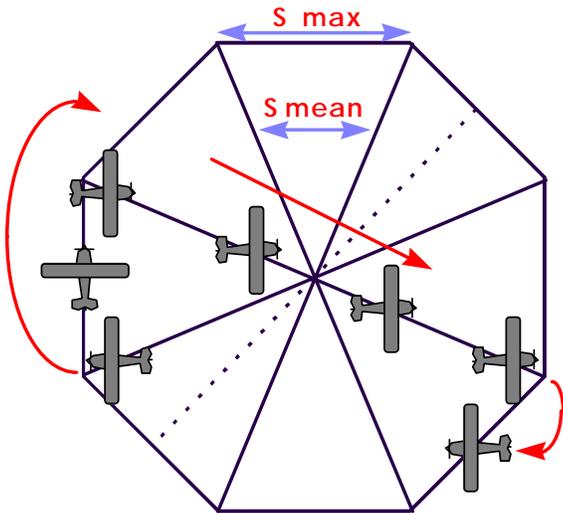
6. In the GX55, the expanding square will radiate from a starting waypoint according to the spacing between lines and at an angle selected by you. All the data you need set up this search pattern in the GX55 is on the worksheet:

- Type of Grid and Sectional (US grid, STL).
- Type of pattern (Expanding Square).
- Starting Waypoint (483' AGL tower, N 38° 59' W 86° 10').

- Spacing (1 nm).
- Direction of Travel (due north, 000°).

* 9.9 nm is the longest leg length you can select on the GX-55.

7. Sector search pattern. A sector search pattern is also best planned on the ground, as it involves multiple headings and precise leg lengths. The pilot will fly over the suspected location and out far enough to make a turn, fly a leg that is equal to the maximum track spacing, and then turn back to fly over the point again. This continues until the point has been crossed from all the angles.



This search pattern provides concentrated coverage near the center of the search area and provides the opportunity to view the suspected area from many angles (this minimizes terrain and lighting problems).

8. Circle search pattern. A circle search pattern may be used when you have a prominent ground reference. The pilot executes a series of 'turns around a point' (circles of uniform distance from a ground reference point). Once the first circle is flown, the pilot moves outward by the desired track spacing and repeats the maneuver. This pattern is usually only used to cover a very small area, which is dependent upon search visibility (the pilot must be able to see the ground reference). Its benefit is that you only need to be able to locate and see the ground reference point, and no prior planning is needed. However, the pilot must constantly correct for the wind.

Additional Information

Search patterns are covered in tasks O-2109 thru O-2115 and may be combined in any fashion. More detailed information and figures on this topic are available in Chapter 11 of the MART.

Practice

Setup: Give the student an expanding square or sector search to plan and perform. The student should have a sectional chart, plotter, and worksheets as needed. A qualified Mission Pilot should be available to assist the trainee.

Brief the pilot. The pilot should fly the pattern long enough to allow the student time to demonstrate proficiency in all aspects of the search. Search altitude, airspeed and track spacing should be selected to match terrain and conditions: 1,000' to 2,000' AGL, 90 knots, and one mile track spacing is recommended.

Depending on the level of proficiency of the student, one or more of these tasks may be practiced simultaneously:

Planning. All mission sorties must be thoroughly planned: this ensures the pilot and crew can accomplish the sortie objectives safely and precisely. Treat each sortie as if it were an actual mission. Each time the student practices a sortie all required paperwork should be completed as part of the drill. The student should sign herself into the mission, ensure that the pilot signs in the aircraft, receive her assignment from you (the briefing officer), plan the sortie, and assist the pilot in completing the flight plan and preliminary mission data portions of the CAPF 104.

The pilot should review the weight and balance, fuel assumptions, and information entered onto the CAPF 104 with the student.

Preflight and pilot briefings. Ensure the student receives pilot safety and mission briefings from the pilot. The student will perform safety assignments as directed (e.g., collision avoidance during taxi and in flight).

Equipment. To the extent possible, the student should operate the communications and navigation equipment. The student should set up and enter information into the equipment (especially the GPS) prior to taxi. [Where necessary for training, the trainer should assist the student in setting up navigation equipment (particularly the GPS) in flight.]

Initial training. Depending on the proficiency and skills of the student, the trainer may need to demonstrate all aspects of a point-based search. This gives the student time to absorb the information and work on such skills as setting up, entering data, and using the navigational equipment.

For each practice sortie, watch for:

- 1) Proper setup and use of the navigational equipment, particularly the GPS. Ensure that the student does not change any navigational or communications equipment setting without the knowledge of the PIC.
- 2) Proper ATC and CAP FM communications technique and terminology. Initially, have the student tell the pilot and/or trainer what she intends to say *before* she transmits.
- 3) Proper and attentive collision avoidance practices during the critical phases of flight.
- 4) Safety. The student should spend most of her time looking outside the aircraft (see and avoid) when enroute to the search area, and most of her time acting as a scanner while in the search area. Initially, the student will spend too much time with her eyes inside the aircraft (e.g., manipulating the GPS) until she is comfortable and proficient with the equipment. Get the student into the habit of *not looking inside the aircraft for more than five seconds at a time* to manipulate communications and navigational equipment.
- 5) Accurate situational awareness at all times.

Evaluation Preparation

Setup: Give the student an expanding square or sector search to plan and perform. The student should have a sectional chart, plotter, and worksheets as needed. A qualified Mission Pilot should be available to assist the trainee during the planning and flying stages.

A search target should be positioned in the search area, if possible.

The pilot will enter and fly the pattern long enough to allow the student to demonstrate proficiency in all aspects of the search. Search altitude, airspeed and track spacing should be selected to match terrain and conditions: 1,000' AGL, 90 knots, three mile legs, and one mile track spacing is recommended.

Run the sortie as it would be during an actual mission. Have the student sign in, sign in the aircraft, and complete all required paperwork. Brief the sortie as if you were the Briefing Officer during a mission.

Brief Student: You are a Mission Observer trainee asked to assist a Mission Pilot in planning and performing a point-based search.

Evaluation

<u>Performance measures</u>	<u>Results</u>
1. Sign into the mission.	P F
2. Receive a sortie briefing, asking questions as necessary.	P F
3. Assist in planning a point-based search (expanding square or sector). Include:	
a. Estimated time enroute, time in the search area, and fuel requirements.	
b. Position coordinates for the entry and exit points (lat/long & VOR radials/cross-radials).	P F
c. Position coordinates for the legs (lat/long and VOR radials/cross-radials).	P F
d. Altitude restrictions, obstacles and other hazards (e.g., MTRs and SUAs).	P F
e. Discuss observer/scanner assignments for all possible combinations.	P F
4. Assist in filling out the flight plan and preliminary mission data on the CAPF 104.	P F
5. Receive pilot safety and mission briefings, asking questions as necessary.	P F
6. Demonstrate and discuss safety during each critical phase of the flight. In particular, demonstrate collision avoidance and enforce sterile cockpit rules.	P F
7. Demonstrate proper ATC communications.	P F
8. Setup the CAP FM radio and perform all required radio reports (may be simulated).	P F
9. Perform the point-based search (expanding square or sector). Demonstrate:	
a. Proper use of nav aids (GPS as primary; VOR as backup).	P F
b. Proper use of radios (ATC as required, and CAP FM radio reports).	P F
c. Proper scanner assignment (may be simulated).	P F
d. Ability to spot the search target (if applicable).	P F
10. Demonstrate proper attention to fuel management.	P F
11. Ensure the aircraft is secured at the end of the sortie (ready for next sortie).	P F
12. Assist in filling out the remainder of the CAPF 104 and debrief the sortie.	P F

Student must receive a pass on all performance measures to qualify in this task. If the individual fails any measure, show what was done wrong and how to do it correctly.