

GARMIN 

G1000[®] Integrated Flight Deck
Pilot's Guide



**Search and Rescue
Pilot's Guide**

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 **WARNING:** Do not use outdated database information. Databases used in the G1000 system must be updated regularly in order to ensure that the information remains current. Pilots using any outdated database do so entirely at their own risk.


 **WARNING:** Do not use basemap (land and water data) information for primary navigation. Basemap data is intended only to supplement other approved navigation data sources and should be considered an aid to enhance situational awareness.


 **WARNING:** The Garmin G1000 has a very high degree of functional integrity. However, the pilot must recognize that providing monitoring and/or self-test capability for all conceivable system failures is not practical. Although unlikely, it may be possible for erroneous operation to occur without a fault indication shown by the G1000. It is thus the responsibility of the pilot to detect such an occurrence by means of cross-checking with all redundant or correlated information available in the cockpit.

 **WARNING:** For safety reasons, G1000 operational procedures must be learned on the ground.

 **WARNING:** The United States government operates the Global Positioning System and is solely responsible for its accuracy and maintenance. The GPS system is subject to changes which could affect the accuracy and performance of all GPS equipment. Portions of the Garmin G1000 utilize GPS as a precision electronic NAVigation AID (NAVAID). Therefore, as with all NAVAIDs, information presented by the G1000 can be misused or misinterpreted and, therefore, become unsafe.

 **WARNING:** To reduce the risk of unsafe operation, carefully review and understand all aspects of the G1000 Pilot's Guide documentation and the Airplane Flight Manual. Thoroughly practice basic operation prior to actual use. During flight operations, carefully compare indications from the G1000 to all available navigation sources, including the information from other NAVAIDs, visual sightings, charts, etc. For safety purposes, always resolve any discrepancies before continuing navigation.

 **CAUTION:** The G1000 PFD and MFD displays use a lens coated with a special anti-reflective coating that is very sensitive to skin oils, waxes, and abrasive cleaners. **CLEANERS CONTAINING AMMONIA WILL HARM THE ANTI-REFLECTIVE COATING.** It is very important to clean the lens using a clean, lint-free cloth and an eyeglass lens cleaner that is specified as safe for anti-reflective coatings.

 **NOTE:** All visual depictions contained within this document, including screen images of the G1000 panel and displays, are subject to change and may not reflect the most current G1000 system. Depictions of equipment may differ slightly from the actual equipment.

Record of Revisions				
Part Number	Revision	Date	Page Range	Description
190-00760-00	A	March 2007	i through vi, S-1 through S-12	Production Release
190-00760-00	B	May 2007	All	Revise Garmin UK Address

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SEARCH AND RESCUE



NOTE: The Search and Rescue (SAR) feature must be purchased and activated before use. Contact a Garmin-authorized service center for configuration and a Secure Digital (SD) unlock card. If Search and Rescue is not enabled, it is not visible on any PFD/MFD page or menu.

Instructions are presented here for quickly and easily incorporating search patterns into a flight plan. The Search and Rescue feature has three basic search patterns (Figure 1) to provide air crews with step by step tracking procedures for the search and rescue mission.

The three search patterns are a rectangular Parallel Track Search Pattern, a triangular Sector Search Pattern, and the Expanding Square Search Pattern. All patterns have adjustable parameters. The most effective pattern may be chosen based on available information about the search object, the weather, and the terrain. Typical flight planning parameters such as time, speed, distance, and fuel remaining are given throughout the search mission on the flight plan pages.

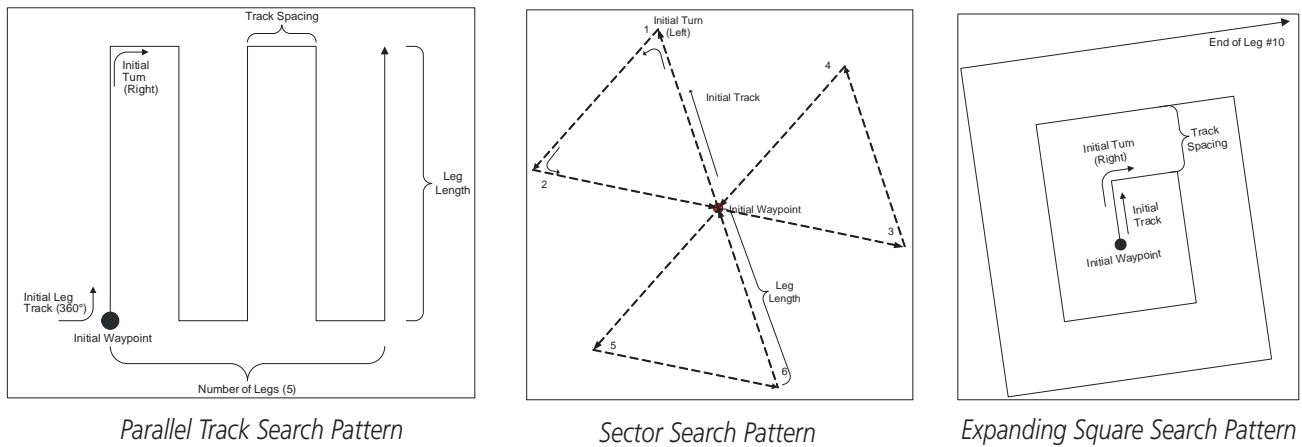


Figure 1 Search and Rescue Flight Patterns

SEARCH AND RESCUE SD UNLOCK CARD

The Search and Rescue feature is enabled with a dedicated Secure Digital (SD) unlock card that is inserted into the top SD card slot on the MFD. If SAR configuration is enabled, the SAR flight patterns are available as part of an active flight plan.

Refer to the G1000 Pilot's Guide for more information on SD cards.

SEARCH AND RESCUE FLIGHT PLANS

A Search and Rescue flight plan is a route that systematically covers an area for a search mission.



NOTE: When turning on the G1000 for use, the system remembers the last type of search pattern used and the track state prior to shutdown. Once the default settings have been changed, the system retains the new data.

The search patterns may be hand flown or coupled to the GFC 700 Automatic Flight Control System (AFCS). Refer to the G1000 Pilot's Guide for more information about the AFCS (if installed) and GPS Navigation.

Creating a Search and Rescue flight plan:

- 1) Press the **FPL** Key to display the Active Flight Plan Menu.
- 2) Press the **MENU** Key to display the PAGE MENU Options (Figure 2).
- 3) Scroll through the choices with the **FMS** Knob and select Search and Rescue.
- 4) Press the **ENT** Key to complete the selection and view the SAR flight plan menus.

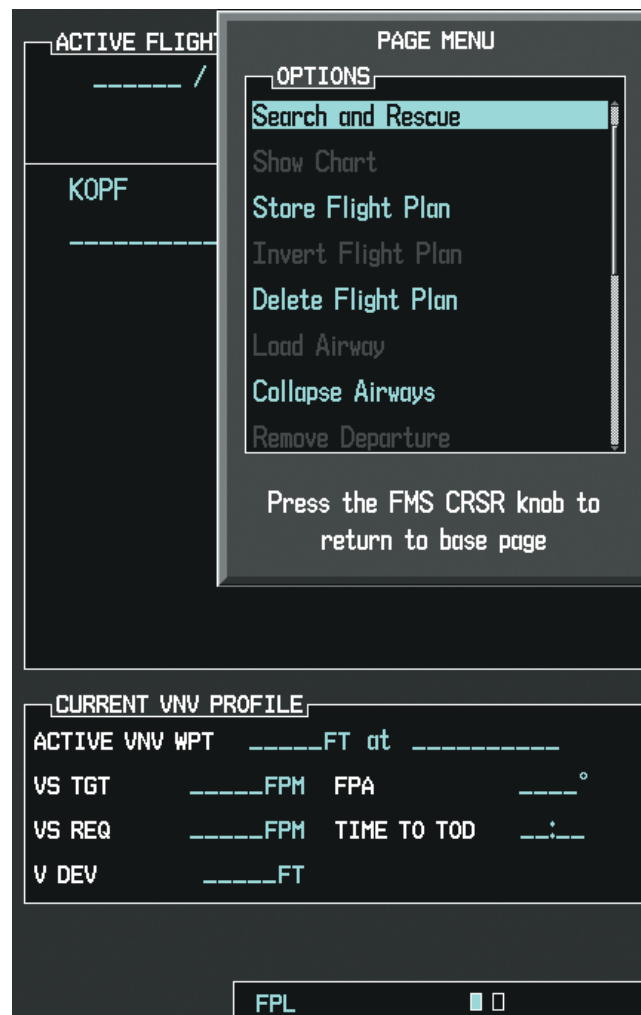


Figure 2 Search and Rescue PAGE MENU Options

Once the Search and Rescue option is selected the next menu (Figure 3) is displayed allowing configuration of the Search and Rescue flight plans. All flight plans must begin with a waypoint location with which to ‘anchor’ the search pattern. Any waypoint may be used to initiate a search pattern, including user defined waypoints. Highlighting a flight plan waypoint before selecting the SAR menu inserts that waypoint into the SAR flight plan WAYPOINT field.

The search patterns have adjustable parameters to modify the size and direction of the route. Default values appear initially for each type of pattern.

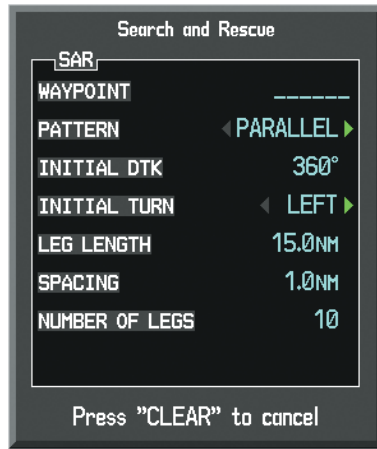


Figure 3 Default Search and Rescue Flight Plan Menu

PARALLEL TRACK SEARCH PATTERN

The Parallel Track Search Pattern (default) is a rectangular pattern that traverses a defined path over the ground in a systematic manner as shown in the figure below. The Parallel Track Search Pattern may begin at any designated waypoint and will continue through the route based upon pilot-entered parameters.

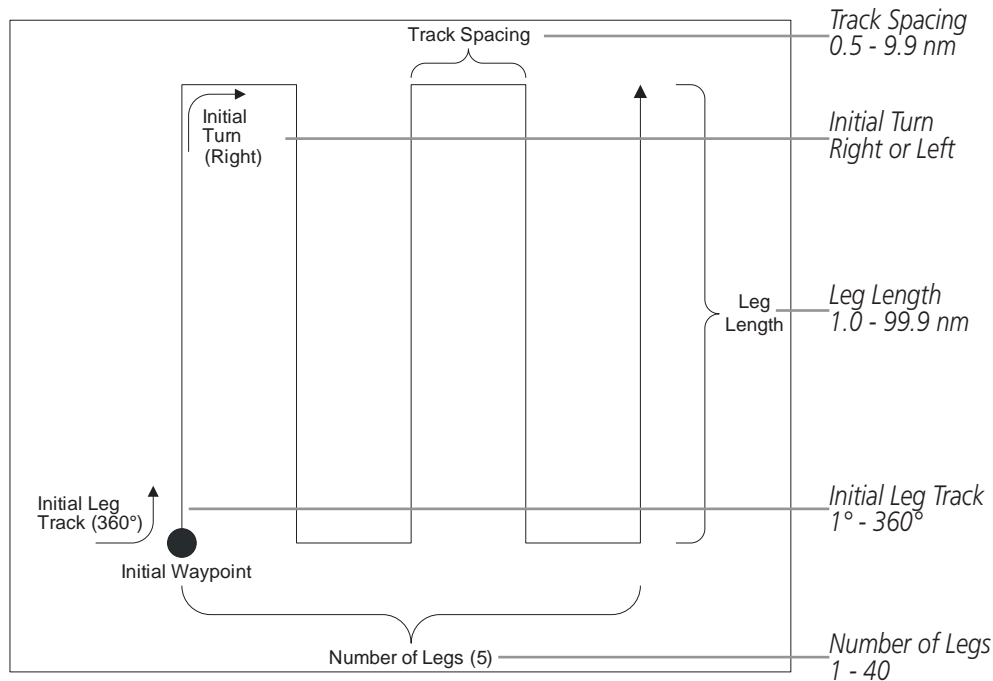


Figure 4 Parallel Track Search Pattern

The Initial Leg can be flown in any direction from 1° to 360° with one-degree resolution. The default desired track is 360° and the default initial turn direction is to the left. The Leg Length can range from 1.0 to 99.9 nm with a 0.1 nm resolution. The default length is 15.0 nm. The spacing between tracks can range from 0.5 to 9.9 nm with a 0.1 nm resolution. The Track Spacing default value is 1.0 nm. The number of legs can range from 1 to 40, with a default value of 10.

The parallel track flight plan begins with a waypoint to anchor the corner of the search pattern. When the Search and Rescue Menu is displayed, the waypoint field is highlighted. In the following example (Figure 5), the search requires a wide path over the central part of southern Florida. KTNT is the crew-selected waypoint from which the Parallel Track Search Pattern begins.

The default entries have been modified in the illustration to fly an initial desired track of 270° with an initial turn to the right. The leg lengths are 17.0 nm with spacing of 1.5 nm between them, and the number of legs has been increased to eleven.

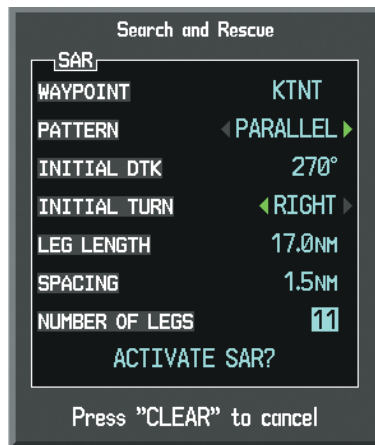
Creating the Parallel Track Search Pattern flight plan:

- 1) From the Search and Rescue Menu, turn the large and small **FMS** Knobs to enter the starting waypoint. Press the **ENT** Key to complete the selection and move to the next option, 'PATTERN' type.
- 2) With the **FMS** Knob scroll through the options and change the fields as desired, or leave the default entries.
- 3) Press the **ENT** Key with the 'ACTIVATE SAR?' field highlighted, to complete and activate the flight plan.

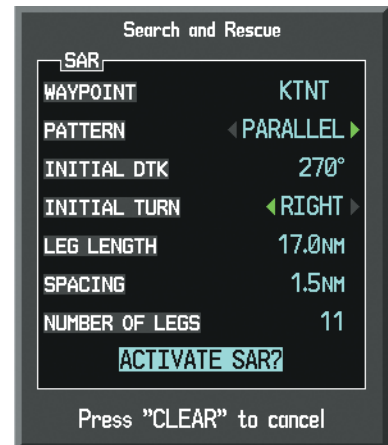
If an error is made after the flight plan has been activated, pressing the **FPL** Key and **MENU** Key returns to the Page Menu Options for making corrections. The modified parameters will remain upon return to the SAR menu. After corrections are made, the new flight plan may be activated.



Waypoint Selection



Default Entries Modified



Pressing ENT Key Activates Flight Plan

Figure 5 Parallel Track Search Pattern, Flight Plan Menus

Once the flight plan is activated, the pattern appears on the map pages and is flown like any other flight plan. The waypoints are numbered to indicate the sequence to be flown. When approaching the corners of the pattern, dashed lines indicate the path to turn, based on the aircraft ground speed.

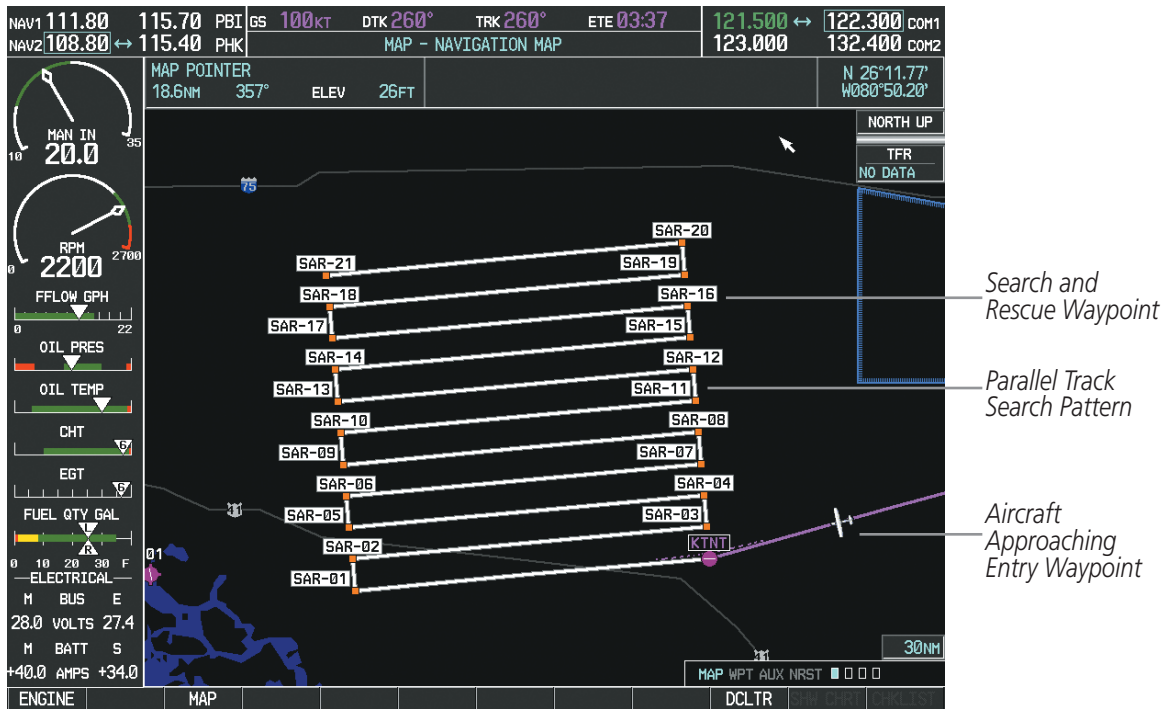


Figure 6 Parallel Track Search Pattern, Navigation Map Page

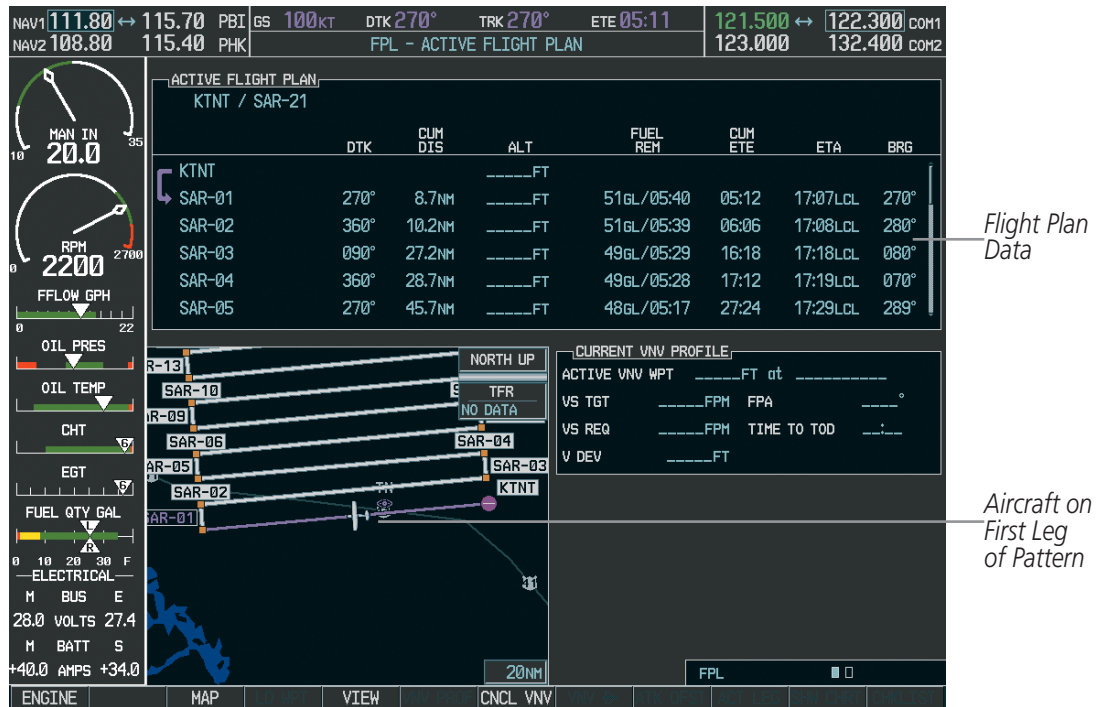


Figure 7 Parallel Track Search Pattern, Flight Plan Page, Wide Screen View

SECTOR SEARCH PATTERN

The Sector Search Pattern consists of three triangular sectors, each composed of three legs as shown in Figure 8. The Sector Search Pattern begins at any designated waypoint and proceeds through the route based upon pilot-entered parameters.

The initial leg can be flown in any direction from 1° to 360° with one-degree resolution. The default initial desired track is 360° and the default initial turn direction is to the left. The leg length can range from 0.5 to 10.0 nm with a 0.1 nm resolution. The default leg length is 5.0 nm.

For the purpose of waypoint numbering, the legs that pass through the initial center waypoint extend from one SAR corner waypoint to the opposite corner. In this case, two legs extend between two SAR waypoints. For the purpose of determining leg length, the pattern is formed by equilateral triangles. That is, all leg lengths are equal. The distance from the corner waypoint to the center waypoint is one leg length.

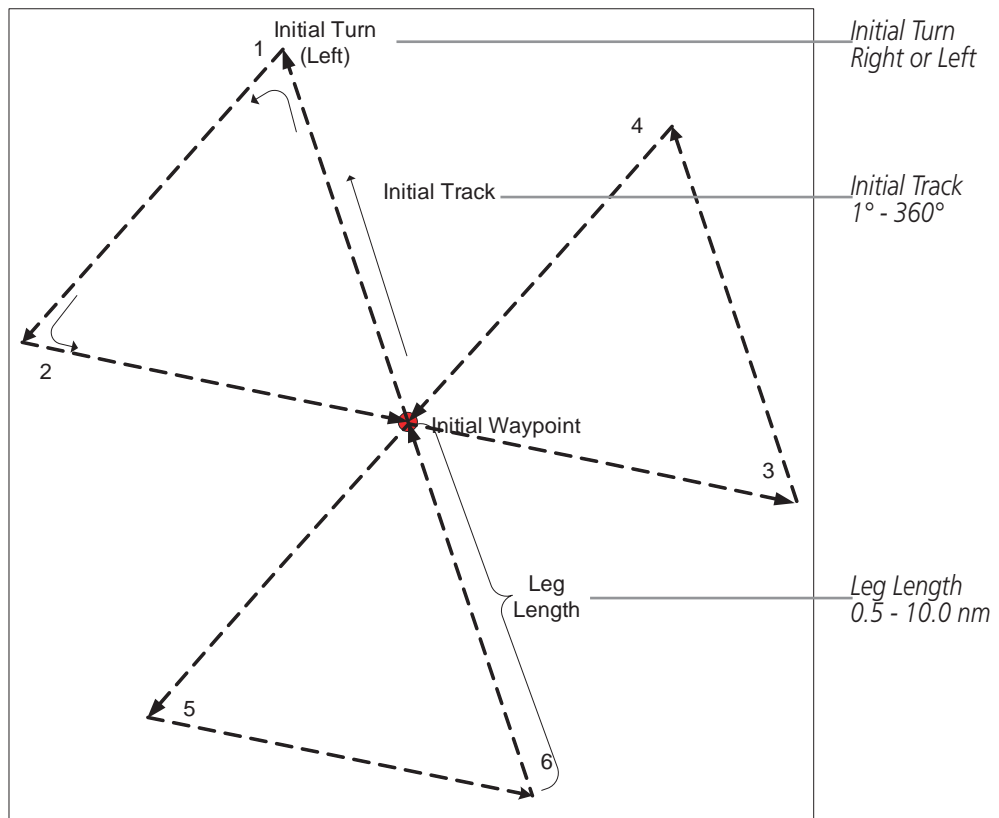


Figure 8 Sector Search Pattern

The Sector Search Pattern can be entered in a manner similar to the Parallel Track Search Pattern using the **FMS** Knob and the **ENT** Key. In this modified example flight plan, the turns are to the left and the leg length is 10.0 nm.



Figure 9 Sector Search Pattern, Flight Plan Menus

Upon flight plan activation, the pattern appears on the map pages. When approaching the corners of the pattern, dashed lines indicate the path to turn based on the aircraft ground speed. The waypoints are numbered to indicate the sequence to be flown.

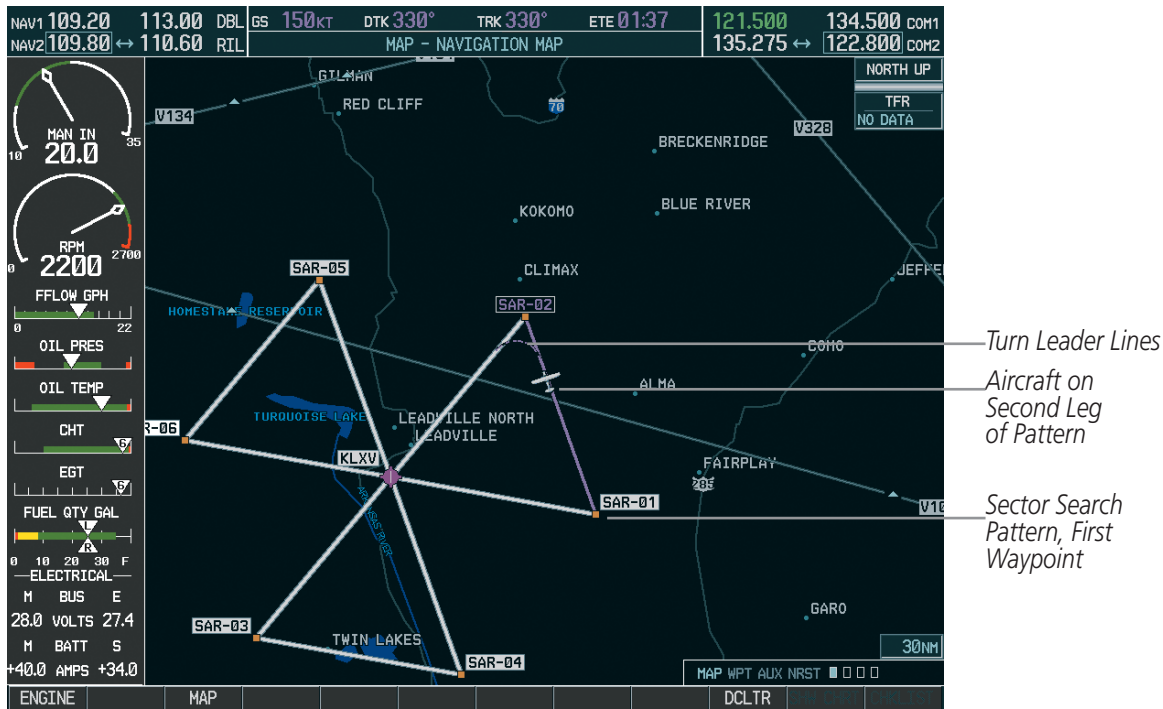


Figure 10 Sector Search Pattern, Navigation Map Page

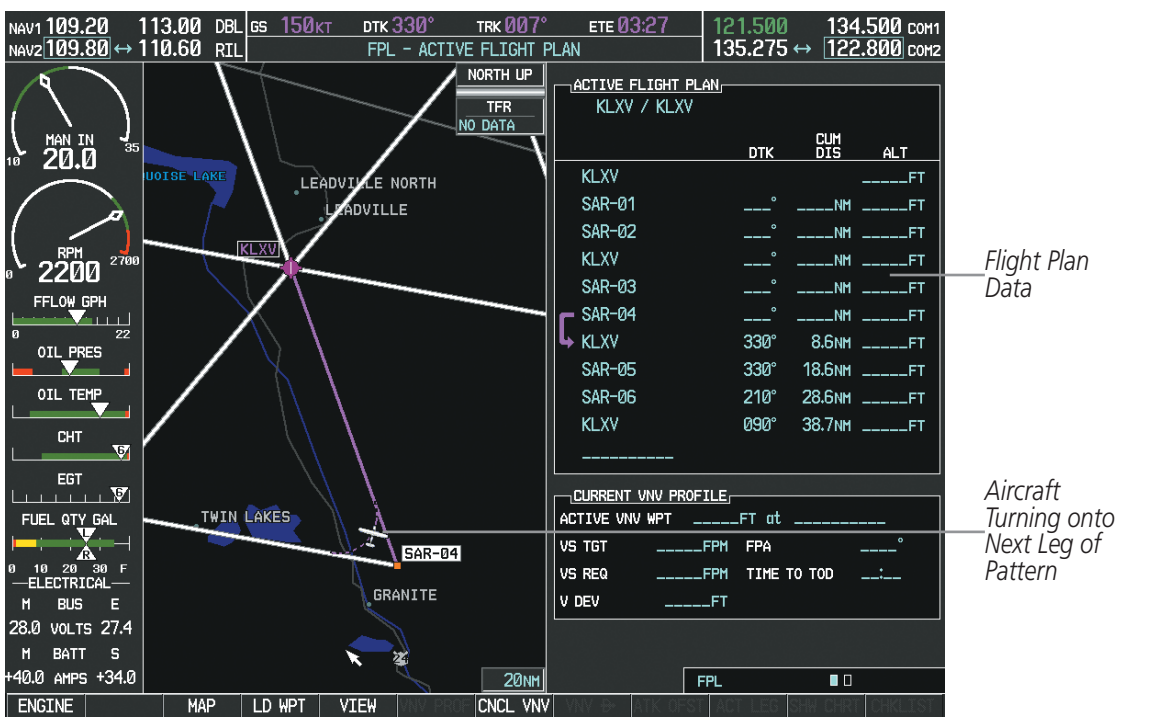


Figure 11 Sector Search Pattern, Flight Plan Page, Narrow Screen View

EXPANDING SQUARE SEARCH PATTERN

The Expanding Square Search Pattern consists of a square-shaped route that begins at a designated waypoint and continually expands away from the center (Figure 12). The waypoints are numbered to indicate the sequence to be flown.

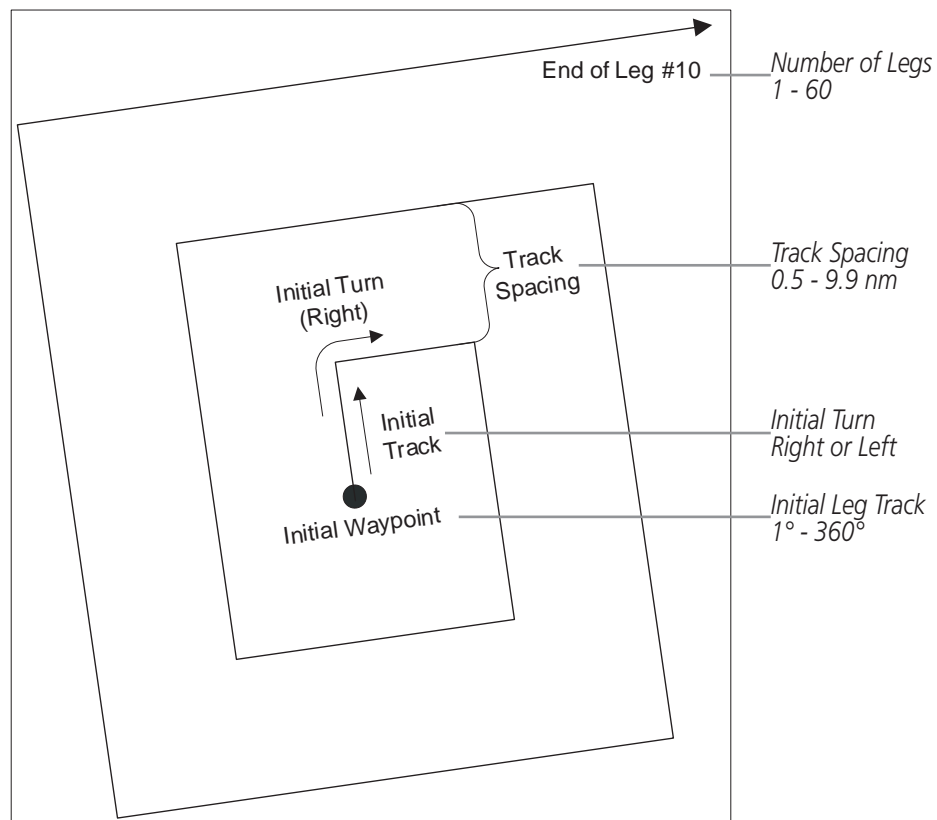
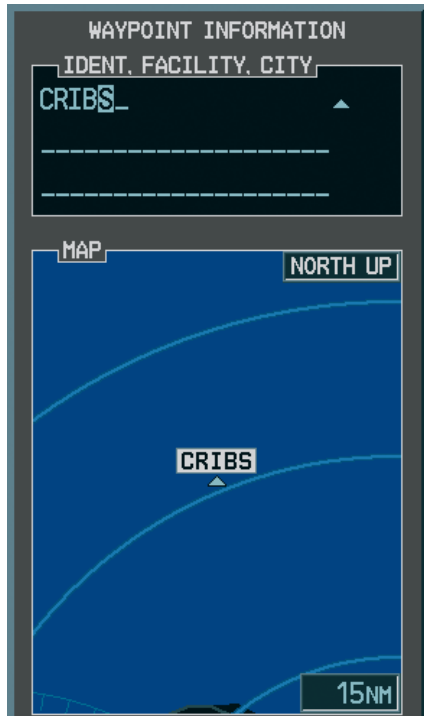


Figure 12 Expanding Square Search Pattern

The Initial Leg can be flown in any direction from 1° to 360° with one-degree resolution. The default desired track is 90° and the default initial turn direction is to the left. The leg length is determined by track spacing.

The spacing between tracks can range from 0.5 to 9.9 nm with a 0.1 nm resolution. The track spacing default value is 1.0 nm. The number of legs can range from 1 to 60, with a default value of 10.

In the example shown, the search covers a wide area over the southern offshore portion of Lake Erie. CRIBS intersection is the selected waypoint from which the Expanding Square Search Pattern begins. The parameters were modified for the search pattern, which required 2.0 nm spacing for the over-water search, and 12 Legs in order to finish the pattern over land.



Waypoint Selection



Default Entries



Pressing the **ENT** Key with the 'ACTIVATE SAR?' Field Highlighted Activates the Flight Plan

Figure 13 Expanding Square Search Pattern, Flight Plan Menus

The search pattern is displayed on the map pages when the flight plan is activated. When approaching the corners of the pattern, dashed lines indicate the path to turn, based on the aircraft ground speed. The aircraft flies to the numbered waypoints in sequence around the center waypoint of the pattern.

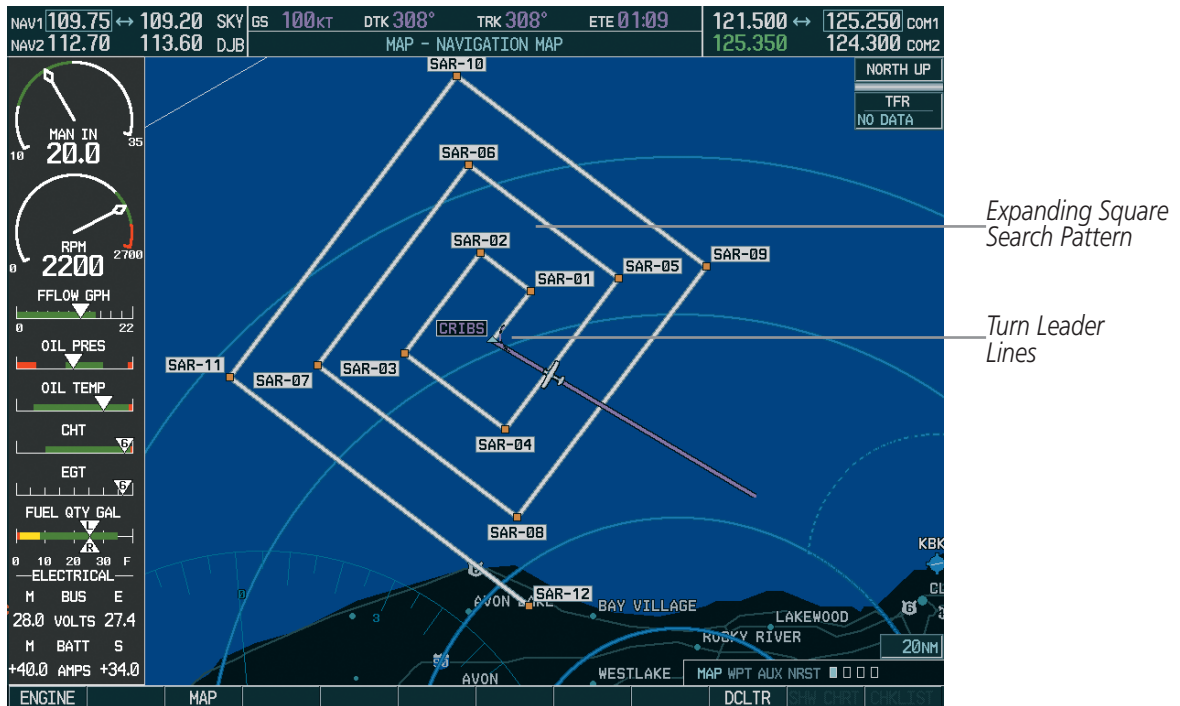


Figure 14 Expanding Square Search Pattern, Navigation Map Page

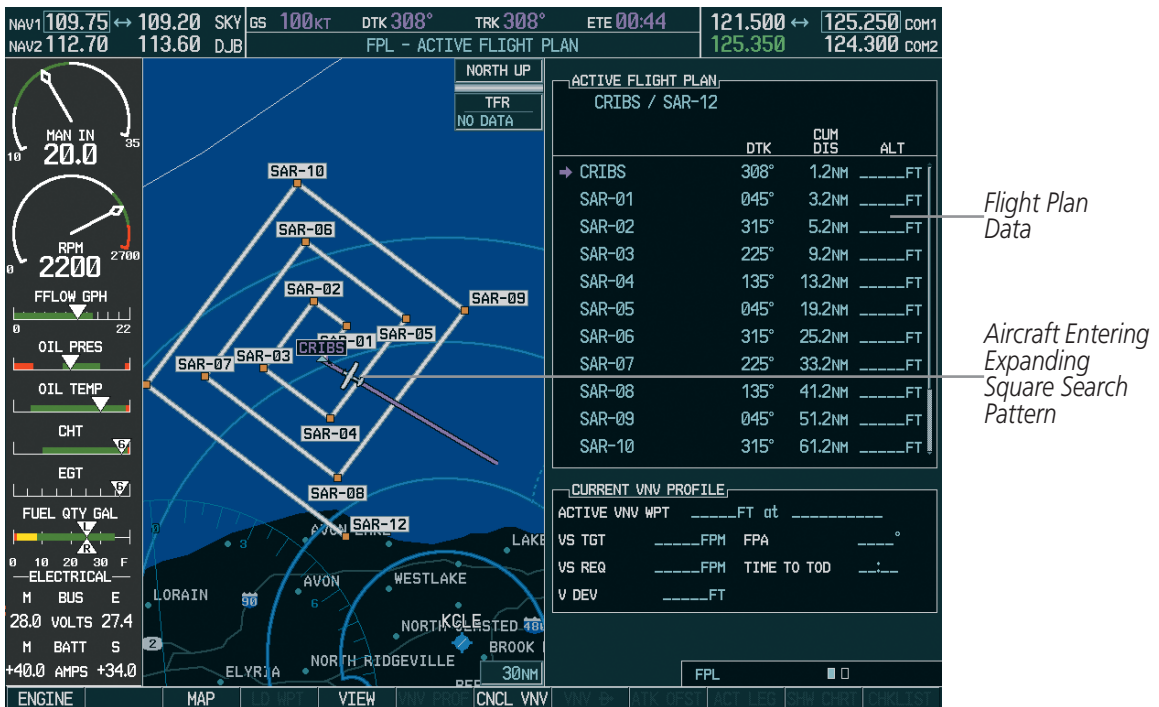


Figure 15 Expanding Square Search Pattern, Flight Plan Page, Narrow Screen View

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