

GTN 725/750 SOFTWARE v6.30 PILOT'S GUIDE UPGRADE SUPPLEMENT

This supplement contains the pages revised in the GTN 725/750 Pilot's Guide, P/N 190-01007-03, Rev P, regarding the new features of software v6.30. Change bars are placed adjacent to the revised information as described in the revision summary table.

This supplement, in combination with the GTN 725/750 Pilot's Guide, P/N 190-01007-03, Rev N, is equivalent to the GTN 725/750 Pilot's Guide, P/N 190-01007-03, Rev P.

Current documents are available at www.flyGarmin.com for free download.



NOTE: *Depending on which version of software is installed and how it is configured, the actual features and screen images may differ from what is shown. For more information regarding feature availability for specific software versions refer to the GTN 725/750 Pilot's Guide, P/N 190-01007-03.*

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This manual reflects the operation of system software v6.30, or later. Some differences in operation may be observed when comparing the information in this manual to later software versions.

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GTN 725/750 Pilot's Guide Revision P, Change Summary

Section	Page	Description
Various		Updated contact information where applicable.
Section 1 – Getting Started		
1.9	1-20	Revised section to include VFR approaches.
Section 2 – Audio & Transponder Controls		
2.1	2-1	Added note regarding unit power up and control panel availability.
2.1.12	2-8	Added "TCAS II Transponder Mode Controls" section.
2.3	2-19	Updated audible cues for passengers in table 2-5, "Intercom Modes."
Section 3 – NAV/COM		
3.3.4	3-13	Updated remote Com key icon.
Section 4 - Flight Plans		
4.2.1.1	4-6	Updated screen image in figure 4-7, "Active Flight Plan Activate Leg Option."
4.2.3.1	4-16	Updated screen image in figure 4-26, "Creating a User-Defined Hold."
4.3.3	4-27	Revised note to include applicable software versions.
Section 5 - Direct-To		
5.8	5-10	Updated screen image in figure 5-12, "Entering Direct-To Hold Parameters."
Section 6 - Procedures		
6	6-1	Revised opening paragraph to include visual approach guidance.
		Added note regarding visual approaches and approach chart availability.
6.1	6-2	Revised opening sentence for clarity.
6.1	6-3	Added "VISUAL" annunciation to table 6-1, "Phase of Flight Annunciations."
6.4	6-10	Added note regarding missed approach procedures.
	6-11	Added information about approach selection order to step 3.
6.13	6-23	Added "Visual Approach Procedures" section.
6.15	6-28	Updated CDI key icon.

Section	Page	Description
Section 7 - Charts		
7	7-1	Revised note to include applicable advisory circular.
7.3	7-15	Added information about Jeppesen chart effectivity.
7.5	7-17	Revised note to include applicable advisory circular.
Section 8 - Waypoint Info		
8.2.9	8-11	Added "Nearest VRPs" section.
Section 9 - Map		
9.1.1.7	9-11	Revised note to include information about StormScope map overlay availability.
		Updated screen image in figure 9-10, "StormScope Map Overlay."
9.1.1.8	9-12	Revised paragraph for clarity.
9.1.2	9-13	Added Visual APPR Selector and North Up Above features to figure 9-13, "Map Setup Functional Diagram."
9.1.2.1	9-15	Added Visual APPR Selector feature to table 9-1, "Map Setup Map Options."
	9-16	Added "Visual Approach Selector" subsection.
	9-24	Updated screen image in figure 9-25, "Point Obstacle Detail." Updated screen image in figure 9-26, "Wire Obstacles."
9.1.2.4	9-27	Updated viewing range selections in table 9-9, "Map Setup Airspace Options."
9.1.2.5	9-30	Added "Airway Range" section.
9.1.3	9-33	Updated screen image in figure 9-33, "Map Data Fields Selection."
9.3.3	9-43	Added note regarding graphical flight plan edits and Direct-To waypoints.
9.3.3.1	9-45	Revised note to include applicable software versions.
Section 10 - Traffic		
10.9	10-38	Added "TCAS II" section.
Section 11 - Terrain		
11.3.1	11-6	Updated screen image in figure 11-2, "Terrain Page."
11.4.8	11-16	Updated screen image in figure 11-11, "Terrain Alert Pop-up."

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11.6.3	11-46	Updated screen image in figure 11-32, "Terrain Alert Pop-up."
Section 12 - Weather		
12.1	12-2	Added Forecast Period, City Forecast, and Surface Analysis products to figure 12-3, "SiriusXM Weather Functional Diagram."
12.1.1	12-3	Updated screen image in figure 12-4, "SiriusXM Weather Page."
	12-4	Updated screen image in figure 12-5, "SiriusXM Weather Menu."
	12-4	Added step 4.
	12-4	Added figure 12-6, "Timestamp Display."
		Added note regarding timestamp functionality.
12.1.4	12-8	Updated products list and timing values in table 12-1, "SiriusXM Weather Products and Data Timing."
12.1.15	12-24	Added "City Forecast" section.
12.1.16	12-25	Added "Surface Analysis" section.
12.2.2		Revised note to include "HDG N/A" annunciation.
12.2.3	12-32	Updated screen images in figure 12-49, "Stormscope 360° and Arc Display Views."
12.2.4		Added "Changing the StormScope Data Mode" section.
12.2.6	12-33	Added cross-reference to associated map overlay section.
12.5.3.1	12-60	Added note regarding Auto Request functionality.
12.6	12-73	Added note regarding FIS-B weather limitations.
	12-73	Added information about FIS-B color transitions.
	12-74	Updated color definition for "No Coverage" indications.
Section 15 - Utilities		
15.1	15-4	Updated screen image in figure 15-5, "VCALC Page."
Section 16 - System		
16.1	16-3	Updated screen image in figure 16-4, "System Status Page."
16.2.2	16-8	Added GAGAN to list of SBAS providers.
16.2.4	16-10	Added "GPS Faults" section.
16.4.6	16-24	Added note regarding ILS CDI Capture key functionality.

Section	Page	Description
16.7	16-34	Added MIC PA Mode option to table 16-7, "Function User Field Selections."
Section 17 - Messages		
17	17-6	Added "Database - Terrain database is not installed, is corrupt, or is not valid for this system" message to table 17-1.
	17-25	Added "Visual Approach Not Active - Approach guidance not available when requesting Direct-To runway" message to table 17-1.
Section 19 - Appendix		
19.1	19-3	Added GAGAN to glossary.
19.2.4.1	19-17	Revised section for clarity.
19.3	19-20	Updated screen image in figure 19-7, "Demo Mode Setup."
	19-21	Updated screen image in figure 19-9, "Demo Mode Navigation Settings."
19.5	19-26	Revised "Voice Command Instructions" subsection for clarity.
		Added cross-reference to associated activation/deactivation instructions.

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1.9 VFR and IFR Procedures

Visual approaches and IFR procedures (i.e., SIDs, STARs, and instrument approaches) are available using the **PROC** (Procedures) key.

Select a Visual or Instrument Approach

1. Touch the **PROC** key on the Home page.
2. Touch the **Approach** key and then touch the Airport key to select the desired airport if it is not present.
3. Touch the **Approach** key, if necessary. Select the desired approach.
4. Touch the **Transition** key and then touch the key for the desired transition. Visual approaches do not have selectable transitions.
5. Touch the **Load Approach** key to load the approach at the end of the active flight plan. The Active Flight Plan page will be displayed.
6. Or, touch the **Load Approach & Activate** key for the flight plan to go Direct-To the selected transition or provide guidance on the final approach course for vectored or visual approaches.



2 AUDIO AND TRANSPONDER CONTROLS (OPTIONAL)

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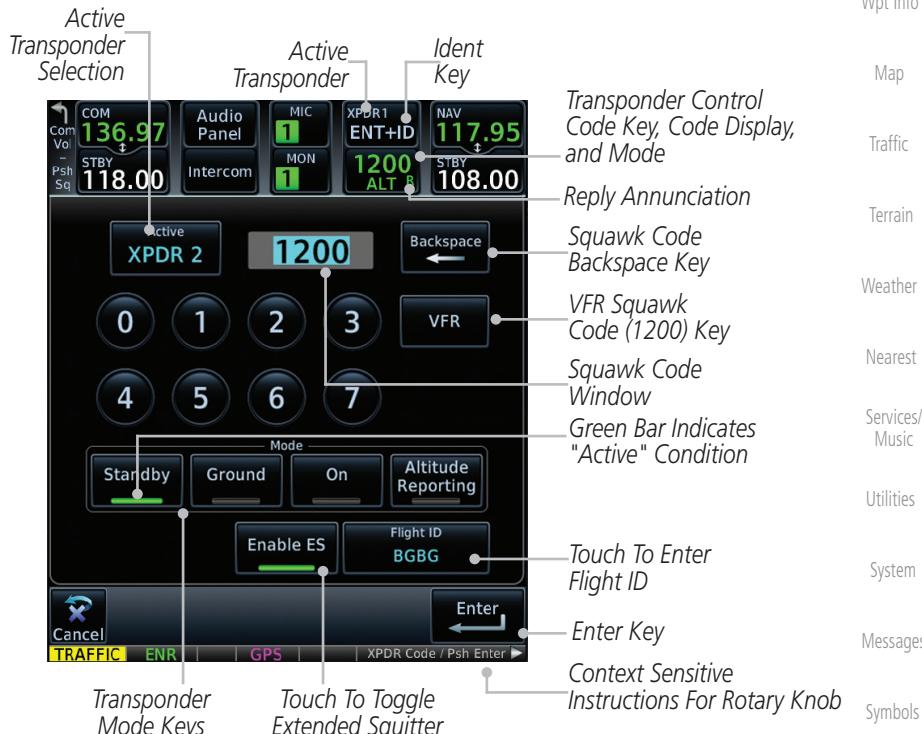


Figure 2-1 XPDRA Control Display

2.1.12 TCAS II Transponder Mode Controls



NOTE: This feature is available in software v6.30 and later.

The GTN can control the modes of a TCAS II system through a GTX 3000. The TA Only and TA/RA modes are added to the transponder control panel. Selecting TA Only or TA/RA will command the TCAS into the selected mode. Depending on the aircraft configuration (e.g., on ground), the TCAS may remain in a different mode.



Figure 2-13 TCAS II Transponder Control Panel



NOTE: The XPDR/TCAS Mode on the Transponder Control Panel always shows the pilot-selected mode and does not necessarily correspond with the traffic system if it is in a lower mode due to other constraints. The active mode is shown in the radio bar next to the transponder squawk code.

	XPDR/TCAS Mode Selection	Transponder Mode	Available TCAS II Modes
	TA/RA	Altitude Reporting	TA/RA or TA Only
	TA Only	Altitude Reporting	TA Only
	Altitude Reporting	Altitude Reporting	Standby
	On	On	Standby
	Standby	Standby	Standby

Table 2-2 Transponder and TCAS II Operating Modes

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Mode	Pilot Hears	Co-Pilot Hears	Passengers Hear
	Selected radios, pilot	Selected radios, co-pilot	Passengers
	Selected radios, pilot, co-pilot	Selected radios, pilot, co-pilot	Passengers
	Selected radios, pilot, co-pilot	Selected radios, co-pilot, pilot, passengers	Selected radios, co-pilot, passengers
	Selected radios, pilot, passengers	Selected radios, co-pilot	Selected radios, pilot, passengers
	Selected radios, pilot	Selected radios, co-pilot, passengers	Selected radios, co-pilot, passengers
	Selected radios, pilot, co-pilot, passengers	Selected radios, pilot, co-pilot	Selected radios, pilot, passengers
	Selected radios, pilot, passengers	Selected radios, pilot, co-pilot, passengers	Selected radios, pilot, co-pilot, passengers
	Selected radios, pilot, co-pilot, passengers	Selected radios, pilot, co-pilot, passengers	Selected radios, pilot, co-pilot, passengers

Table 2-5 Intercom Modes



6. Touch the **Enter** key to accept the displayed name and frequency. The new User Frequency will be added to the list. The list can store up to 15 user frequencies.

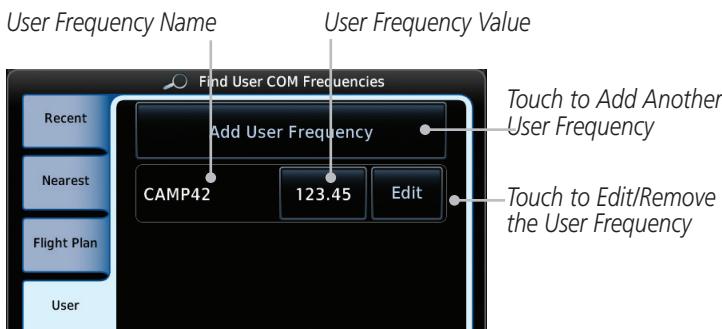


Figure 3-22 Completed New User Frequency

3.3.4 Emergency Frequency

The GTN 750's emergency frequency select provides a quick method of selecting 121.50 MHz as the active frequency in the event of an in-flight emergency. The emergency frequency select is available whenever the unit is on, regardless of GPS or cursor status, or loss of the display.



To quickly tune and activate 121.50, press and hold volume knob or the remote Com flip-flop key for approximately two seconds.



NOTE: Pressing and holding the remote Com FLIP/FLOP key for approximately two seconds, on units so configured, will lock the COM board, preventing further changes in Com frequency until the Com board is unlocked, by pressing the remote Com FLIP/FLOP key again for two seconds. The following message will notify the pilot that the Com board has been locked: "COM LOCKED TO 121.5 MHZ. HOLD REMOTE COM TRANSFER KEY TO EXIT."



NOTE: Under some circumstances if the Com system loses communication with the main system, the radio will automatically tune to 121.50 MHz for transmit and receive regardless of the displayed frequency.

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4.2.1.1 Activate Leg

The Activate Leg option allows you to change the active leg of a flight plan.

Activate Leg

- On the Waypoint Options menu, touch the desired TO waypoint and then the **Activate Leg** key to select the TO waypoint as the active leg for navigation.



Figure 4-7 Active Flight Plan Activate Leg Option

- Touch the **OK** key to set the selected leg as the Active Leg, or **Cancel** to not select it.

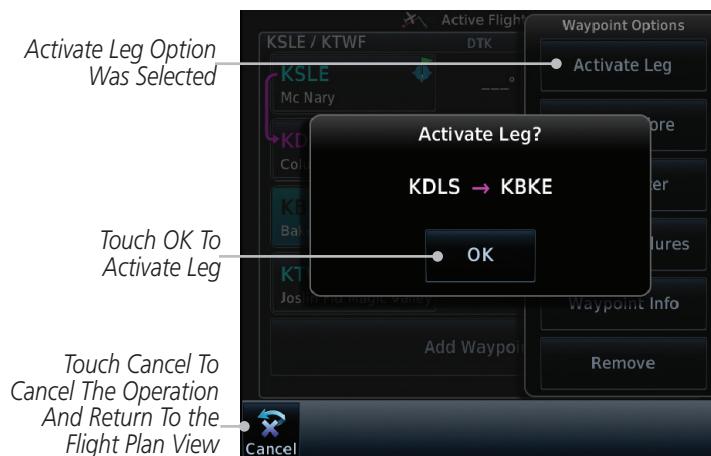


Figure 4-8 Active Flight Plan Activate Leg Option

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4.2.3 Load Hold at Waypoint



NOTE: This feature is available in software v6.00 and later.

4.2.3.1 Hold at Waypoint

Holding patterns may be added to existing waypoints within the flight plan.

1. On the Active Flight Plan page, touch the desired waypoint in the flight plan. The Waypoint Options list will then be displayed.



Figure 4-25 Active Flight Plan with Hold At Waypoint Option

2. Touch the **Hold At Waypoint** key to open the Hold at Waypoint dialog window.

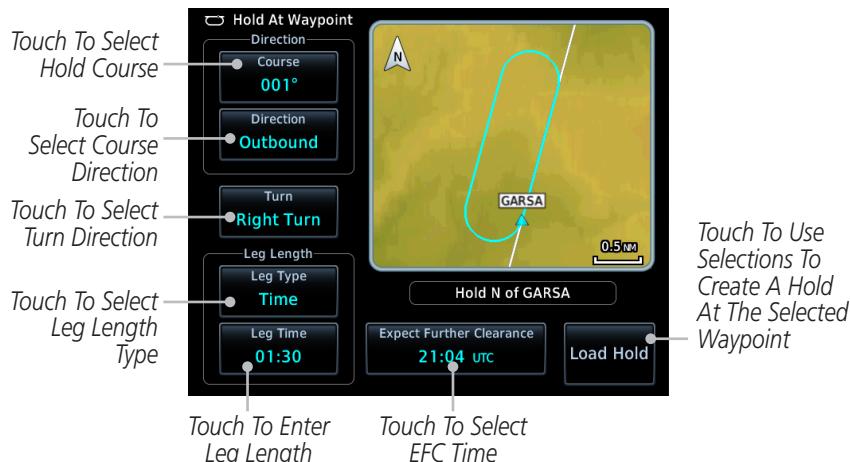


Figure 4-26 Creating a User-Defined Hold



Invert

1. While viewing the Active Flight Plan page, touch the **Menu** key. The Flight Plan Menu will be displayed.
2. Touch the **Invert** key to invert the current Active Flight Plan.

4.3.3 Parallel Track

Parallel Track allows you to create a parallel course offset of 1 to 99 NM to the left or right of your current flight plan. After setting a parallel track to your current flight plan, a magenta parallel track line will be drawn offset from the original by the selected distance. The original course line will be drawn in gray. The aircraft will navigate to the parallel track course line and external CDI/HSI guidance will be driven from the parallel track.

When you reach the end of the flight plan, a message will state, "Parallel offset terminating in X seconds." The message will be given when the aircraft reaches the offset distance from the end of the parallel track. This will give the pilot sufficient time to intercept the original course.

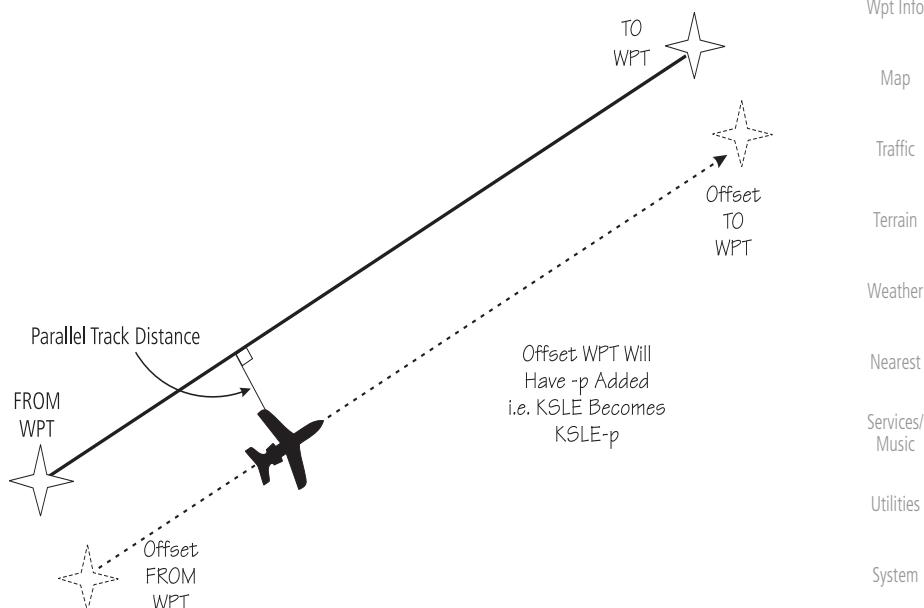


Figure 4-38 Parallel Track Description



NOTE: In software v6.21 and earlier, graphically editing a flight plan cancels the parallel track function.

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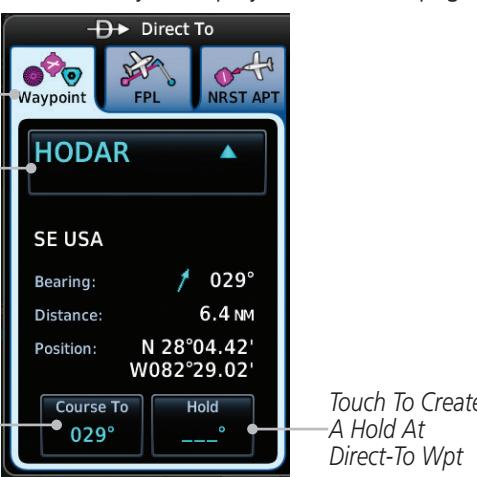


Figure 5-11 Create Hold at Direct-To Waypoint

2. Touch the **Hold** key. The Direct-To Hold page is displayed.

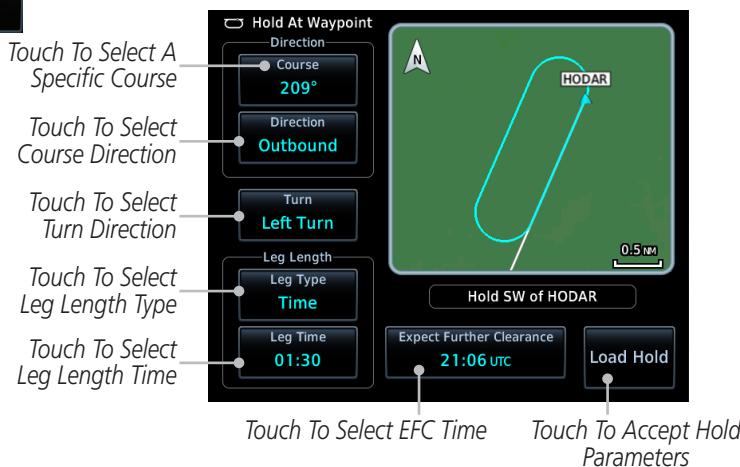


Figure 5-12 Entering Direct-To Hold Parameters

3. Touch the **Course** key to open the keypad. Use the keypad and the **Enter** key to select the inbound or outbound course.
4. Touch the **Course Direction** key to select between Inbound or Outbound for the course direction.
5. Touch the **Turn** key to select between Left or Right for the turn direction.

6 PROCEDURES

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The GTN 7XX allows you to fly non-precision and precision approaches to airports with published instrument approach procedures. The system can also provide visual approach guidance to most airports. Approach procedures are not the same as the approach plates available in ChartView or FliteCharts, which are separate databases.

The Procedures Page is displayed by touching the **PROC** key on the Home page. The Procedures Page provides access to approaches, departures and arrivals. Selections are also shown to: Activate Approach, Vectors to Final, and Activate Missed Approach.



NOTE: *With the exception of Charted Visual Flight Procedures (CVFPs), visual approaches do not have associated approach charts.*



NOTE: *The Chart feature provides a digital representation of a paper chart and provides no vertical or lateral course guidance. Flight Plan and Procedures are separate from Charts, and do provide vertical and lateral course guidance for the loaded route or procedure shown on the Flight Plan page. The term "Chart Unavailable" means that the chart cannot be viewed on the Charts due to either a chart not being published, or an error in the Chart database, but does not preclude its availability or inclusion of the procedure in the Flight Plan or Procedures portion of the system. The absence of a chart for a particular Departure, Arrival, or Approach does not preclude its availability or inclusion in the Flight Plan or Procedures portion of the system. The absence of a particular Departure, Arrival, or Approach under the Flight Plan or Procedures portion of the system does not preclude the ability to view the Chart for that procedure under the Chart feature.*



NOTE: *Baro-corrected altitude is not required by the GTN unit to meet the requirements of TSO-C146c; however, to take full advantage of the GTN unit's capabilities, an optional baro-corrected altitude source is recommended for automatic sequencing of altitude leg types. If no baro-corrected altitude data is provided to the GTN unit, altitude leg types must be manually sequenced.*

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6.1 Basic Approach Operations

The GTN 7XX provides lateral and, when appropriate, vertical guidance for visual and GPS/RNAV approaches. The moving map pages can also be used as an aid to situational awareness for ILS, VOR, and NDB approaches (and non-precision localizer-based approaches), but the appropriate radio navigational aid MUST be used for primary approach course guidance for non-GPS approaches.

Approaches designed specifically for GPS are often very simple and don't require overflying a VOR or NDB. Currently, many non-precision approaches have "GPS overlays" to let you fly an existing procedure (VOR, VOR/DME, NDB, etc.) more accurately using GPS.

Many overlay approaches are more complex (in comparison to GPS-only approaches). The GTN 7XX displays and guides you through each leg of the approach — automatically sequencing through each of these legs, up to the missed approach point (MAP). Approaches may be flown "as published" with the full transition — using any published feeder route or initial approach fix (IAF) — or may be flown with a vectors-to-final transition.

Phase of flight annunciations are provided on the bottom of the display indicating the current mode of flight.

Procedures are arranged around the existing flight plan in the following order: Departure, En Route, Arrival, and Approach. For example, Departure waypoints are inserted before the En Route waypoints in the flight plan and Arrival waypoints are inserted between the En Route waypoints and the approach waypoints. Always verify that the transition waypoints between each phase are correct.

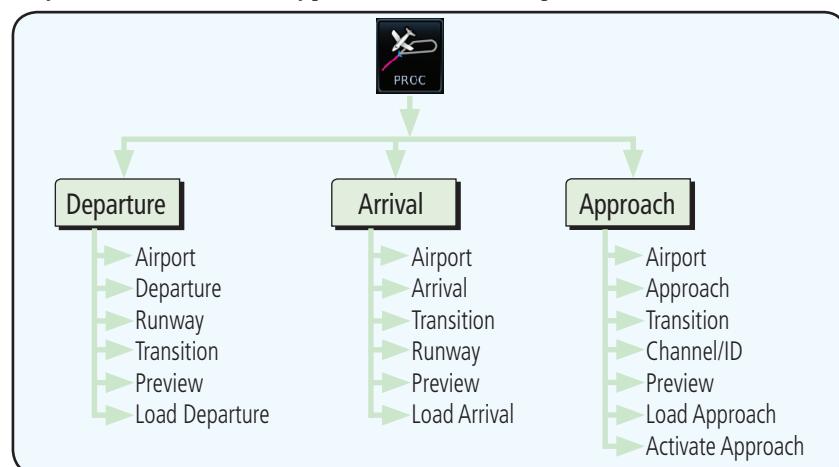


Figure 6-1 Procedures Functional Diagram

Annunciation	Description	
LPV	Localizer Performance with Vertical guidance (LPV) approach. Fly to LPV minimums.	Foreword
LP +V	Localizer Performance using published LP minima. Advisory vertical guidance is provided. Fly to LP minimums.	Getting Started
LP	Localizer Performance with no vertical guidance. Fly to LP minimums.	Audio & Xpdr Ctrl
VISUAL	Advisory visual approach with vertical guidance based on advisory terrain avoidance calculations. CDI scaling is identical to LPV approaches.	Com/Nav
L/VNAV	Lateral Navigation and Vertical Navigation (LNAV/VNAV) approach. Fly to LNAV/VNAV minimums.	FPL
LNAV+V	GPS approach using published LNAV minima. Advisory vertical guidance is provided. Fly to LNAV minimums.	Direct-To
LNAV	Lateral Navigation approach. Fly to LNAV minimums.	Proc
MAPR	Missed Approach indicates the system is providing missed approach integrity and CDI full-scale deflection ± 0.3 NM.	Charts
ENR	En route, CDI full-scale deflection is 2.0 NM or current CDI scale selection, whichever is smaller.	Wpt Info
TERM	Terminal, CDI full-scale deflection is 1.0 NM or current CDI scale selection, whichever is smaller.	Map
DPRT	Departure, indicates the system is using non-precision approach integrity. CDI full-scale deflection is 0.3 NM.	Traffic
OCN	Oceanic, CDI full-scale deflection is 2.0 NM.	Terrain
LOW ALT (lower window)	For LNAV+V, LNAV/VNAV, or LPV approaches, the LOW ALT annunciation indicates the aircraft's estimated height is lower than the Final Approach Waypoint height by approximately 50 meters. This annunciation will not be active when TAWS is operational.	Weather
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Table 6-1 Phase of Flight Annunciations

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6.4 Selecting an Approach

NOTE: In software v6.21 and later, the pilot may load an alternate approach during a missed approach procedure. The GTN retains all missed approaches in the flight plan.

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1. Touch the **PROC** key on the Home page. The Approach, Arrival, and Departure fields will be dashed until a selection is made.

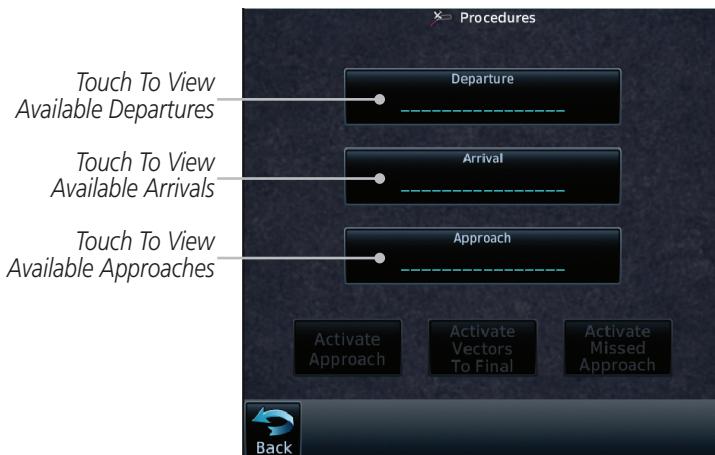


Figure 6-12 Procedures Selection Window

2. Touch the **Approach** key on the Procedures page to select an approach for the destination airport. Confirm that the intended airport is shown or touch the **Airport** key and select the desired airport.

Approach

3. Touch the **Approach** key on the Procedures-Approach page and then touch the key for the desired approach. Selections are listed according to approach type: instrument first, visual second.



Figure 6-13 Selecting an Approach

4. After selecting the approach for the destination airport, the approach options will be displayed.

Sequence List For The Selected Transition



Figure 6-14 Selected Approach Options

6.13 Visual Approach Procedures



NOTE: This feature is available in software v6.30 and later. Not all airports in the database support visual approaches.

The GTN generates visual approaches, providing advisory horizontal and optional vertical guidance for the selected runway. Advisory guidance aids in the performance of a stabilized approach and ensures the aircraft is in line with the destination runway.

There are three different methods for loading and activating visual approaches.

Method 1: Select the **Visual** key on the map. When the aircraft is within 10 NM of the destination airport the **Visual** key displays. For information about key configuration, refer to "Visual Approach Selector".



Figure 6-22 Visual Approach Key - No Selected Destination

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Figure 6-23 Visual Approach Key - Selected Destination

For both methods, pressing the **Visual** key prompts a list of available visual approaches. Once selected, the visual approach immediately loads and becomes active.

Method 3: Visual approaches load from the PROC - Approach page or the Airport Info - Procedures tab (similar to published instrument approaches). For information on how to use this page, refer to section 6.4.

After a visual approach loads, a confirmation pop-up prompts, detailing the glidepath angle (GPA) and threshold crossing height (TCH) when vertical guidance is available. When unavailable it reads, "NO VERTICAL GUIDANCE."

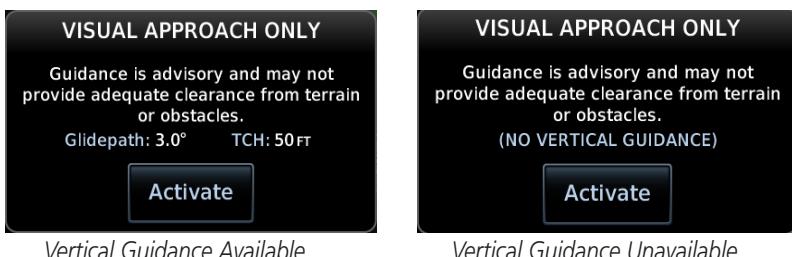


Figure 6-24 Visual Approach Confirmation Pop-up

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The availability of vertical guidance advisories for visual approaches is dependent on terrain and obstacle obstructions along the approach path. If no known obstructions are within the approach path, vertical guidance is provided to a maximum distance of 28 NM from the runway. If there are known obstructions further than 3 NM, but within the 28 NM maximum distance from the runway along the approach path, vertical guidance is limited to the approach path portion after crossing the known obstructions. This is indicated by the shortened magenta line on the map after loading the approach. If obstructions are within 3 NM to the runway, along the approach path, advisory vertical guidance is not provided. Lateral guidance is always provided for visual approaches.

Published data is used to determine the visual approach GPA and TCH for the selected runway. If no published data is available, the default is 3° GPA and 50 FT TCH.



NOTE: *If the GTN does not have a valid terrain database, advisory vertical guidance is not available for visual approaches.*



NOTE: *Only external CDI/VDI displays provide vertical deviation indications.*

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- When flying a localizer-based approach (other than backcourse) with automatic CDI switching enabled:
 1. "GPS" guidance may be used while flying outbound and on the initial portion of the procedure turn.
 2. "VLOC" guidance is used on the remainder of the approach from the time you turn inbound on the procedure turn.
 3. The localizer frequency must be active to use "VLOC" guidance at the MAP.
- When flying a localizer-based approach with automatic CDI switching disabled:
 1. You may select "VLOC" guidance at any point on the approach prior to reaching the FAF.
 2. The localizer frequency must be active to use "VLOC" guidance.

7 CHARTS



NOTE: The availability of SafeTaxi, ChartView, or FliteCharts in electronic form may not preclude the requirement to carry paper charts aboard the aircraft. See the AFMS for more information.



NOTE: The Chart feature provides a digital representation of a paper chart and provides no vertical or lateral course guidance. Flight Plan and Procedures are separate from Charts, and do provide vertical and lateral course guidance for the loaded route or procedure shown on the Flight Plan page. The term "Chart Unavailable" means that the chart cannot be viewed on the Charts due to either a chart not being published, or an error in the Chart database, but does not preclude its availability or inclusion of the procedure in the Flight Plan or Procedures portion of the system. The absence of a chart for a particular Departure, Arrival, or Approach does not preclude its availability or inclusion in the Flight Plan or Procedures portion of the system. The absence of a particular Departure, Arrival, or Approach under the Flight Plan or Procedures portion of the system does not preclude the ability to view the Chart for that procedure under the Chart feature.



NOTE: Features that are selectable on the main map page, such as obstacles, airports, airspace, and other waypoint types that are not visible beneath the overlaid chart, remain selectable even when an approach chart is overlaid on the main map.



NOTE: Do not use SafeTaxi or Chartview functions as the basis for ground maneuvering. SafeTaxi and Chartview do not comply with the requirements of AC 120-76C and are not qualified to be used as an airport moving map display (AMMD). SafeTaxi and Chartview should only be used by the flight crew to orient themselves on the airport surface.

The chart page will default to the nearest airport if no flight plan or destination airport is present. While you are on the ground, the displayed charts will default to the current airport location regardless of flight plan. The optional ChartView and FliteCharts provide on-board electronic terminal procedures charts. Electronic charts offer the convenience of rapid access to essential information. Either ChartView or FliteCharts may be configured in the system, but not both.

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NOTE: The entire ownership symbol must be able to fit within the displayed chart area before it will be drawn.

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7.3 ChartView Cycle Number and Revision

The ChartView database is revised every 14 days. Charts are still viewable during a period that extends from the cycle expiration date to the disables date. ChartView is disabled 70 days after the expiration date and is no longer available for viewing upon reaching the disable date. When turning on the GTN unit, the Power-up Page indicates the criteria for ChartView availability. An enablement card that is purchased from Garmin is separate from the Jeppesen database and is required to enable ChartView. Jeppesen charts that do not contain a specific effective date are effective upon receipt.



Figure 7-23 System Status Database Information for ChartView

The database CYCLE number, EXPIRES, and DISABLES dates of the ChartView database appear in either white or yellow text. When the ChartView EXPIRES date is reached, ChartView becomes inoperative 70 days later. This is shown as the DISABLES date. When the DISABLES date is reached, charts are no longer available for viewing.

The ChartView database is provided directly from Jeppesen. Refer to Jeppesen Databases in Appendix A for instructions on revising the ChartView database.

7.5 SafeTaxi®

SafeTaxi® is an enhanced feature that gives greater map detail when zooming in on airports. The airport display on the map reveals runways with numbers, taxiways with identifying letters/numbers, airport Hot Spots, and airport landmarks including ramps, buildings, control towers, and other prominent features. Resolution is greater at lower map ranges (zooming in). When the aircraft location is within the screen boundary, including within SafeTaxi ranges, an airplane symbol is shown on any of the navigation map views for enhanced position awareness.



NOTE: Do not use SafeTaxi or Chartview functions as the basis for ground maneuvering. SafeTaxi and Chartview do not comply with the requirements of AC 120-76C and are not qualified to be used as an airport moving map display (AMMD). SafeTaxi and Chartview should only be used by the flight crew to orient themselves on the airport surface.

Designated Hot Spots are recognized at airports with many intersecting taxiways and runways, and/or complex ramp areas. Airport Hot Spots are outlined to caution pilots of areas on an airport surface where positional awareness confusion or runway incursions happen most often. Hot Spots are defined with a magenta circle or outline around the region of possible confusion.



Figure 7-25 SafeTaxi Depiction on the Navigation Map Page

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8.2.9

Nearest VRPs



1. Touch the **NRST VRPs** tab for a list of the visual reporting points located near the selected airport.



Figure 8-15 Waypoint Info Airport NRST VRPs Page

2. Touch the **Up** and **Down** keys to view additional information, as needed.



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9.1.1.7 StormScope® (Optional)

The WX-500 StormScope Weather Mapping Sensor is a passive weather avoidance system that detects electrical discharges associated with thunderstorms within a 200 NM radius of the aircraft. The StormScope measures relative bearing and distance of thunderstorm-related electrical activity and reports the information to the display. Stormscope and XM Lightning are mutually exclusive.



NOTE: *The StormScope map overlay is only displayed if valid aircraft heading information is available. Refer to the WX-500 Pilot's Guide for a detailed description of the WX-500 StormScope.*



1. While viewing the Map Menu, touch the **StormScope** Map Overlay key to show the menu for selecting the StormScope radar weather data display mode (Cell, Strike, Off, or Clear Strikes).

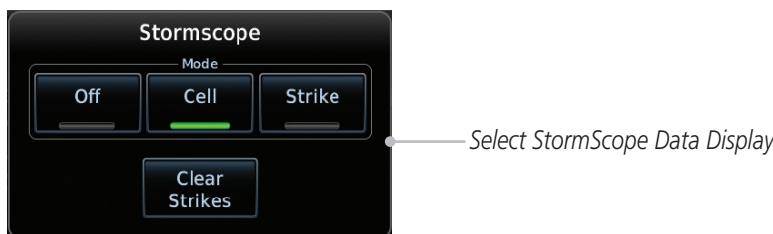


Figure 9-9 StormScope Map Overlay Selections

2. StormScope data will be overlaid on the Map page when Cell or Strike is selected. See the Weather section for more details.



Figure 9-10 StormScope Map Overlay

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9.1.1.8 Radar (Optional)

With the exception of WATCH Shading, all radar settings specified on the Weather Radar page are applied to the radar map overlay. NEXRAD/PRECIP and the Radar overlay may not be shown at the same time.

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While viewing the Map Menu, touch the **Radar** Map Overlay key to toggle the view of airborne Radar data.



Figure 9-11 Radar Map Overlay

9.1.1.9 Traffic (Optional)

The Traffic Map Overlay option selects whether Traffic data is shown on the Map page. A Traffic icon will indicate that the Traffic overlay has been selected. Traffic may or may not be shown depending on the other aircraft's location and equipment. See the Traffic section for more detail.

While viewing the Map Menu, touch the **Traffic** Map Overlay key to toggle the view of Traffic data.

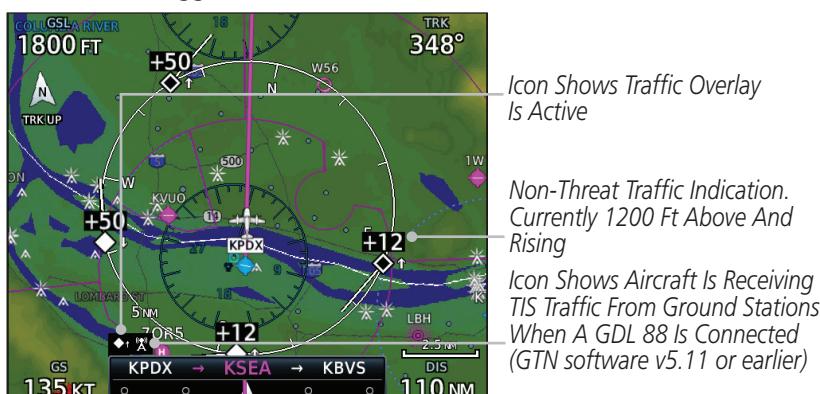


Figure 9-12 Traffic Map Overlay

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9.1.2 Map Setup



Figure 9-13 Map Setup Functional Diagram

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9.1.2.1 Map

The Map option defines the behavior and display of information on the Map page such as: Orientation, North Up Above, Auto Zoom, Nav Range Ring, Topo Scale, Obstacle Range, and Restore Defaults. The default values are shown in **bold** type.

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Feature	Selection
Orientation	North Up, Track Up , Heading Up
North Up Above	Off, 10 NM, 15 NM, 25 NM, 40 NM , 50 NM, 75 NM, 100 NM, 150 NM, 250 NM
Visual APPR Selector	Off, 2.5 NM, 4 NM, 5 NM, 7.5 NM, 10 NM , 15 NM, 25 NM
Auto Zoom	Off, On
Auto Zoom Min	250 ft, 400 ft, 500 ft, 750 ft, 1000 ft, 1500 ft, 2500 ft, 0.5 NM, 0.75 NM, 1 NM, 1.5 NM , 2.5 NM, 4 NM, 5 NM, 7.5 NM, 10 NM, 15 NM, 25 NM, 40 NM, 50 NM, 75 NM, 100 NM, 150 NM, 250 NM, 400 NM
Auto Zoom Max	250 ft, 400 ft, 500 ft, 750 ft, 1000 ft, 1500 ft, 2500 ft, 0.5 NM, 0.75 NM, 1 NM, 1.5 NM, 2.5 NM, 4 NM, 5 NM, 7.5 NM, 10 NM, 15 NM, 25 NM , 40 NM, 50 NM, 75 NM, 100 NM, 150 NM, 250 NM, 400 NM
Track Vector Length	Off, 30 SEC, 60 SEC , 2 MIN, 5 MIN, 10 MIN, 20 MIN
Nav Range Ring	Off, On , Enhanced
Fuel Range Ring	Off, On
Fuel Reserve Time	30 Min, 45 Min , 60 Min, 90 Min
Topo Scale	Off , On
Point Obstacle Range	Off, 4 NM, 5 NM , 7.5 NM, 10 NM, 15 NM
Wire Obstacle Range	Off, 1 NM, 1.5 NM , 2.5 NM
Chart Color Scheme	Day , Night
Restore Defaults	Returns values to original factory settings

Table 9-1 Map Setup Map Options

Map Orientation

The Map Orientation selection sets the orientation of the Map page. Selections are North Up, Track Up, and Heading Up. A Map Orientation label is shown below the North indicator (reference to True North) in the top left corner of the Map page.

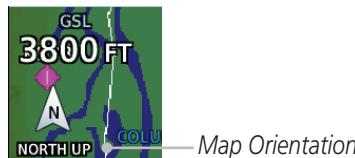


Figure 9-15 Map Orientation Label

North Up Above

The North Up Above option allows you to select the map range where at and above the selected value the Map Orientation will automatically change to North Up as a default. When the map range is 500 NM or more, the map orientation will automatically become North Up.

Visual Approach Selector

This option allows you to select the range at which the Visual Approach Selector becomes active. When the aircraft is within a specified distance of the destination airport, the **Visual** key automatically appears in the bottom left corner of the map. Any values displaying in this area are obscured while the key is active. To disable this feature, select OFF.

For visual approach procedures, refer to section 6.13.

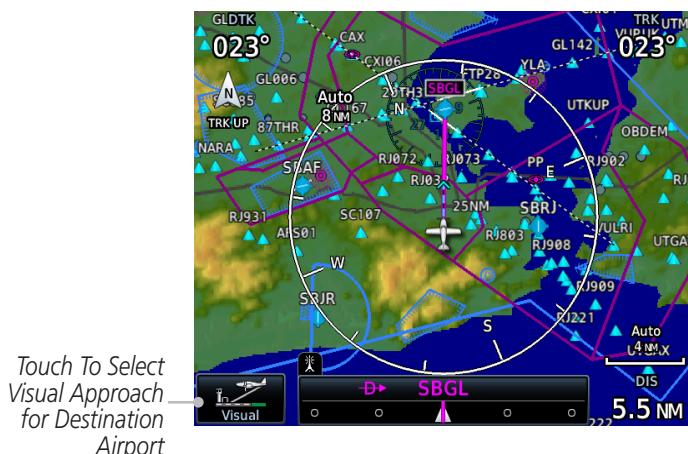


Figure 9-16 Visual Approach Key

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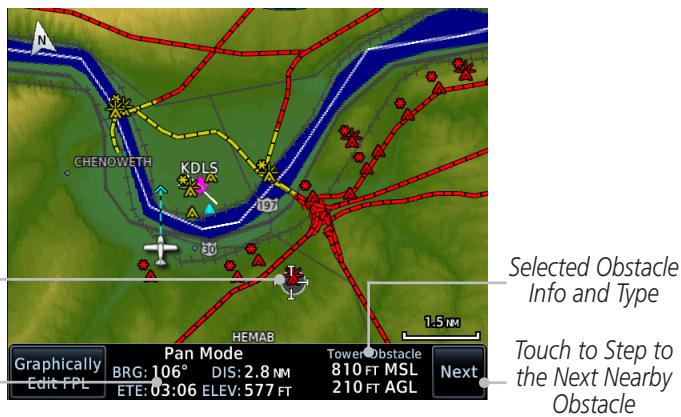


Figure 9-25 Point Obstacle Detail

Wire Obstacle Range

The Wire Obstacle Range option selects whether the power lines are shown on the Map page at and below the selected Wire Obstacle range. Map ranges above this value will not show the Wire Obstacle Data.

NOTE: This feature is available in software v5.10 and later and requires the use of obstacle databases that contain wire obstacle data.



Figure 9-26 Wire Obstacles

9.1.2.3 Land

The Land Data option selects whether detailed land features, such as Freeways, National Highways, Local Roads, Cities, States/Provinces, and Rivers/Lakes are displayed. Topo features, traffic, terrain, and obstacles will still be displayed, even with Land Data turned off. The options for each feature are shown in the following table. The default values are shown in **bold** type.

Feature	Selection
Road Detail	None, Least, Less, Normal , More, Most
City Detail	None, Least, Less, Normal , More, Most
State/Province Names	Off, On
River/Lake Detail	None, Least, Less, Normal , More, Most
Restore Defaults	Returns values to original factory settings

Table 9-8 Map Setup Land Options

9.1.2.4 Airspace

The Airspace viewing range options select whether the Airspaces are shown on the Map and at and below the selected map ranges. The Smart Airspaces selection filters airspaces to show the ones appropriate for your altitude.

Feature	Selection
Airspace Label Range	Off, 7.5 NM, 10 NM, 15 NM, 25 NM , 40 NM, 50 NM
Smart Airspace	Off , On
Show Airspaces	All, Below 18000 ft, Below 15000 ft, Below 12000 ft, Below 9000 ft, Below 6000 ft, Below 3000 ft
Class B/TMA Range	Off, 7.5 NM, 10 NM, 15 NM, 25 NM, 40 NM, 50 NM, 75 NM, 100 NM , 150 NM
Class C/TCA Range	Off, 7.5 NM, 10 NM, 15 NM, 25 NM, 40 NM , 50 NM, 75 NM, 100 NM, 150 NM
Class A/D Range	Off, 7.5 NM, 10 NM, 15 NM , 25 NM, 40 NM, 50 NM, 75 NM, 100 NM, 150 NM
Restricted Range	Off, 7.5 NM, 10 NM, 15 NM, 25 NM, 40 NM, 50 NM, 75 NM, 100 NM, 150 NM
MOA (Military) Range	Off, 7.5 NM, 10 NM, 15 NM, 25 NM, 40 NM , 50 NM, 75 NM, 100 NM, 150 NM
Other/ADIZ Range	Off, 7.5 NM, 10 NM, 15 NM, 25 NM, 40 NM, 50 NM, 75 NM, 100 NM, 150 NM
Restore Defaults	Returns values to original factory settings

Table 9-9 Map Setup Airspace Options

9.1.2.5 Airway Range

The Airways viewing range option selects whether the Airways are shown on the Map and at and below the selected map ranges for Low and High Airways. When Off is selected, the information will not be shown.

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Map Setup

1. While viewing the Map function, touch the **Menu** key.
2. Touch the **Map Setup** key and then with the **Aviation** tab highlighted drag the list down or use the Down key to show the Airway Range.

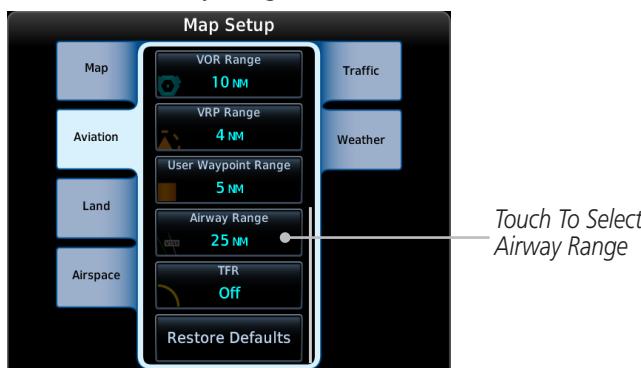


Figure 9-31 Map Setup for Airway Range



3. Touch the **Airway Range** key and select a range.

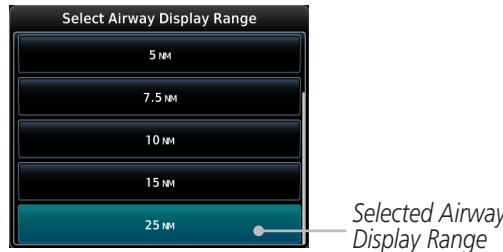


Figure 9-32 Select Airway Display Range

9.1.3 Change User Fields

The Change User Fields selection allows you to configure the Data, Function, and Page field type shown in each of the four corners of the Map page. The information shown in each field may be selected from a list after Change User Fields is selected.



Change User Fields

1. While viewing the Map page, touch the **Menu** key.
2. From the Map Menu screen, touch the **Change User Fields** key.

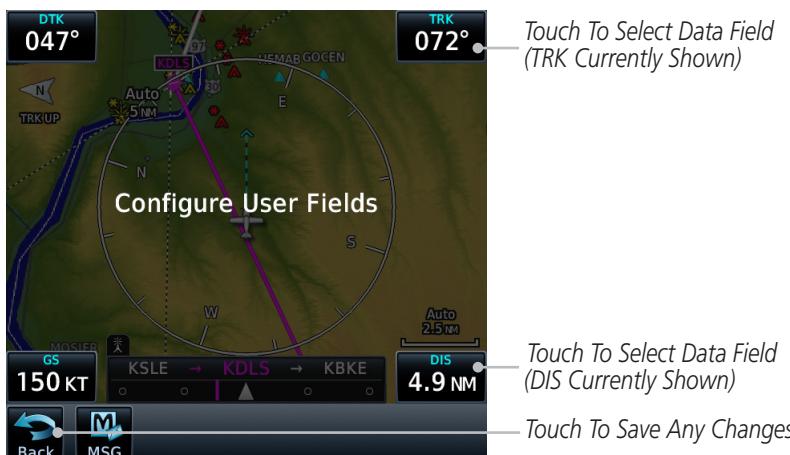


Figure 9-33 Map Data Fields Selection



NOTE: Map Data Field Types that use the term "Destination" refer to the missed approach point (if an approach is loaded) or the final airport in the flight plan.



NOTE: In software v5.13 and earlier, ETE to Destination is not available when a procedure is loaded and there are waypoints in the Enroute section of the flightplan.

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9.3.3 Graphically Edit Flight Plan Mode

The Edit Flight Plan Mode allows making quick changes to the active flight plan directly on the display. The process is simply touching the display to start Map Pan Mode, touching the **Graphically Edit FPL** key, dragging the desired leg to a new waypoint or airway, and touching the **Done** key. When graphically editing the active flight plan leg, the active leg course and TO Waypoint will be added to the flight plan as a Direct-To. At any point, a step may be removed by touching the **Undo** key or the whole process ended by touching the **Cancel** key. The **Undo** key will remove up to nine steps.



NOTE: It is not possible to graphically add an intermediate waypoint between the current position and a Direct-To waypoint unless that waypoint is in the flight plan. Garmin recommends deleting any flight plan prior to graphically editing a Direct-To waypoint.

9.3.3.1 Adding a Waypoint Within an Existing Flight Plan

1. Touch the Map page display. The Map Mode selection keys will appear. Touch the **Graphically Edit FPL** key.

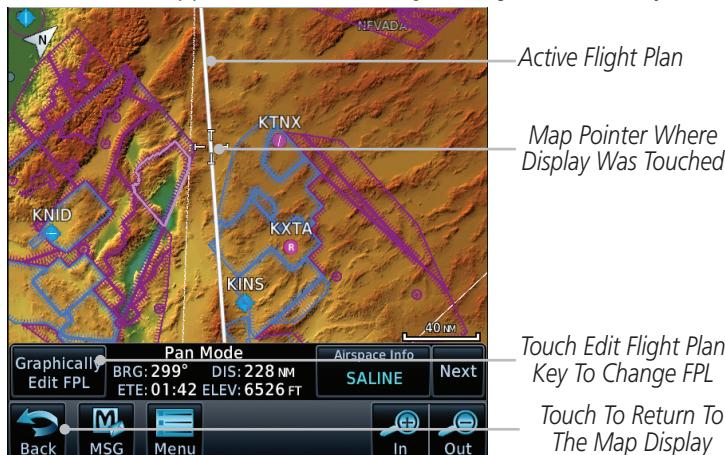


Figure 9-41 Edit Flight Plan Mode

Done

4. Touch the **Done** key. The aircraft will now navigate according to the new flight plan.



Figure 9-44 Completed Flight Plan with New Waypoint



NOTE: In software v6.21 and earlier, graphically editing a flight plan cancels the parallel track function.

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Graphically Edit FPL**Done**

9.3.3.2 Adding a Waypoint to the End of an Existing Flight Plan

1. Touch the Map page display. The Map Mode selection keys will appear. Touch the **Graphically Edit FPL** key.
2. Touch a waypoint that you want to add to the end of the flight plan.
3. Touch the **Done** key to accept the changes and return to the Map page.

Graphically Edit FPL**Done**

9.3.3.3 Removing a Waypoint from an Existing Flight Plan

1. Touch the Map page display. The Map Mode selection keys will appear. Touch the **Graphically Edit FPL** key.
2. Touch a waypoint, or airway, on the flight plan that you want to remove.
3. Drag the flight plan line away from the waypoint, or airway, and release the line. The waypoint, or airway, will be removed from the flight plan.
4. Touch the **Done** key to accept the changes and return to the Map page.

Done

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10.9 TCAS II



NOTE: This feature is available with software v6.30 and later.



WARNING: Traffic information shown on system displays is provided as an aid in visually acquiring traffic. Traffic avoidance maneuvers are based upon TCAS II Resolution Advisories, ATC guidance, or positive visual acquisition of conflicting traffic.



WARNING: Do not rely solely upon the display of traffic information to accurately depict all of the traffic information within range of the aircraft. Due to lack of equipment, poor signal reception, and/or inaccurate information from other aircraft, traffic may be present but not represented on the displays.



NOTE: If the installed TCAS II traffic system is not a GTS 8000, refer to the applicable documentation for system-specific information.

A Traffic Alert and Collision Avoidance System II (TCAS II), such as the GTS 8000, improves flight safety by monitoring nearby airspace for aircraft flying with operating transponders. The TCAS II system provides traffic information to the displays. If separation from other aircraft is within certain limits, the system issues Traffic Advisories (TAs) assisting the flight crew in the visual acquisition of traffic, or Resolution Advisories (RAs) providing recommended vertical guidance maneuvers to resolve traffic conflicts.

10.9.1 TCAS II Theory of Operation

When the TCAS II system is operating in TA/RA or TA Only Mode, the system interrogates the transponders of other aircraft in the vicinity, and monitors for their replies. Based on successive replies, the system tracks the range, bearing, and (if reported) the altitudes of other aircraft. For each detected aircraft transponder, the system calculates time to, and separation at, the closest point of approach (CPA) around the potential collision area surrounding own aircraft. Based on CPA time, own aircraft altitude, and selected TCAS II system mode, the system determines if a TA or RA should be issued for a detected intruder.

Altitude (Feet*)	TA Time to CPA (Seconds)	RA Time to CPA (Seconds)
0 - 1,000	20	RA not issued below 1,000 feet
1,000 - 2,350	25	15
2,350 - 5,000	30	20
5,000 - 10,000	40	25
10,000 - 20,000	45	30
20,000 and above	48	35

* System uses pressure altitude except when Radar Altitude is available. Radar Altitude takes precedence over pressure altitude reporting.

Table 10-17 Altitude-based TCAS II TA/RA Alert Thresholds

The TCAS II system categorizes detected traffic into four groups of increasing collision threat potential:

- **Other Traffic** (OT), displayed as a hollow white diamond, is not currently a threat.
- **Proximate Traffic** (PT), displayed as a filled white diamond, is not currently a threat, but is within 6 nm and $\pm 1,200$ feet of the own-aircraft altitude.
- **Traffic Advisory** (TA), displayed as a filled yellow circle, indicates traffic is within 20-48 seconds of a potential collision area. If a Traffic Map is shown, and the TA traffic is beyond the selected map range, the system displays a half-TA symbol at the edge of the map at the approximate relative bearing of the TA traffic. If TA traffic subsequently meets the criteria for an RA, the system will issue an RA.
- **Resolution Advisory** (RA), displayed as a filled red square, indicates traffic is within 15-35 seconds of a potential collision area. If a Traffic Map is shown, and the RA traffic is beyond the selected map range, the system displays a half-RA symbol at the edge of the map positioned at the approximate relative bearing to the RA traffic.

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	Symbol	Description
		Other Non-threat Traffic
		Proximity Advisory (PA)
		Traffic Advisory (TA)
		Off-scale Traffic Advisory
		Resolution Advisory (RA)
		Off-scale Resolution Advisory

Table 10-18 TCAS II Traffic Symbol Description

10.9.2 TCAS II with ADS-B

When the GTS 8000 TCAS II is in operating mode, it interrogates Mode-S transponder data while automatically receiving ADS-B position and velocity information directly from a comparably equipped aircraft target. The system attempts to match (or “correlate”) the two surveillance data sources to increase the precision of its target location. When a correlation is made, the system displays the traffic information for the source determined to be the most accurate. Any traffic that is not correlated (i.e., only detected by one system but not the other) is also displayed for the flight crew. This may occur, for example, if another aircraft is beyond the surveillance range of the TCAS II, but the GTS 8000 is still receiving position and velocity information from other ADS-B equipped aircraft. The traffic correlation feature improves the accuracy of the traffic displayed, while reducing the occurrence of displaying a single target twice.



NOTE: Aircraft that are surveilled by ADS-B In only will not trigger a TCAS resolution advisory.

10.9.3 TCAS II Alerts

When the TCAS II unit issues a TA or RA, the following occur:

- A ‘TRAFFIC’ annunciation appears in the annunciator bar of the GTN, flashes for 5 seconds and remains displayed until no TAs or RAs are detected in the surveillance area.
 - RA ‘TRAFFIC’ annunciations are white text with red backgrounds.
 - TA ‘TRAFFIC’ annunciations are black text with yellow backgrounds.
 - If a TA and RA occur simultaneously, only the red and white RA ‘TRAFFIC’ annunciation is shown.
- If the GTN is not displaying the traffic page, the system displays a traffic alert pop-up.
- During a TA event, the system issues a single “Traffic, Traffic” voice alert each time the system detects a new TA threat.
- During an RA event, voice alert(s) provide vertical guidance to resolve the traffic conflict.
 - The Vertical Speed Indicator displays a range of vertical speeds to fly to or avoid as applicable.
 - Additional voice alerts occur if the RA status changes and when the aircraft is clear of the conflict.

If the traffic system cannot determine the bearing of a Traffic or Resolution Advisory, the alert will be displayed as a traffic alert banner outlined in the following table:

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	Traffic Alert Banner	Description
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Getting Started	RA XX ± XX <UP> or <DN>	<ul style="list-style-type: none"> • Warning banner displayed when system unable to determine bearing of Resolution Advisory (RA) and extreme pilot vigilance is required. • Banner indicates distance in nm and altitude separation in hundreds of feet. • If altitude trend is available, banner indicates altitude trend up <UP> for climbing and down <DN> for descending traffic.
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Charts	TA XX ± XX <UP> or <DN>	<ul style="list-style-type: none"> • Caution banner displayed when system unable to determine bearing of Traffic Advisory (TA) and pilot vigilance is required. • Banner indicates distance in nm and altitude separation in hundreds of feet. • If altitude trend is available, banner indicates altitude trend up <UP> for climbing and down <DN> for descending traffic.
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Table 10-19 TCAS II No Bearing Alert Banners

10.9.3.1 Resolution Advisories

Resolution Advisories (RAs) are TCAS II recommended vertical guidance maneuvers to be flown to resolve a traffic conflict. If the targeted threat aircraft is also TCAS II equipped, the two traffic systems use Mode S data link interrogations to generate complimentary responses to the RAs. During an RA event, the system monitors the performance and status of the aircraft response. It may command an increase/decrease vertical speed, and/or reverse climb/descend commands until the aircraft is clear of the conflict.

RAs are categorized in two resolution types: preventive and corrective:

Preventive Resolutions

Preventive RAs are issued when the aircraft's present vertical speed will resolve a traffic conflict. The system displays a range of vertical speed avoidance limits. These limits are displayed to help the pilot from climbing or descending into conflicting traffic.

Corrective Resolutions

Corrective RAs are issued when the aircraft's present vertical speed will not resolve a traffic conflict. The VSI indicates a range of vertical speeds to be avoided, while the current vertical speed appears in white with a red background. For advisory, the VSI indicates a green "fly to" vertical speed range that needs to be flown to resolve the RA conflict. In some cases, the TCAS II system logic determines it will be necessary to cross through the intruder aircraft's altitude to resolve the traffic conflict.

The following tables illustrate Preventive Advisories, Corrective Advisories, and TCAS II Voice Alerts.

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Preventive RA Type	Required Vertical Speed (fpm)
Do Not Climb	< 0
Do Not Climb > 500 fpm	< 500
Do Not Climb > 1,000 fpm	< 1,000
Do Not Climb > 2,000 fpm	< 2,000
Do Not Descend	> 0
Do Not Descend > 500 fpm	> -500
Do Not Descend > 1,000 fpm	> -1,000
Do Not Descend > 2,000 fpm	> -2,000

Table 10-20 Preventative RA Types with Required Vertical Speeds

Corrective RA Type	Required Vertical Speed (fpm)
Climb	1,500 to 2,000
Crossing Climb	
Crossing Maintain Climb	1,500 to 4,400
Maintain Climb	
Reduce Descent	0
Descend	-1,500 to -2,000
Crossing Descend	
Crossing Maintain Descent	-1,500 to -4,400
Maintain Descent	
Reduce Climb	0

Table 10-21 Corrective RA Types with Required Vertical Speeds

Alert Type	Voice Alert	
TA	"Traffic, Traffic"	Foreword
Climb RA	"Climb, Climb"	Getting Started
Descend RA	"Descend, Descend"	Audio & Xdr Ctrl
Altitude Crossing Climb RA	"Climb, Crossing Climb, Climb, Crossing Climb"	Com/Nav
Altitude Crossing Descend RA	"Descend, Crossing Descend, Descend, Crossing Descend"	FPL
Reduce Climb RA	"Level Off, Level Off"	Direct-To
Reduce Descend RA	"Level Off, Level Off"	Proc
RA Reversal to Climb RA	"Climb - Climb NOW, Climb - Climb NOW"	Charts
RA Reversal to Descend RA	"Descend - Descend NOW, Descend - Descend NOW"	Wpt Info
Increase Climb RA	"Increase Climb, Increase Climb"	Map
Increase Descent RA	"Increase Descent, Increase Descent"	Traffic
Maintain Rate RA	"Maintain Vertical Speed, Maintain"	Terrain
Altitude Crossing, Maintain Rate RA (Climb and Descend)	"Maintain Vertical Speed, Crossing Maintain"	Weather
Preventive RA	"Monitor Vertical Speed"	Nearest
RA Removed	"Clear of Conflict"	Services/ Music
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Table 10-22 TCAS II Voice Alerts

10.9.4 TCAS II System Test

The TCAS II system test is initiated from the traffic menu. During a TCAS II system test, the system displays a traffic test pattern on the Traffic Page. A Resolution Advisory (RA) alert annunciation will be displayed with the vertical speed indicator indicating not to descend nor climb greater than 2,000 feet per minute. The system test takes approximately eight seconds to complete.

Condition	Voice Alert
System Test Passed	"TCAS Two System Passed"
System Test Failed	"TCAS Two System Failed"

Table 10-23 GTS 8000 System Test Voice Alerts

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Figure 10-36 TCAS II Traffic Map Page



NOTE: The GTS 8000 TCAS II system automatically selects TA ONLY Mode when the aircraft is below 1,000' AGL. After landing, the GTS 8000 automatically selects STANDBY Mode. If the installed TCAS II traffic system is not a GTS 8000, refer to the applicable documentation for system-specific automatic traffic mode selections.

10.9.5.1 Altitude Display

The flight crew can select the volume of airspace in which Other Non-Threat and proximity traffic is displayed. TAs and RAs outside of these limits will always be shown. This airspace can be selected by pressing the **Altitude Filter** button on the traffic page.

Altitude Mode	Displayed Traffic Range
Below	-9,900 ft to 2,700 ft
Normal	-2,700 ft to 2,700 ft
Above	-2,700 ft to 9,900 ft
Unrestricted	-9,900 ft to 9,900 ft

Table 10-24 Displayed Traffic Range

10.9.5.2 Traffic System Status

The traffic mode is annunciated in the upper left corner of the Traffic Map pane. If the traffic system fails, or is in test mode, an annunciation is shown in the center of the Traffic Map.

Operating Mode	Traffic Page Annunciations	Traffic Page Banner
TCAS II Self-Test Initiated (TEST)	Test	Test Mode
Traffic and Resolution Advisory (TA/RA)	TA/RA	N/A
Traffic Advisory Only	TA Only	N/A
TCAS II Standby	STBY	N/A
TCAS II Failed	Fail	Failed or No Data

Table 10-25 TCAS II Modes

10.9.5.3 External Display

If an external traffic display is being controlled by the GTN, it will be commanded to match the display settings on the GTN (traffic range and altitude filter). In a dual GTN installation, GTN #1 will control the external display. The traffic range on the external display will be set to the nearest range to the selected range on the GTN.

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11.3.1 Displaying Terrain Proximity

The Terrain page is in the Terrain function.

1. Touch the **Terrain** key on the Home page.

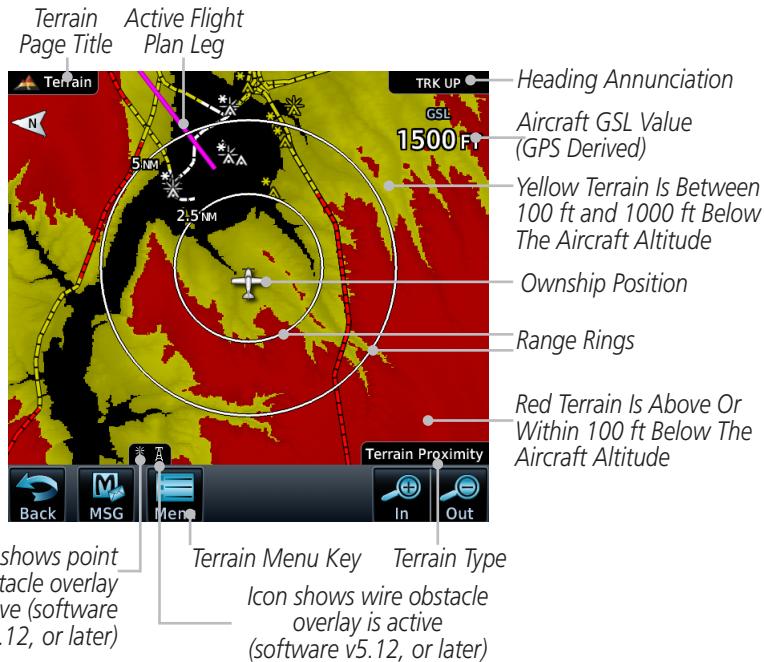


Figure 11-2 Terrain Page

2. Touch the **Menu** key for options.



Figure 11-3 Terrain Menu Options

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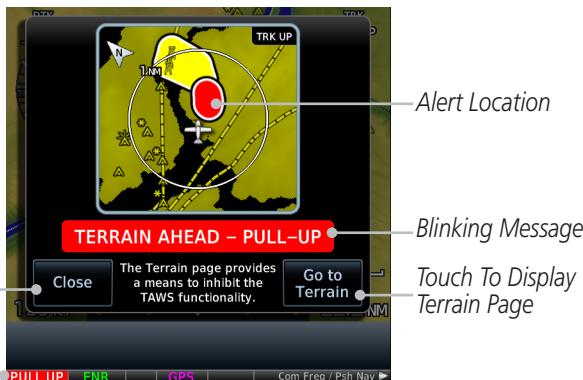


Figure 11-11 Terrain Alert Pop-Up

To acknowledge the pop-up alert:



Touch the **Go to Terrain** key (accesses the TAWS Page)

OR



Touch the **Close** key to remove the pop-up alert

If the pilot takes no action, the pop-up will be removed when the alert is no longer active.

11.4.8.1 TAWS-B Alerting Colors and Symbolology

Color and symbols are also associated with TAWS alerts. The alert annunciations show in the bottom left corner of the display. The three TAWS alert levels and their associated text coloring as well as any associated symbology are shown in the following table.

Alert Level	Annunciator Text	Threat Location Indicator	Example Visual Annunciation
Warning	White text on red background		PULL UP
Caution	Black text on yellow background		TERRAIN
Informational	Black text on white background	Not Applicable	TAWS INHB

Table 11-5 TAWS-B Alert Colors and Symbolology

11.6.3 TAWS-A Alerts

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Alerts are issued when flight conditions meet parameters that are set within TAWS-A software algorithms. TAWS-A alerts employ a CAUTION or a WARNING alert severity level. When an alert is issued, visual annunciations are displayed and aural alerts are simultaneously issued. TAWS-A alert types with corresponding annunciations and aural messages are shown in Table 11-13.

When an alert is issued, annunciations appear on the display. The TAWS-A Alert Annunciation is shown on the lower left part of the display. If the TAWS-A Page is not already displayed, a pop-up alert appears while an alert is active.

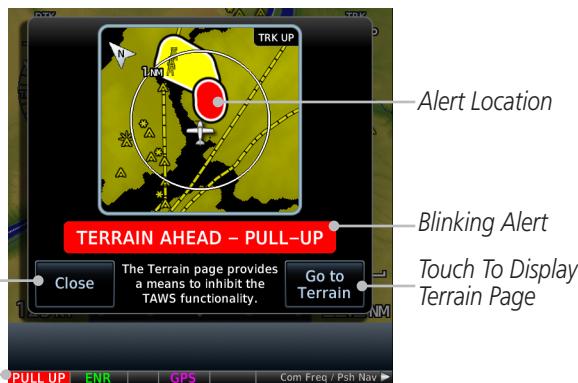


Figure 11-32 Terrain Alert Pop-Up

To acknowledge the pop-up alert:

Touch the **Close** key (returns to the currently viewed page), or

Touch the **Go to Terrain** key (accesses the TAWS-A Page)

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WARNING: Do not use data link weather information for maneuvering in, near, or around areas of hazardous weather. Information contained within data link weather products may not accurately depict current weather conditions.

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NOTE: Do not rely solely upon data link services to provide Temporary Flight Restriction (TFR) information. Always confirm TFR information through official sources such as Flight Service Stations or Air Traffic Control.

12.1 SiriusXM Weather Products (Optional)



Figure 12-3 SiriusXM Weather Functional Diagram

12.1.1 Displaying SiriusXM Weather

To display SiriusXM Weather information:

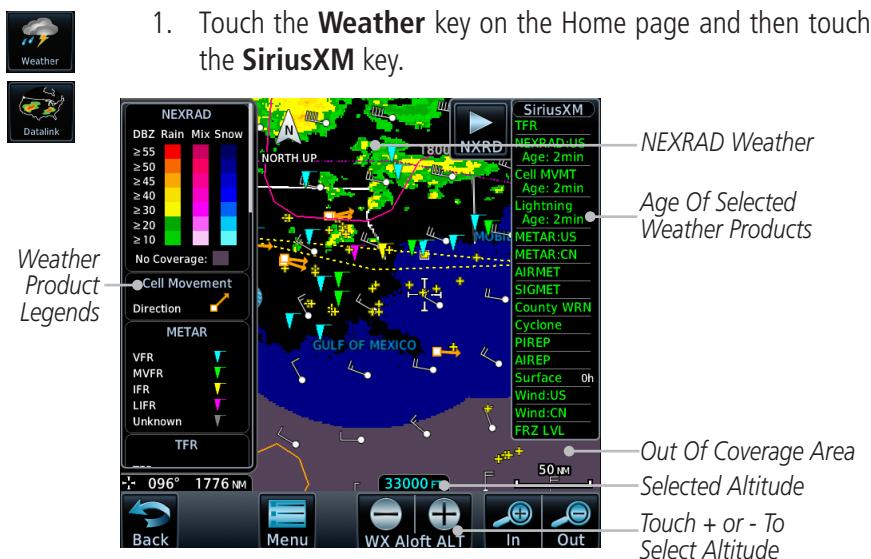


Figure 12-4 SiriusXM Weather Page

2. While viewing the Data Link weather page, touch the **Menu** key to configure the Data Link Weather page.

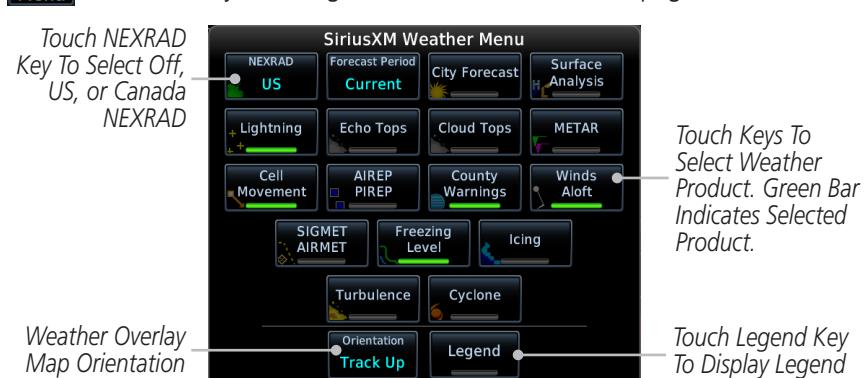


Figure 12-5 SiriusXM Weather Menu

3. Once you selected what items you want to display, touch **BACK** to return to the Data Link Weather page.



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4. Touch the SiriusXM timestamp to view the age of all selected weather products.



Figure 12-6 Timestamp Display

NOTE: The Timestamp is collapsed when all weather products are current (software v6.30 and later).

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NOTE: The unit displays valid times on the weather map in lieu of product age indications for SiriusXM Weather Icing Potential, Winds Aloft, and Turbulence weather products.

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NOTE: The unit displays product age for SiriusXM Weather Freezing Level and Canada Winds Aloft weather products. The product age indication represents the number of minutes that have elapsed since the weather product was provided by SiriusXM Weather. The unit does not display the valid times assigned to the information within these products.

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	Weather Product	Expiration Time (Minutes)	Estimated Broadcast Rate (Minutes)
	NEXRAD (NEXRAD and Echo Top are Mutually Exclusive)	30	5 (U.S.) 5 (Canada)
	Echo Top (Cloud Top and Echo Top Mutually Exclusive) (NEXRAD and Echo Top Mutually Exclusive)	30	5
	Cloud Top (Cloud Top and Echo Top Mutually Exclusive)	60	30
	Lightning	30	5
	Cell Movement	30	5
	SIGMETs / AIRMETs	60	5
	METARs	90	5
	City Forecast	90	12*
	Surface Analysis	60	12*
	Freezing Levels	120	30
	Winds Aloft	90	30
	County Warnings	60	5
	Cyclone Warnings	60	20
	Icing Potential (Icing) (SLD)	90	15
	Pilot Weather Report (PIREP) (Blue - Regular, Yellow - Urgent)	90	15

Weather Product	Expiration Time (Minutes)	Estimated Broadcast Rate (Minutes)
Air Report (AIREP)	90	15
Turbulence	180	15
Temporary Flight Restriction (TFR)	60	15
Terminal Aerodrome Forecast (TAF)	60	10

* Data for longer forecast periods may not be broadcast at this rate.

Table 12-1 SiriusXM Weather Products and Data Timing

12.1.5 NEXRAD

WSR-88D, or NEXRAD (NEXt-generation RADar), is a network of 158 high-resolution Doppler radar systems that are operated by the National Weather Service (NWS). NEXRAD data provides centralized meteorological information for the continental United States and selected overseas locations. The maximum range of a single NEXRAD radar site is 250 NM. The NEXRAD network provides important information about severe weather for air traffic safety.

NEXRAD data is not real-time. The lapsed time between collection, processing, and dissemination of NEXRAD images can be significant and may not reflect the current radar synopsis. Due to the inherent delays and the relative age of the data, it should be used for long-range planning purposes only. Never use NEXRAD data for maneuvering in, near, or around areas of hazardous weather. Instead, use it in an early-warning capacity of pre-departure and en route evaluation.

Composite data from all the NEXRAD radar sites in the United States is shown. This data is composed of the maximum reflectivity from the individual radar sweeps. The display of the information is color-coded to indicate the weather severity level.



NOTE: Due to similarities in color schemes, the display of Echo Tops cannot be shown with Cloud Tops and NEXRAD.

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12.1.15 City Forecast

City Forecast shows current and future weather conditions for various cities.

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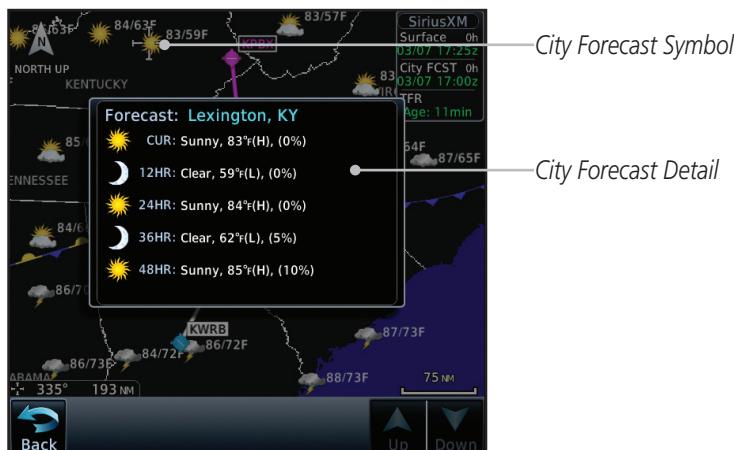


Figure 12-34 City Forecast



Figure 12-35 City Forecast Legend

12.1.16 Surface Analysis



NOTE: In software v6.21 and earlier, Surface Analysis and City Forecast are combined features of the Weather Forecast product.

The Surface Analysis map shows regional weather forecasts for a selected time period. The map shows high and low pressure centers and their associated frontal movement.



1. While viewing the SiriusXM Weather menu, touch the **Surface Analysis** key.



Figure 12-36 Surface Analysis and Fronts Legend



2. Touch the **Forecast Period** key and select the desired time increment.



Figure 12-37 Select Forecast Time Period

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Routinely clearing the StormScope Page of all discharge points is a good way to determine if a storm is building or dissipating. In a building storm discharge points reappear faster and in larger numbers. In a dissipating storm discharge points appear slower and in smaller numbers.

1. While viewing the Weather StormScope page, touch the **Clear Strikes** key to clear lightning strikes.
2. Lightning strikes will be cleared from the display and the Rate value will be reset.

NOTE: The GTN displays StormScope data with or without a heading source. If no heading source is available, the "HDG N/A" annunciation appears in the upper right corner of the page. When flying without a heading source, the pilot must clear all strikes following each heading change.

12.2.3 Changing the StormScope® Display View

The Lightning Page displays either a 360° or a 120° viewing angle.

1. While viewing the Weather StormScope page, touch **MENU**.
2. Touch the **360°** or **Arc** to select the display view.

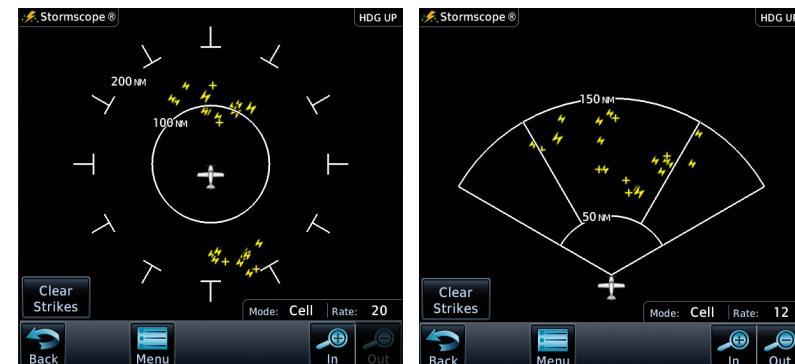


Figure 12-49 StormScope 360° and Arc Display Views

12.2.4 Changing the StormScope® Data Mode

Cell display mode uses a clustering program to locate storm cells instead of individual discharge points. This mode is most useful during periods of heavy storm activity. Strike display mode is used during periods of light electrical activity. It is useful in plotting initial lightning discharges associated with a building thunderstorm.



1. While viewing the Weather StormScope page, touch **MENU**.



2. Touch **Cell** or **Strike** to select the display mode.

12.2.5 Changing the StormScope® Data Display Range

StormScope data can be displayed on the Map page 2,000 NM zoom scale, but the data only goes out as far as the StormScope can report (200 NM). The 500 NM zoom scale will display all lightning data. Scales greater than 500 NM do not display any additional StormScope data.



While viewing the StormScope page touch the **In** and **Out** keys to display a larger or smaller area.

12.2.6 Displaying StormScope® Data on the Map Page

The Map Page displays cell or strike information using yellow lightning strike symbology overlaid on a moving map. This added capability improves situational awareness, which in turn makes it much easier for the pilot to relate storm activity to airports, NAVAIDs, obstacles and other ground references. For details about viewing Stormscope data on the Map page, refer to section 9.1.1.7.



NOTE: The selected lightning display type, cell or strike, will be shown the same on both the StormScope and the Map pages.

12.5.3.1 Connxet Data Request

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NOTE: The Auto Request function is only enabled if the GTN is connected directly to the GSR 56 (software v6.30 and later).

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3. Touch the **Cancel Request** key to cancel a request in progress.

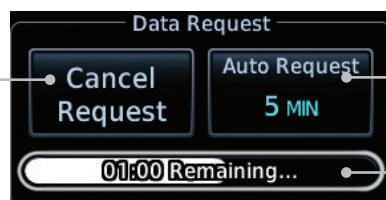


Figure 12-77 Cancelling A Request

12.6 FIS-B Weather



NOTE: FIS-B information is to be used for pilot planning decisions and pilot near-term decisions focused on avoiding areas of inclement weather that are beyond visual range or where poor visibility precludes visual acquisition of inclement weather. FIS-B weather and NAS status information may be used as follows:

- (a) To promote pilot awareness of own ship location with respect to reported weather, including hazardous meteorological conditions, NAS status indicators, and enhance pilot planning decisions and pilot near-term decision-making.
- (b) To cue the pilot to communicate with the Air Traffic Control controller, Flight Service Station specialist, operator dispatch, or airline operations control center for general and mission critical meteorological information, NAS status conditions, or both.

FIS-B information, including, weather information, NOTAMs, and TFR areas, are intended for the sole purpose of assisting in long- and near-term planning decision making. The system lacks sufficient resolution and updating capability necessary for aerial maneuvering associated with immediate decisions.

The Flight Information Services (FIS-B) function is capable of displaying text and graphic weather information with GDL 88 and GTX 345 installations. No subscription for FIS-B services is required.

The FIS-B Function is a graphic weather display capable of displaying graphical weather information on UAT equipped installations. Graphical data overlaid on the map indicates the rainfall detected by ground based radar for a specific area. Color transitions from light green (light rainfall) to magenta (heavy rainfall) represent an increase in precipitation. Review the Limitations section in the front of this guide for the limitations that apply to the FIS-B data.

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Rainfall data is color coded as follows:

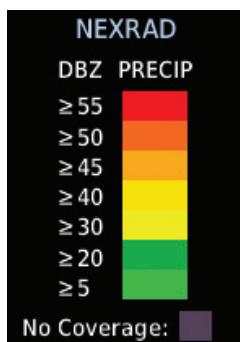


Figure 12-93 FIS-B Weather Precipitation Legend

Gray shaded areas indicate that data is not available or that no data has been received for a requested area. Gray shades may also indicate that the rainfall rate for a given area is undetermined.

The FIS-B Function is based on a ground-to-air data link and requires that the appropriate ground systems are broadcasting weather data and the aircraft is within reception range of the Ground Broadcast Transceiver (GBT).

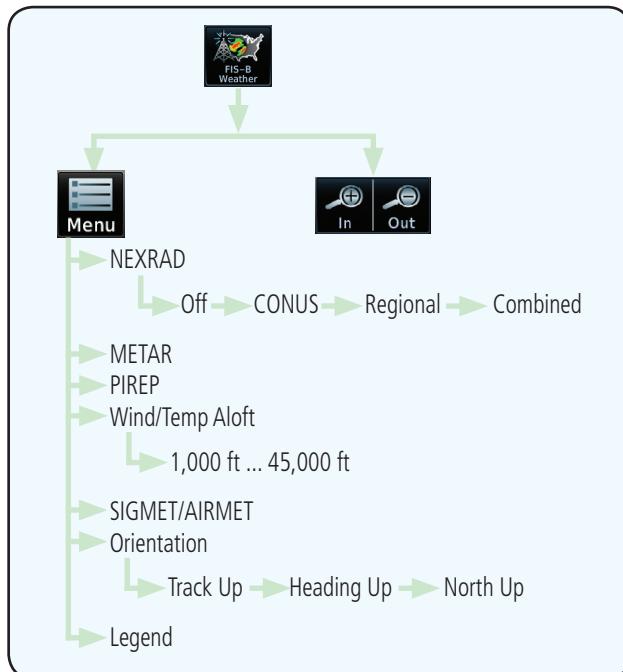


Figure 12-94 FIS-B Weather Functional Diagram

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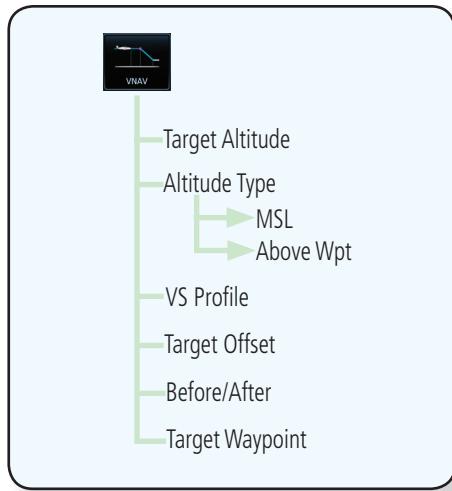


Figure 15-4 VCALC Page Functional Diagram



- From the Utilities page, touch **VCALC**.

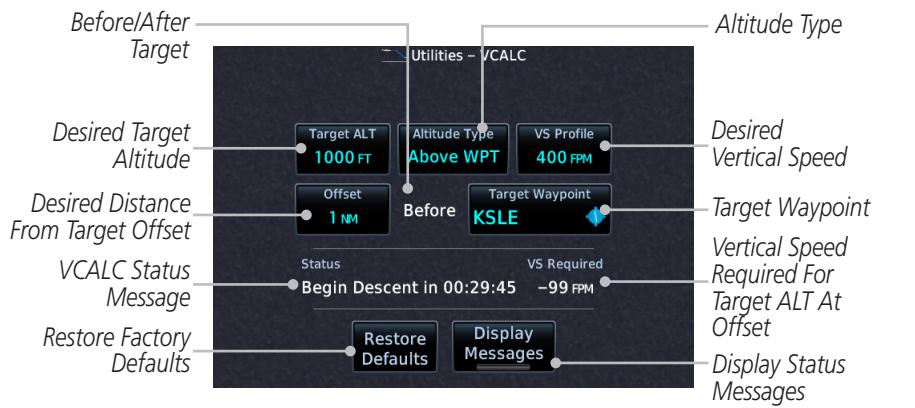


Figure 15-5 VCALC Page

- Select the VCALC items as necessary to set up parameters for the next waypoint. Touch the **Back** key when finished.



16.1 System Status

The System status page of the System function provides information about the GTN unit and the equipment attached to it. This information is useful if it is necessary to contact Customer Service. The System Status page shows the System ID and serial number for the GTN unit, hardware and software versions, as well as a list of the installed databases.

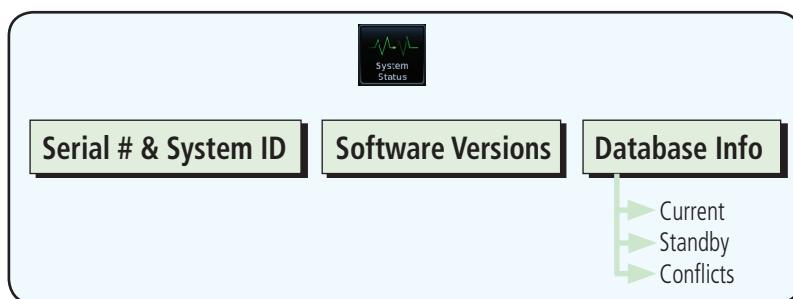


Figure 16-3 System Status Functional Diagram

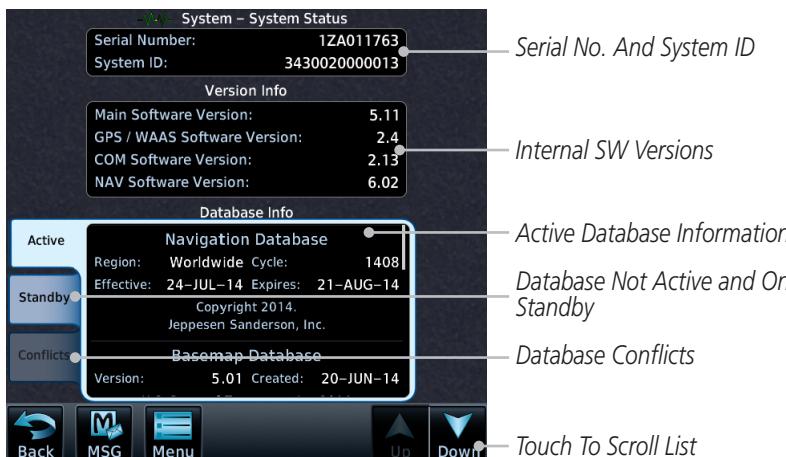


Figure 16-4 System Function System Status Page Description

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NOTE: Operating outside of an SBAS service area with SBAS enabled may cause elevated EPU values to be displayed on the satellite status page. Regardless of the EPU value displayed, the LOI annunciation is the controlling indication for determining the integrity of the GPS navigation solution.

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NOTE: The FDE Prediction program is used to predict FDE availability. This program must be used prior to all oceanic or remote area flights for all operators using the GTN as a primary means of navigation under FAR parts 91, 121, 125, and 135. The FDE program is part of the GTN trainer, available for download from the GTN product information page on Garmin's website, www.flyGarmin.com.

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If the GTN has not been operated for a period of six months or more, acquiring satellite data to establish almanac and satellite orbit information can take 5 to 10 minutes.

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The Time and other data may not be displayed until the unit has acquired enough satellites for a fix.

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16.2.4 GPS Faults

The GTN communicates various fault conditions that can affect the accuracy of the GPS. These include loss of integrity, loss of navigation, and a loss of position.

Loss of Integrity

A loss of integrity is when the integrity of the GPS position does not meet the requirements for the current phase of flight. This only occurs before the final approach fix (if an approach is active).

The GTN indicates a loss of integrity by displaying the amber "LOI" annunciation at the bottom of the screen.

Loss of Navigation

A loss of navigation can be caused by any of the following conditions:

- Aircraft is after the final approach fix and GPS integrity does not meet the active approach requirements
- Insufficient number of satellites supporting aircraft position (i.e., more than 5 seconds pass without adequate satellites to compute a position)
- GPS sensor detects an excessive position error or failure that cannot be excluded within the time to alert
- On-board hardware failure

The GTN indicates a loss of navigation by invalidating the active course guidance, and issuing a system message describing the cause.

Loss of Position

If the GTN cannot determine a GPS position solution, the ownship icon disappears and the amber "No GPS Position" annunciation appears across the map pages. For information about managing limited navigation features, refer to section 1.10.

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2. Touch the **ILS CDI Capture** key to select automatic or manual. This feature enables the unit to automatically switch from GPS to VLOC on an ILS approach. See *Procedures-ILS Approaches* for more detail on ILS approaches.



NOTE: The ILS CDI Capture key may be disabled in certain GTN installations.

16.5 Alerts Settings

The Alerts Setup page controls two functions: Arrival Alerts and Airspace Alerts. Arrival Alerts, when active, will generate a message when the aircraft is within the selected proximity of the destination. Airspace Alerts generate a message and filtering of the Nearest Airspace list. The altitude component of Airspace Alerts are dependent on both aircraft and airspace altitude and the values set for the Altitude Buffer.

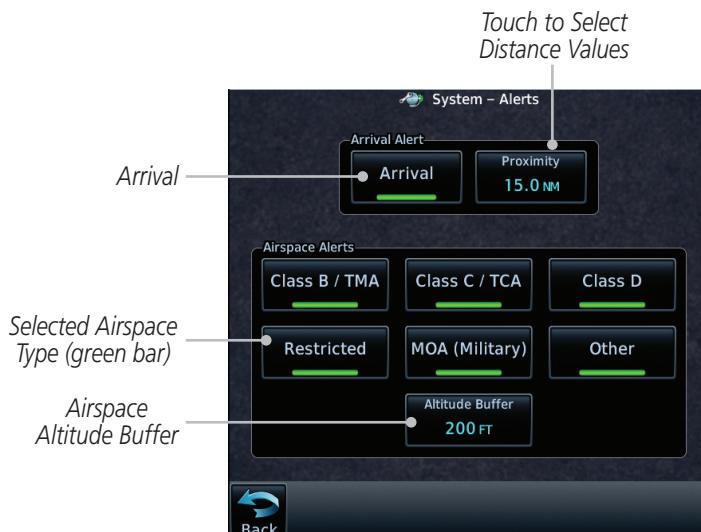


Figure 16-29 Alerts Setup Page

1. While viewing the System page, touch the **Alerts** key.
2. Touch the **Arrival** key to toggle activation. A green bar will appear when it is active.



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Note 1: B/D APT is the straight line distance.

Note 2: Dist to DEST is the distance along the flight plan.

Function Field Type	
CDI - Course Deviation Indicator	MIC PA Mode - Passenger Address Toggle
Flap Override - Flap Override ¹	Playback - Play Last Recording
GPWS Inhibit - GPWS Inhibit ¹	TAWS Inhibit - TAWS Inhibit
G/S Inhibit - G/S Inhibit ¹	Gen Timer - Generic Timer Control
HTAWS RP Mode - HTAWS RP Mode ²	WX RDR Controls - Weather Radar Controls
OBS/Suspend/Unsuspend Button	OFF - Do Not Display Data Field
On Scene - "On Scene" Mode Toggle	

Table 16-7 Function User Field Selections

Note 1: With TAWS-A enabled.

Note 2: With HTAWS enabled.

Map Page Field Type	
Blackout Mode	Checklist - Checklist Page
Charts - Charts Page	Fuel PLAN - Fuel Planning Page
Flight Plan - Flight Plan Page	SCHED MSG - Scheduled Messages
Map - Map Page	Trip PLAN - Trip Planning Page
Nearest - Nearest Page	VCALC - VCALC Page
NEAR APT - Nearest Airport Page	User FREQ - User Frequencies
PROC - Procedures Page	WPT INFO - Waypoint Information
Approach - Approach Page	Weather - Weather Page
Arrival - Arrival Page	CNXT WX - Connex WX Page
Departure - Departure Page	FIS-B WX - FIS-B Weather Page
Backlight - Backlight Page	Stormscope - Stormscope Page
Services - Services Page	WX Radar - Weather Radar Page
Traffic - Traffic Page	SiriusXM WX - Sirius XM WX Page
Terrain - Terrain Page	OFF - Do Not Display Page Field
Utilities - Utilities Page	

Table 16-8 Page User Field Selections

	Message	Description	Action
Foreword	CROSSFILL ERROR - GTN software mismatch. See CRG for crossfilled items.	Crossfill is configured "on" but is not working due to software mismatch.	See section 16.4.5.1 for a list of crossfilled items that will no longer be crossfilled. Contact dealer to have software versions updated.
FPL	CROSSFILL STATUS - Crossfill is turned off.	Crossfill is turned off.	No action.
Direct-To			
Proc	DATABASE - A procedure has been modified in a catalogued flight plan.	A new database update caused a procedure to be truncated because the flight plan now has too many waypoints or removed a procedure because it no longer exists in the database.	Verify stored catalogued flight plans and procedures. Modify stored flight plans and procedures as necessary to include the current procedures by re-loading those procedures to the stored flight plan routes.
Charts			
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Messages	DATABASE - Terrain database is not installed, is corrupt, or is not valid for this system.	The terrain database is not available. Terrain information and alerts do not display.	Re-load the database on the external datacard.

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Message	Description	Action	
VCALC - Arriving at VCALC target altitude.	User has configured a vertical descent calculation, and the aircraft is approaching the target altitude.	No action is necessary; message is informational only.	Foreword
VISUAL APPROACH NOT ACTIVE - Approach guidance not available when requesting Direct-To runway.	Visual approach could not transition to active. Guidance is not available.	Reactivate the approach or cancel the Direct-To course.	Getting Started
VLOC RECEIVER - Navigation receiver has failed.	The nav radio is not communicating properly with the system.	Use GPS based navigation. Contact dealer for service.	Audio & Xdr Ctrl
VLOC RECEIVER - Navigation receiver needs service.	The nav radio is reporting to the GTN that it needs service. The nav radio may continue to function.	Use GPS based navigation. Contact dealer for service.	Com/Nav
WAYPOINT - Arriving at [wpt name].	User has configured the arrival alarm and is within the specified distance.	No action is necessary; message is informational only.	FPL
WX ALERT - Possible severe weather ahead.	The weather radar system is indicating the presence of severe weather ahead.	Check weather radar. See section 12.4.8.2 for more information.	Direct-To
WX RADAR FAIL - Weather radar is inoperative.	The GTN is configured for a weather radar but is not receiving data from it. Weather Radar will not be displayed on the GTN.	Contact dealer for service.	Proc
			Charts
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En Route Safe Altitude

The recommended minimum altitude within ten miles left or right of the desired course on an active flight plan or direct-to

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ERR

error

ESA

En route Safe Altitude

Audio &

ETA

Estimated Time of Arrival

Xpdr Ctrl

ETE

Estimated Time En Route

Com/Nav

°F

degrees Fahrenheit

FPL

FAA

Federal Aviation Administration

FCC

Federal Communication Commission

Direct-To

FCST

forecast

FD

flight director

Proc

FIR

Flight Information Region

FIS-B

Flight Information Services-Broadcast

Charts

FISDL

Flight Information Service Data Link

FLTA

Forward Looking Terrain Avoidance

Wpt Info

FPL

flight plan

FREQ

frequency

Map

FRZ

freezing

FSS

Flight Service Station

Traffic

ft

foot/feet

Terrain

GAGAN

Provides SBAS service for India

Weather

GCS

Ground Clutter Suppression

GDC

Garmin Air Data Computer

Nearest

GDL

Garmin Satellite Data Link

GEO

geographic

Services/

GLS

Global Navigation Satellite Landing System

Music

GMA

Garmin Audio Panel System

GMT

Greenwich Mean Time

Utilities

GMU

Garmin Magnetometer Unit

System

GPS

Global Positioning System

GPSS

GPS Roll Steering

Ground Speed

The velocity that the aircraft is travelling relative to a ground position

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Ground Track

see *Track*

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GRS

Garmin Reference System

GS

Ground Speed

Appendix

19.2.4.1 Resolving Database SYNC Conflicts

Database conflicts must be resolved for synchronization to occur. Conflicts exist when multiple LRUs have a database of the same cycle, but with different regions or types (e.g., fixed wing vs. rotorcraft navigation database, different regions of the navigation database, or different obstacle database types). The GTN attempts to resolve these by automatically synchronizing the most recently installed database across all other LRUs (software v6.30 and later). Pilot intervention is required when conflicts cannot be resolved automatically. Conflicts occurring with earlier software versions also require manual intervention.

To manually resolve database conflicts, touch the **Resolve Conflicts** key on the display containing the desired database version. This key is located on the Conflicts tab of the System Information page.

19.2.5 Chart Streaming

While the Chart database is SYNCing in the background, the GTN will stream individual charts to other compatible displays. This enables all Garmin displays to use the latest chart database information even though the database is currently installed only on a single unit. Chart Streaming will begin after the chart database has begun SYNCing.

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3. Touch the **Demo** key in the lower part of the display to reach the Demo Setup functions.

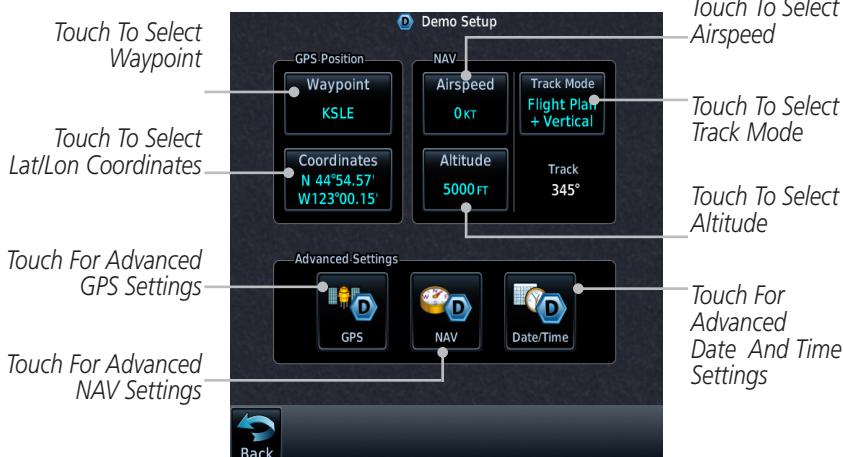


Figure 19-7 Demo Mode Setup

4. Touch the **GPS** key to reach the Demo GPS Settings page. The Position Error values (Horizontal Protection Level Fault Detection [HPL FD], HPL SBAS, and Vertical Protection Level [VPL] SBAS) may be adjusted to reflect errors induced by naturally occurring conditions, but are normally not adjusted for most Demo mode operations.

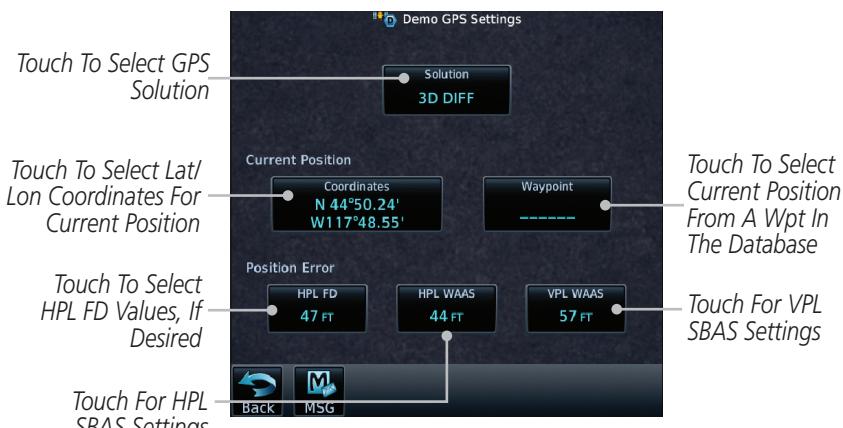


Figure 19-8 Demo Mode GPS Settings



5. Touch the **Nav** key to reach the Demo Navigation Settings page.

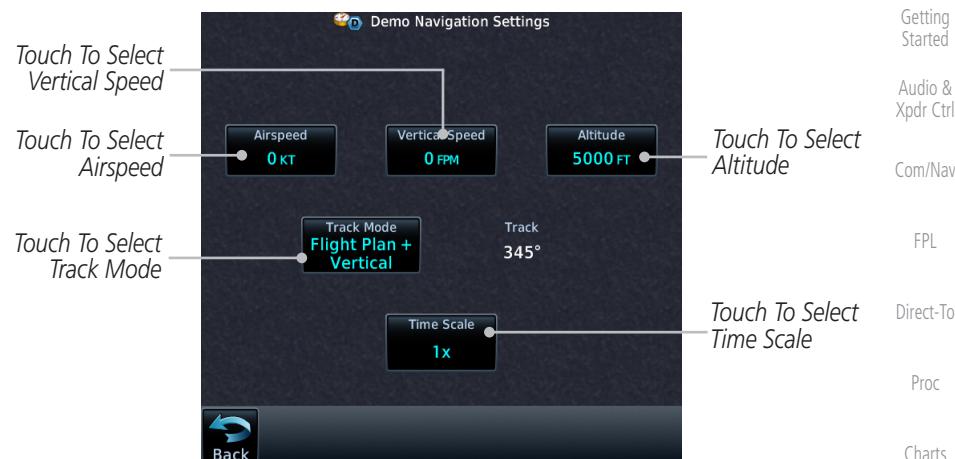


Figure 19-9 Demo Mode Navigation Settings



6. Touch the **Date/Time** key to reach the Demo Date/Time Settings page.

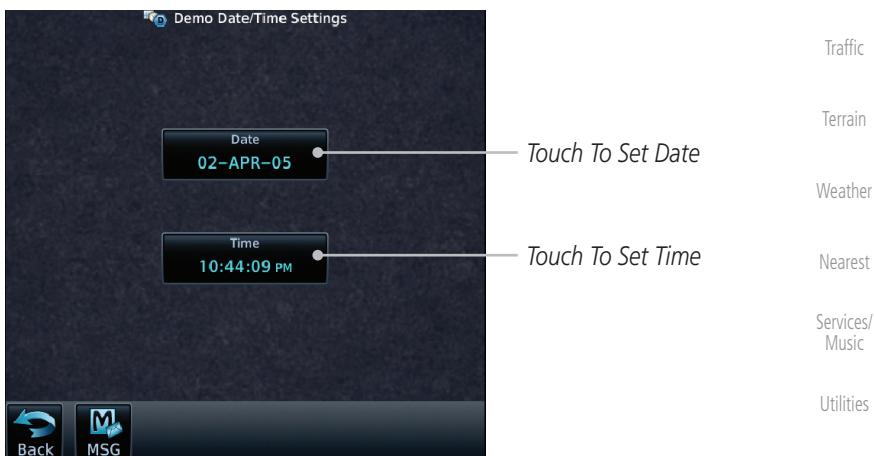
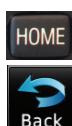


Figure 19-10 Demo Mode Date/Time Settings



7. After completing the settings for Demo mode, touch the **HOME** key or **Back** key to get started with operating the GTN.

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Voice Command Instructions

1. Press and hold the Push to Command (PTC) switch.
 2. Speak the entire command into the headset MIC.
 3. Release the "PTC" switch.
- A positive tone (low-to-high) indicates the command has been recognized and executed. (i.e., page changed, radio tuned, MIC selected, etc.)
 - A negative tone (high-to-low) indicates the command is either unrecognizable or invalid.

Successful Command Example

"Show approaches page" is spoken, the approach selection page displays immediately, and a positive tone sounds.

Unsuccessful Command Examples

"Show map page" is spoken and the traffic page displays.

"Show map page" is spoken and a negative tone sounds.

Qualification Procedure

Speak the unbold phrase if the voice command in this procedure is not applicable to the aircraft's configuration. If the total number of successful commands is less than 17, the voice commands must be disabled. For instructions on how to activate and deactivate voice commands, refer to section 16.13.

Example: If the requirement states a COM radio is required, but your GTN does not have a COM radio, use the unbold command.

1. Start the GTN and acquire a GPS position.
2. Conduct the voice commands in sequential order while wearing an aviation headset. If necessary, a command can be attempted twice.
3. When the command is successful check the box next to the command.



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