

GTN 625/635/650 SOFTWARE v6.30

PILOT'S GUIDE UPGRADE SUPPLEMENT

This supplement contains the pages revised in the GTN 625/650 Pilot's Guide, P/N 190-01004-03, Rev M, 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 625/650 Pilot's Guide, P/N 190-01004-03, Rev L, is equivalent to the GTN 625/650 Pilot's Guide, P/N 190-01004-03, Rev M.

Current documents are available at www.flyGarmin.com

Printed copies may be purchased by contacting Garmin Customer Support.



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 625/650 Pilot's Guide, P/N 190-01004-03.

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This manual reflects the operation of System Software version 6.30, or later. Some differences in operation may be observed when comparing the information in this manual to later software versions.

At Garmin, we value your opinion. For comments about this guide, please e-mail:
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GTN 625/650 Pilot's Guide Revision M, Change Summary

| Section | Page | Description |
|---|------|--|
| Various | | Updated contact information where applicable |
| Front Matter | | |
| | v | Revised note with updated Advisory Circular |
| Section 1 – Getting Started | | |
| 1.4.1 | 1-6 | Rewrote section for clarity. |
| 1.9 | 1-18 | Rewrote section to include VFR visual approaches. |
| 1.10 | 1-19 | Added reference to section 15.2.4, “GPS Faults.” |
| Section 2 – Audio & Transponder Control | | |
| 2.1.8 | 2-9 | Added “TCAS II Transponder Mode Controls” section. |
| Section 3 NAV/COM | | |
| 3.3.4 | 3-11 | Updated external remote Com flip-flop key reference. |
| Section 4 – Flight Plan | | |
| 4.2 | 4-4 | Rewrote “Edit Data Fields” footnote. |
| 4.3.3 | 4-23 | Updated note regarding graphically editing flight plans with earlier software revisions. |
| Section 6 - Procedures | | |
| 6.0 | 6-1 | Rewrote opening paragraph to include visual approach guidance. |
| 6.1 | 6-2 | Added lateral vertical guidance reference for visual approaches. |
| | 6-3 | Added “LP” and “L/VNAV” annunciations to table 6-1, “Phase of Flight Annunciations.” |
| 6.4 | 6-8 | Added note regarding the loading of alternate approaches during a missed approach procedure. |
| | 6-9 | Added information about approach selection order to step 3. |
| 6.13 | 6-21 | Added “Visual Approach Procedures” section |
| | 6-22 | Updated screen image for figure 6-27, “Visual Approach Configuration Pop-up.” |
| | | Added note regarding CDI/VDI displays. |
| Section 7 - Charts | | |
| 7.2.9 | 7-10 | Added “Nearest VRPs” section. |
| 7.8.2 | 7-20 | Rewrote step 6 for clarity. |

| Section | Page | Description |
|-----------------------------|-------|---|
| Section 8 - Map | | |
| 8.1.1.6 | 8-6 | Rewrote note to include information about StormScope map overlay management. |
| 8.1.1.6 | 8-7 | Updated screen image in figure 8-8, "StormScope Overlay." |
| 8.1.2 | 8-8 | Added "Visual APPR" to figure 8-10, "Map Setup Functional Diagram." |
| 8.1.2.1 | 8-10 | Added "Visual APPR" feature and range selections to table 8-1, "Map Setup Map Options." |
| | 8-12 | Added "Visual APPR Selector" subsection. |
| | 8-18 | Updated screen image in figure 8-24, "Point Obstacle Detail." |
| | 8-19 | Updated screen image in figure 8-25, "Wire Obstacles" |
| 8.1.2.2 | 8-20 | Updated range selections to table 8-6, "Map Setup Aviation Options." |
| 8.1.2.4 | 8-22 | Revised viewing range distance selections in table 8-9, "Map Setup Airspace Options." |
| | 8-23 | Rewrote "Airspace Labels" subsection for clarity. |
| 8.1.3 | 8-28 | Updated call out for figure 8-33, "Map Data Fields Selection." |
| 8.1.4 | 8-30 | Rewrote paragraph for clarity. |
| 8.3.3 | 8-35 | Added "active leg course and TO waypoint" flight plan features to paragraph. |
| 8.3.3.1 | 8-36 | Revised captions in figures 8-41, "Drag Selected Leg to New Waypoint." |
| | | Revised captions in figures 8-42, "Completed Flight Plan with New Waypoint." |
| | | Revised note content regarding "graphically editing a flight plan." |
| 8.7.1 | 8-42 | Revised not with updated Advisory Circular |
| Section 9 - Traffic | | |
| 9.9 | 9-37 | Added "TCAS II" section. |
| Section 10 - Terrain | | |
| 10.6.6 | 10-60 | Updated title heading. |

| Section | Page | Description |
|-------------------------------|-------|---|
| Section 11 - Weather | | |
| 11.1 | 11-2 | "City Forecast and Surface Analysis" added to figure 11-3, "SiriusXM Weather Page Functional Diagram." |
| 11.1.1 | 11-3 | Update figure 11-4, "SiriusXM Weather Page." |
| | 11-4 | Added "Touch the SiriusXM Timestamp" step #4. Add figure 11-6, "Timestamp Display." |
| 11.1.4 | 11-8 | Updated table 11-1, "SiriusXM Weather Products and Data Timing." |
| 11.1.15 | 11-22 | Added "City Forecast" section. |
| 11.1.16 | 11-23 | Added "Surface Analysis" section. |
| 11.2.2 | 11-30 | Added "HDG N/A" detail to StormScope note. |
| 11.2.3 | | Revised figure 11-51, "StormScope 360 and Arc Display Views." |
| 11.2.6 | 11-31 | Added cross reference to associated map overlay section. |
| 11.3.3.1 | 11-35 | Revised note content regarding "Auto Request." |
| 11.4 | 11-49 | Added note regarding FIS-B weather limitations. Added note about FIS-B color transitions. |
| | 11-50 | Rewrote paragraph for clarity. |
| Section 14 - Utilities | | |
| 14.1 | 14-4 | Updated screen image in figure 14-5, "VCALC Page." |
| Section 15 - System | | |
| 15.1 | 15-3 | Updated screen image in figure 15-3, "System Status Page Description." |
| 15.2.2 | 15-8 | Added "GAGAN" detail to SBAS provider list. |
| 15.2.4 | 15-9 | Added "GPS Faults" section. |
| 15.4.1 | 15-17 | Added note regarding ILS CDI Capture Key functionality. |
| Section 16 - Messages | | |
| 16 | 16-5 | Added "Database - Terrain database is not installed, is corrupt, or is not valid for this system" message to table 16-1. |
| | 16-23 | Added "Visual Approach Not Active - Approach guidance no available when requesting Direct-To runway" message to table 16-1. |

| Section | Page | Description |
|------------------------------|-------|---|
| Section 18 - Appendix | | |
| 18.1 | 18-3 | Added GAGAN to glossary |
| 18.2.4.1 | 18-15 | Rewrote section for clarity. |
| 18.3 | 18-18 | Updated screen image in figure 18-7, "Demo Mode Setup." |
| | 18-19 | Updated screen image in figure 18-9, "Demo Mode Navigation Settings." |
| 18.5 | 18-25 | Rewrote "Voice Command Instructions" subsection for clarity. |
| | | Added cross-reference to associated activation/deactivation instructions. |



NOTE: Canadian installations: In accordance with Canadian Radio Specifications Standard 102 (RSS 102), RF field strength exposure to persons from an antenna connected to this device should be limited to 60 V/m for controlled environment and 28 V/m for uncontrolled environment.



NOTE: Do not use SafeTaxi functions as the basis for ground maneuvering. SafeTaxi functions 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 is to be used by the flight crew to orient themselves on the airport surface.



NOTE: The FAA has asked Garmin to remind pilots who fly with Garmin database-dependent avionics of the following:

- It is the pilot's responsibility to remain familiar with all FAA regulatory and advisory guidance and information related to the use of databases in the National Airspace System.
- Garmin equipment will only recognize and use databases that are obtained from Garmin or Jeppesen. Databases obtained from Garmin or Jeppesen are assured compliance with all data quality requirements (DQRs) by virtue of a Type 2 Letter of Authorization (LOA) from the FAA. A copy of the Type 2 LOA is available for each database at www.flyGarmin.com.
- Use of a current Garmin or Jeppesen database in your Garmin equipment is required for compliance with established FAA regulatory guidance, but does not constitute authorization to fly any and all terminal procedures that may be presented by the system. It is the pilot's responsibility to operate in accordance with established AFM(S) and regulatory guidance or limitations as applicable to the pilot, the aircraft, and installed equipment.



NOTE: The pilot/operator must review and be familiar with Garmin's database exclusion list as discussed in SAIB CE-14-04 to determine what data may be incomplete. To see if an exclusion report exists for a specific database, visit www.flyGarmin.com.

1.4 Unit Power Up

The GTN 6XX System is integrated with the aircraft electrical system and receives power directly from electrical buses. The GTN 6XX and supporting sub-systems include both power-on and continuous built-in test features that exercise the processor, memory, external inputs, and outputs to ensure safe operation.

1.4.1 Start-Up Screens

During system initialization, test annunciations are displayed. All system annunciations should disappear typically within the first 30 seconds after power-up. Upon power-up, key annunciator lights also become momentarily illuminated on the GTN 6XX display bezel.

The splash screen displays the following information:

- Copyright
- Database List and System version
- Instrument Panel Self-Test

Currently installed database information includes valid operating dates, cycle number, and database type. When this information has been reviewed for currency (to ensure that no databases have expired), the pilot is prompted to continue. Databases that are not current will be shown in amber.

During the startup process the user may be asked if they would like to update to newer databases. Additional information on database updates can be found in section 18.2.

The COM and NAV radios, transponder controls, and GDL 88 control panel are displayed on the Start-Up screens. Some functions may be unavailable until after the databases are verified.

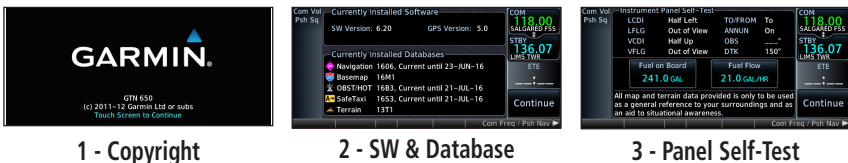


Figure 1-10 System Startup Pages

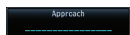
1.9 VFR and IFR Procedures

Visual approaches and IFR procedures (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 APPR & 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.

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1.10 Dead Reckoning

Dead reckoning is a feature that enables the GTN to provide limited navigation using the last known position and speed after a loss of GPS navigation while on an active flight plan.



CAUTION: *Navigation using dead reckoning is only an estimate and should not be used as the sole means of navigation. Use other means of navigation, if possible.*

Dead reckoning becomes active after a loss of GPS position while navigating using an active flight plan and the flight phase is either En Route (ENR) or Oceanic (OCN).

“DR” will be overlayed on the ownship icon. The To/From flag is removed from the CDI. The Dead Reckoning annunciator (DR) appears on the lower left side of the map display and will replace ENR or OCN when a GPS position is unavailable and the unit is in Dead Reckoning mode. All external outputs dependent on GPS position are flagged.

Terrain will be noted as not available and new terrain advisory pop-ups will not occur. Traffic and StormScope information will not be shown on the Map page, but will continue to be available on their own dedicated pages. XM weather will still be available on the Map page.

Dead Reckoning mode will continue until GPS position is restored, when GPS navigation is restored Dead Reckoning mode is exited. The DR annunciators will be removed and GPS information will be used to compute navigation related information for the current flight phase.

Dead Reckoning is only allowed in En Route and Oceanic phases of flight. If the unit is in a Terminal or Approach phase of flight when Dead Reckoning takes place, “No GPS Position” will be displayed on the map pages and all navigation data will be dashed. If you are operating in Dead Reckoning mode and a transition to Terminal or Approach phases of flight would occur from the projected Dead Reckoning position, Dead Reckoning mode will be discontinued. “No GPS Position” will be displayed on the map pages and all navigation data will be dashed. For information about GPS faults, refer to section 15.2.4.

2.1.7 Extended Squitter Transmission

When interfaced with a compatible transponder, the GTN can act as a control for the Extended Squitter functions. When “Enable ES” is selected, the GTX turns on Extended Squitter (ES) transmissions.

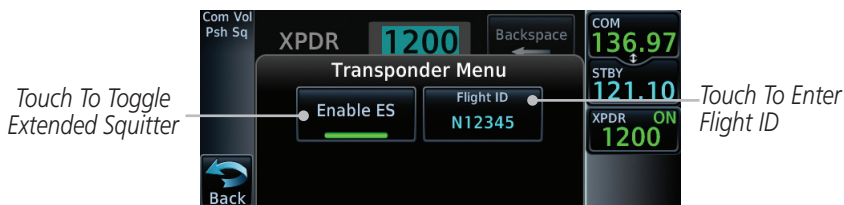
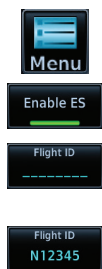


Figure 2-16 Transponder Menu With Extended Squitter Capability



1. While viewing the Transponder (XPDR) page, touch the **Menu** key and then the **Enable ES** key to toggle Extended Squitter Off and On.
2. Touch the **Flight ID** key and use the keypad to select a Flight ID and then touch **Enter**.
3. After selecting a Flight ID, the selected value will be shown in the **Flight ID** key.

2.1.8 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 stay in a different mode.



Figure 2-17 TCAS II Transponder Control Panel

8. Touch the **Name** or **Frequency** keys to edit the displayed name or frequency, if desired.

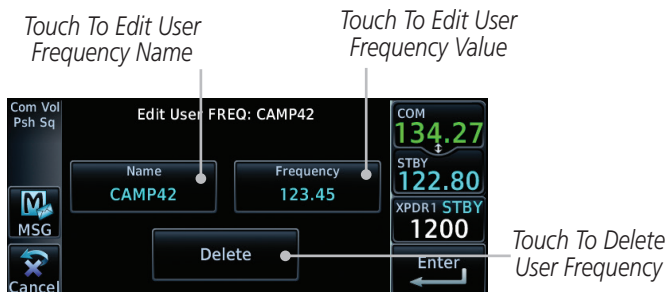


Figure 3-24 Edit The User Frequency

3.3.4 Emergency Frequency

The GTN 635 or 650 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 external 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.

4.2 Active Flight Plan Page

The Active Flight Plan Page provides information and editing functions for the flight plan currently in use for navigation. Once you have activated a flight plan, the Active Flight Plan Page shows each waypoint for the flight plan, along with the Desired Track (DTK), Distance (DIST) for each leg and Cumulative Distance (CUM). The data fields are user-selectable and may be changed to display Cumulative Distance (CUM), Distance (DIST), Desired Track (DTK), En Route Safe Altitude (ESA), or Estimated Time of Arrival (ETA).

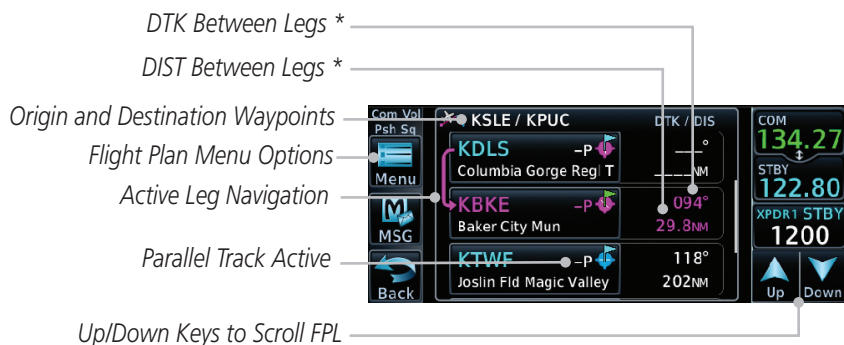


Figure 4-7 Active Flight Plan Page

* The field types may be changed using the Edit Data Fields function in the Flight Plan page Menu.

4.2.1 Waypoint Options

1. While viewing the Active Flight Plan page, touch the desired flight plan waypoint. The Waypoint Options window will be shown.



Figure 4-8 Active Flight Plan Wpt Options

2. Touch one of the options to perform the selected action. Cancel the option selection by touching the **Back** key.

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.

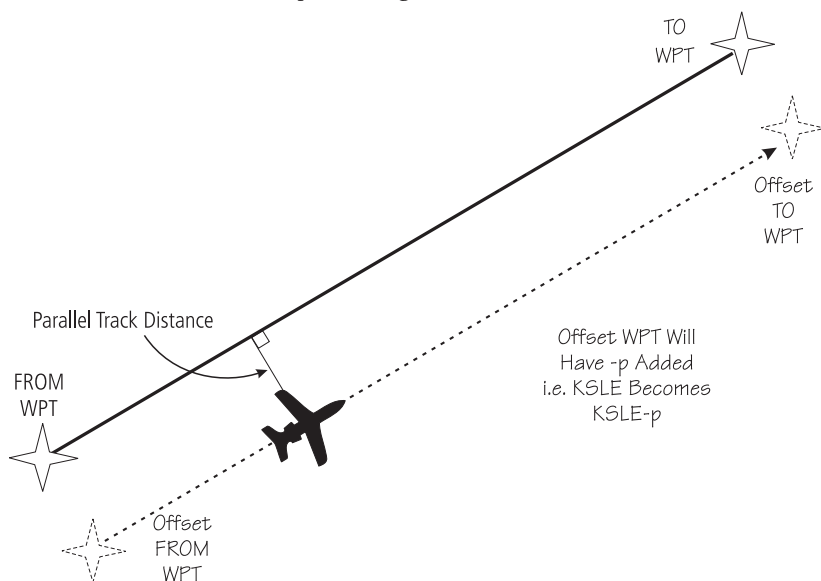


Figure 4-43 Parallel Track Description



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

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6 PROCEDURES

The GTN 6XX 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.

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: *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 6XX 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 6XX 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.

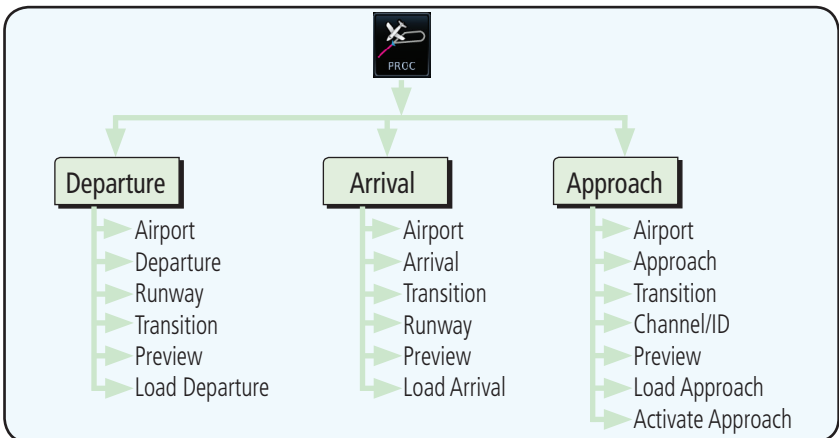


Figure 6-1 Procedures Functional Diagram

| Annunciation | Description |
|---------------------------|--|
| LPV | Localizer Performance with Vertical guidance (LPV) approach. Fly to LPV minimums. |
| LP +V | Localizer Performance using published LP minima. Advisory vertical guidance is provided. Fly to LP minimums. |
| LP | Localizer Performance with no vertical guidance. Fly to LP minimums. |
| VISUAL | Advisory visual approach with vertical guidance based on advisory terrain avoidance calculations. CDI scaling is identical to LPV approaches. |
| L/VNAV | Lateral Navigation and Vertical Navigation (LNAV/VNAV) approach. Fly to LNAV/VNAV minimums. |
| LNAV+V | GPS approach using published LNAV minima. Advisory vertical guidance is provided. Fly to LNAV minimums. |
| LNAV | Lateral Navigation approach. Fly to LNAV minimums. |
| MAPR | Missed Approach indicates the system is providing missed approach integrity and CDI full-scale deflection ± 0.3 NM. |
| ENR | En route, CDI full-scale deflection is 2.0 NM or current CDI scale selection, whichever is smaller. |
| TERM | Terminal, CDI full-scale deflection is 1.0 NM or current CDI scale selection, whichever is smaller. |
| DPRT | Departure, indicates the system is using non-precision approach integrity. CDI full-scale deflection is 0.3 NM. |
| OCN | Oceanic, CDI full-scale deflection is 2.0 NM. |
| 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. |

Table 6-1 Phase of Flight Annunciations

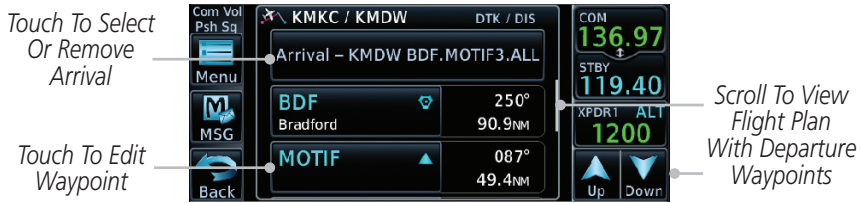


Figure 6-14 Flight Plan With Arrival Loaded

6.4 Selecting an Approach

Only one approach can be loaded at a time in a flight plan. If an approach is loaded when another approach is already in the active flight plan, the new approach replaces the previous approach. The route is defined by selection of an approach, the transition waypoint, and a runway.



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.



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

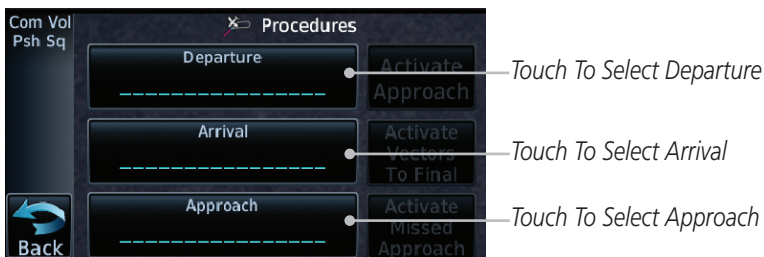
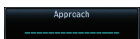


Figure 6-15 Procedures Selection Window



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.

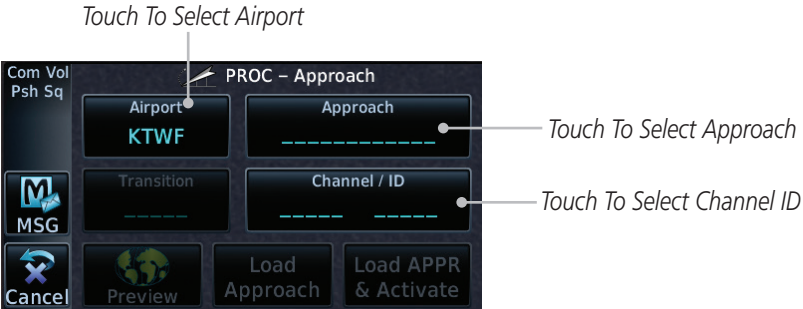
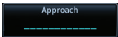


Figure 6-16 Selecting an Approach



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 6-17 Selecting an Approach from the List

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



Figure 6-18 Selected Approach Overview

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".

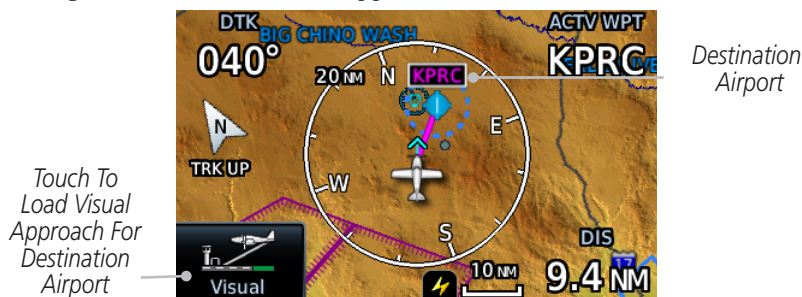


Figure 6-25 Visual Approach Key Flying Near Destination

Method 2: Select the **Visual** key located on the left edge of the screen. This key appears when a visual approach supported airport is selected on the map during pan mode.

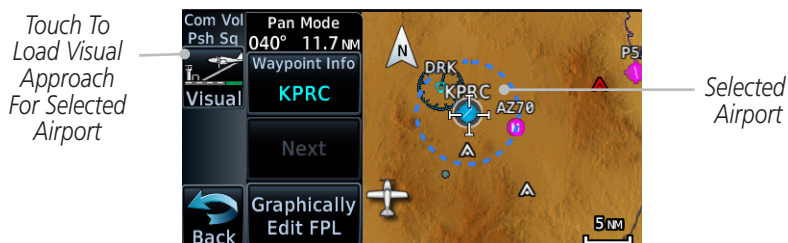


Figure 6-26 Visual Approach Key When Selecting Airport

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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, see 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.”

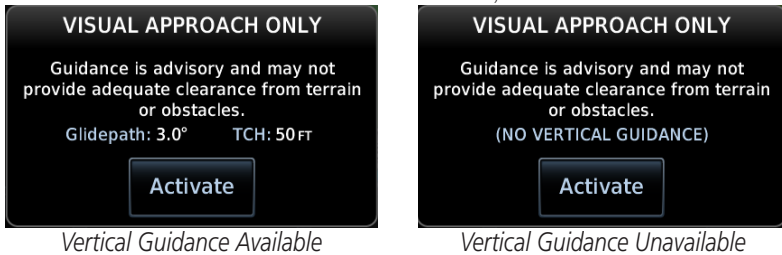


Figure 6-27 Visual Approach Configuration Pop-up

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, 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.

7.2.9 Nearest VRPs



1. Touch the **NRST VRPs** tab on the Airport Waypoint Info page to view a list of the visual reporting points that are located near the selected airport.

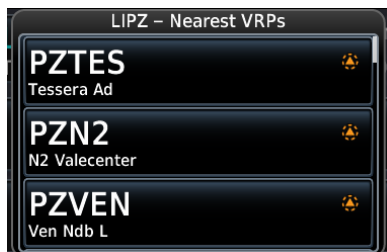


Figure 7-16 Waypoint Info Airport NRST VRPs Page



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



- The Lat/Lon coordinate values will be highlighted. Touch the **Lat** or **Lon** key to toggle selection of the hemisphere values and highlight the selected value. The **Large** knob may also be used for cursor movement and characters selected with the **Small** knob. Use the **Large** knob to backspace or move the cursor to the left.

When The Lat Key Is Touched, The Latitude Hemisphere Value Is Active For Selection

Touch to Select Hemisphere Value



Touch To Toggle Lat/Lon Selection

Touch to Select Numeric Values

Figure 7-28 Waypoint Info - Set Lat/Lon Coordinates

- Touch the desired hemisphere keys to select the desired values. After selecting the hemisphere value, the cursor will advance to the first character of the adjacent numeric value for selection. Even when the hemisphere values are highlighted, touching a valid numeric key will always place the cursor at the first numeric value. The **Large** knob may also be used for cursor movement and characters are selected with the **Small** knob.



NOTE: When editing values, turn the Large knob counter-clockwise to backspace or move the cursor to the left.

- As each value is selected, the cursor will advance to the next character. Touch the necessary key for the desired values.
- When finished with the Lat/Long selections, touch the **Enter** key.
- When finished with all selections, touch the **Create** key to create the new waypoint.

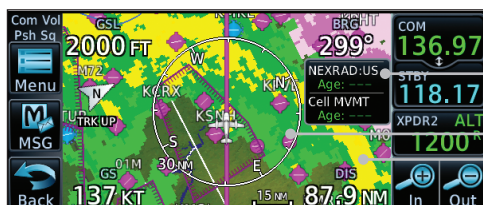


8.1.1.5 NEXRAD (Optional)

The NEXRAD menu option allows the display of NEXRAD Precip weather information overlaid on the Map page. Terrain and NEXRAD Precip weather may not be displayed at the same time. Selecting one will disable the other. NEXRAD Precip weather is an optional feature that requires the installation of a GDL 69/69A, GDL 88, GTX 345, or GSR 56 and an appropriate Weather subscription. Only one weather source can be displayed at a time (i.e., FIS-B and XM cannot be displayed on the map simultaneously. See the Weather section for more detail.



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



NEXRAD
Product Age
NEXRAD
Weather

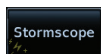
Figure 8-7 NEXRAD Map Overlay

8.1.1.6 StormScope® (Optional)

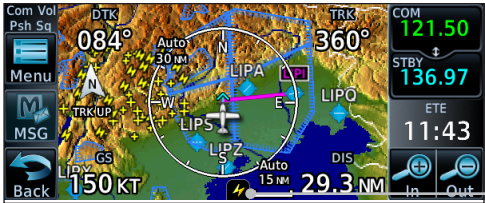
The WX-500 StormScope Weather Mapping Sensor is a passive weather avoidance system that detects electrical discharges associated with thunderstorms within a 200 NM radius of the aircraft. The StormScope measures relative bearing and distance of thunderstorm-related electrical activity and reports the 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 a StormScope radar weather data display mode: Cell, Strike, Off, or Clear Strikes. Touch the desired function.
2. StormScope data displays on the Map page. See the Weather section for more details.



Icon Shows StormScope Overlay Is Active

Figure 8-8 StormScope Map Overlay

8.1.1.7 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.



Icon Shows Traffic Overlay Is Active

Non-Threat Traffic Indication. Currently 1200 Ft Above And Rising

Icon Shows Aircraft Is Receiving TIS Traffic From Ground Stations When A GDL 88 Is Connected (GTN software v5.11 or earlier)

Figure 8-9 Traffic Map Overlay

8.1.2 Map Setup



Figure 8-10 Map Setup Functional Diagram

8.1.2.1 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.

| 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 |
| 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 |
| Restore Defaults | Returns values to original factory settings |

Table 8-1 Map Setup Map Options

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.

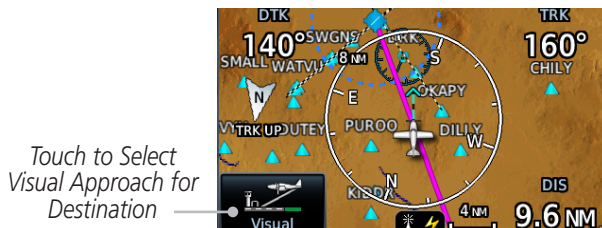


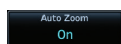
Figure 8-14 Visual Approach Key

Auto Zoom

With a valid flight plan, the Auto Zoom feature will automatically change the Map page range depending on the distance to the next waypoint in the flight plan. If enabled, it will also automatically zoom to the SafeTaxi zoom range when the aircraft is on the ground. Auto Zoom can be overridden at any time by manually zooming with the **In** and **Out** keys. The Auto Zoom Min selection sets the minimum range that the display will Zoom in. The Auto Zoom Max value sets the maximum range the display will Zoom out.

Auto Zoom is re-enabled once one of the following conditions is met:

- A waypoint is sequenced
- The aircraft transitions from “on ground” to “in air”
- A point is reached where the Auto Zoom range matches the manual override range (known as auto-sync) and will be noted as “Auto” above the map range value on the map page
- Auto Zoom is toggled off and back on in the Map Setup page



1. While viewing the Map Setup - Map selection, touch the Auto Zoom key to toggle it On or Off.
2. When Auto Zoom is On the Auto Zoom Min and Max values will be used.



NOTE: Rotorcraft use a Local Auto Zoom function where Auto Zoom will remain at the 1500 ft zoom scale until the rotorcraft is above 400 ft GSL or 40 kts.

Next

4. Touch an obstacle on the map and the elevation will be shown. If there are nearby or overlayed objects (obstacle, airspace, airport, etc), touch the **Next** key to step through the nearby objects.



Figure 8-24 Point Obstacle Detail

5. Touch the **Back** key to return to the normal map view.



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.

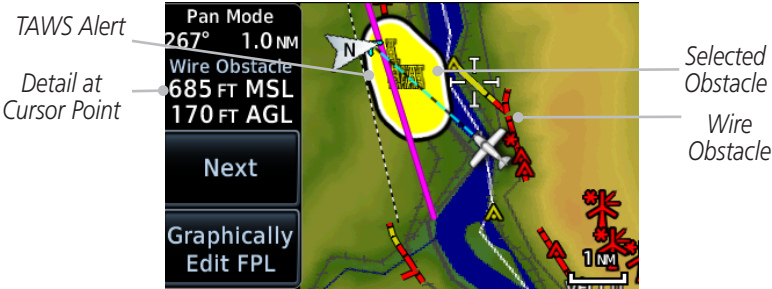


Figure 8-25 Wire Obstacles

Restore Defaults

Returns values to the original factory settings.

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8.1.2.2 Aviation

The Aviation group selection from the Map Setup Page Menu allows you to customize the display of Active Flight Plan, Active Flight Plan Waypoints, Airport size range, SafeTaxi information, Runway Extensions, Intersection/NDB locations, VOR locations, Airspace Detail, and TFR icons on the Map page. The feature will be shown at map ranges of the selected value and lower. The options for each feature are shown in the following table. The default values are shown in **bold** type.

| Feature | Selection |
|----------------------|--|
| Airport Range | Off, 7.5 NM, 10 NM, 15 NM, 25 NM , 40 NM, 50 NM, 75 NM, 100 NM, 150 NM |
| Heliports (Optional) | Off, On |
| SafeTaxi Diagrams | Off, 1000 ft, 1500 ft, 2500 ft, 0.5 NM, 0.75 NM, 1 NM , 1.5 NM |
| Runway Extensions | Off, 1 NM, 1.5 NM, 2.5 NM, 4 NM, 5 NM |
| Intersection Range | Off, 0.75 NM, 1 NM, 1.5 NM, 2.5 NM, 4 NM , 5 NM, 7.5 NM, 10 NM |
| NDB Range | Off, 0.75 NM, 1 NM, 1.5 NM, 2.5 NM, 4 NM, 5 NM , 7.5 NM, 10 NM |
| VOR Range | Off, 10 NM , 15 NM, 25 NM, 40 NM, 50 NM, 75 NM, 100 NM |
| VRP Range | Off, 0.75 NM, 1 NM, 1.5 NM, 2.5 NM, 4 NM , 5 NM, 7.5 NM, 10 NM |
| User Wpt Range | Off, 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 |
| Airspace Detail | None, Least, Less, Normal , More, Most |
| Airway Range | 2.5 NM, 4 NM, 5 NM, 7.5 NM, 10 NM, 15 NM, 25 NM |
| TFR | Off , On |
| Restore Defaults | Returns values to original factory settings |

Table 8-7 Map Setup Aviation Options



NOTE: The term “intersection range” means any GPS waypoint included in the navigation database, and includes waypoints that may not be intersections of two VOR radials.

8.1.2.4 Airspace

The Airspace viewing range options select whether the Airspaces are shown on the Map and at and below the selected map ranges. Smart Airspace selection filters the display of airspace appropriate for aircraft altitude. The following table depicts airspace features and map ranges. Default values are shown in **bold** type.

| 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, 5 NM, 7.5 NM, 10 NM, 15 NM, 25 NM, 40 NM, 50 NM, 75 NM , 100 NM |
| Class C/TCA Range | Off, 5 NM, 7.5 NM, 10 NM, 15 NM , 25 NM, 40 NM, 50 NM, 75 NM, 100 NM |
| Class A/D Range | Off, 5 NM, 7.5 NM, 10 NM , 15 NM, 25 NM, 40 NM, 50 NM, 75 NM, 100 NM |
| Restricted Range | Off, 5 NM, 7.5 NM, 10 NM, 15 NM, 25 NM, 40 NM, 50 NM, 75 NM, 100 NM |
| MOA (Military) Range | Off, 5 NM, 7.5 NM, 10 NM, 15 NM , 25 NM, 40 NM, 50 NM, 75 NM, 100 NM |
| Other/ADIZ Range | Off, 5 NM, 7.5 NM, 10 NM, 15 NM, 25 NM, 40 NM, 50 NM, 75 NM, 100 NM |
| Restore Defaults | Returns values to original factory settings |

Table 8-10 Map Setup Airspace Options

Airspace Labels

The Airspace Label feature shows the United States airspace system altitude limits up to a selected range.



NOTE: This feature is available in software v5.10 and later when configured by the installer.



Figure 8-26 Display of Airspace Labels

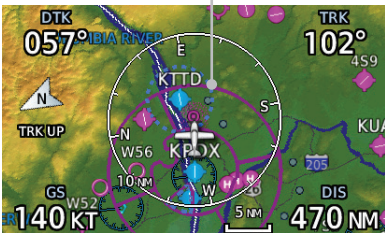
Smart Airspaces

Garmin's Smart Airspace™ feature aids visual clarity on-screen by deemphasizing airspace that's well above or below the aircraft's current altitude. The vertical separation is 1,000 feet at sea level and the vertical separation will gradually increase to 2,000 feet until the aircraft reaches 10,000 feet. Anything above 10,000 feet keeps the 2,000 feet vertical separation.



NOTE: Smart Airspace only changes the depiction of the airspace on the moving map display. It does not alter the Airspace Alerts that can be set on the System-Alerts portion of the system.

Smart Airspaces - Off



Smart Airspaces - On

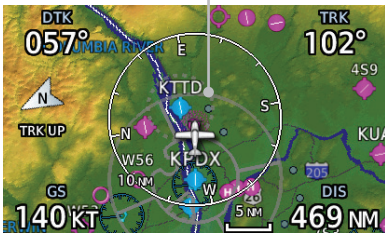


Figure 8-27 Display of Smart Airspaces (Airspace Borders Grayed)

2. From the Map Menu screen, touch the **Change User Fields** key.



Figure 8-33 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.



NOTE: Only the bottom right corner data field on the map page can be configured for a Page or Function. The other three corner data fields are for Data items only.

3. Touch the corner data field key you want to select. Touch the **Data**, **Function**, or **Page** keys to select the User Field type. A list of information types will be displayed.



Figure 8-34 Map Data Field Type Selections



4. Touch the **Up** or **Down** keys or touch the display and drag your finger to scroll through the list. Touch the desired item to select it or touch the **Back** key to cancel selection.

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

Table 8-17 Map Page Field Types of Information

8.1.4 Map Detail

The Map Detail feature allows four levels of decluttering to remove map information. Level 0 shows the most detail and level 3 shows the least detail.

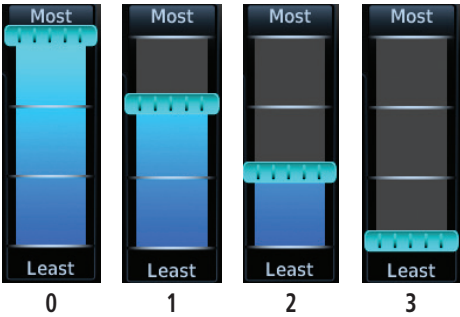


Figure 8-35 Map Detail (Declutter) Levels

8.3.3 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.*

8.3.3.1 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 8-40 Edit Flight Plan Mode

2. Touch and hold the desired leg of the flight plan and drag the flight plan leg to a new waypoint to add a waypoint to the active flight plan. The leg may also be dragged to an airway. The leg being edited will turn cyan.

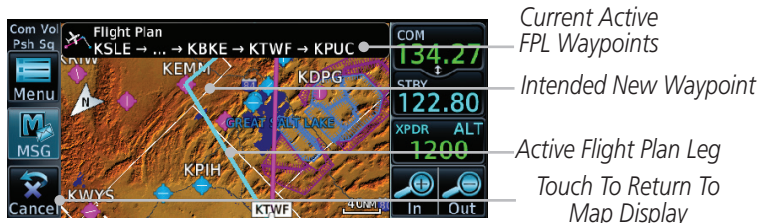


Figure 8-41 Drag Selected Leg to New Waypoint

3. Touch the **Done** key to accept the new flight plan leg or **Undo** to maintain the existing flight plan.



Figure 8-42 Completed Flight Plan with New Waypoint

4. The aircraft will now navigate according to the new flight plan.



Figure 8-43 Aircraft Navigates on Edited Flight Plan to New Waypoint

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



8.7 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.

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 8-47 SafeTaxi Depiction on the Navigation Map Page

8.7.1 Using SafeTaxi®

Any map page that displays the navigation view can also show the SafeTaxi® airport layout within the maximum configured range.

During ground operations the aircraft's position is displayed in reference to taxiways, runways, and airport features. The nose of the ownship symbol, not the center, depicts the current location of the aircraft.



NOTE: Do not use SafeTaxi functions as the basis for ground maneuvering. SafeTaxi does not comply with the requirements of AC 120-76C and is not qualified to be used as an airport moving map display (AMMD). SafeTaxi is to be used by the flight crew to orient themselves on the airport surface to improve pilot situational awareness during ground operations.

9.9 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.

9.9.1 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.

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| | Altitude (Feet*) | TA Time to CPA (Seconds) | RA Time to CPA (Seconds) |
|----------------------|---------------------|-----------------------------|-----------------------------------|
| Foreword | 0 - 1,000 | 20 | RA not issued below 1,000 feet |
| Getting Started | 1,000 - 2,350 | 25 | 15 |
| Audio & Xpdr Ctrl | 2,350 - 5,000 | 30 | 20 |
| Com/Nav | 5,000 - 10,000 | 40 | 25 |
| FPL | 10,000 - 20,000 | 45 | 30 |
| Direct-To | 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 9-17 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.







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

Table 9-18 TCAS II Traffic Symbol Description

9.9.2 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 preciseness 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.

9.9.3 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:

| Traffic Alert Banner | Description |
|---|---|
| <div>RA X.X ± XX <UP> or <DN></div> | <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. |
| <div>TA X.X ± XX <UP> or <DN></div> | <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. |

Table 9-19 TCAS II No-Bearing Alert Banners

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9.9.3.1 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:

| 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 9-20 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 Descend | -1,500 to -4,400 |
| Maintain Descend | |
| Reduce Climb | 0 |

Table 9-21 Corrective RA Types with Required Vertical Speeds

| | Alert Type | Voice Alert |
|-------------------|---|--|
| Foreword | TA | "Traffic, Traffic" |
| Getting Started | Climb RA | "Climb, Climb" |
| Audio & Xpdr Ctrl | Descend RA | "Descend, Descend" |
| Com/Nav | Altitude Crossing Climb RA | "Climb, Crossing Climb, Climb, Crossing Climb" |
| FPL | Altitude Crossing Descend RA | "Descend, Crossing Descend, Descend, Crossing Descend" |
| Direct-To | Reduce Climb RA | "Level Off, Level Off" |
| Proc | Reduce Descend RA | "Level Off, Level Off" |
| Wpt Info | RA Reversal to Climb RA | "Climb - Climb NOW, Climb - Climb NOW" |
| Map | RA Reversal to Descend RA | "Descend - Descend NOW, Descend - Descend NOW" |
| Traffic | Increase Climb RA | "Increase Climb, Increase Climb" |
| | Increase Descent RA | "Increase Descent, Increase Descent" |
| | 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" |

Table 9-22 TCAS II Voice Alerts

9.9.4 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 9-23 GTS 8000 System Test Voice Alerts

9.9.5 TCAS II Operation

To display TCAS II traffic, the system must be in TA ONLY or TA/RA Mode. These modes can be accessed from the transponder control panel or the Traffic Page Menu.

The Traffic Map is the principal map page for viewing TCAS II traffic data. Traffic data is displayed in relation to the aircraft's current position and altitude, without basemap clutter. Aircraft orientation is always heading up unless there is no valid heading. The map range is adjustable from 2 to 40 nm. Its scale is indicated by the map range rings.

The traffic operating mode and altitude display mode are annunciated in the upper left corner of the Traffic Map Page.

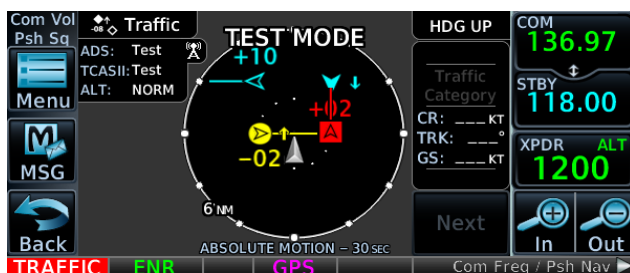


Figure 9-36 TCAS II Traffic Map Page



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.

9.9.5.1 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 (feet) |
|---------------|--------------------------------|
| Below | -9,900 to 2,700 |
| Normal | -2,700 to 2,700 |
| Above | -2,700 to 9,900 |
| Unrestricted | -9,900 to 9,900 |

Table 9-24 Displayed Traffic Range

9.9.5.2 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 Annunciation | 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 System Standby | STBY | N/A |
| TCAS II System Failed | Fail | Failed or No Data |

Table 9-25 TCAS II Modes

9.9.5.3 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.

10.6.5 TAWS-A System Status

During power-up, TAWS-A conducts a self-test of its aural and visual annunciations. The system test can also be manually initiated. An aural alert is issued at test completion. TAWS-A System Testing is disabled when ground speed exceeds 30 knots.

10.6.6 TAWS-A Abnormal Operations

TAWS-A continually monitors several system-critical items such as database validity, flap and landing gear position, radar altimeter input, and GPS status.

If the GTN does not contain Terrain, Airport Terrain, and Obstacle databases (or the databases are invalid), the aural message “*TAWS System Failure*” is generated along with the “TAWS FAIL” alert annunciation.

TAWS-A requires a 3-D GPS navigation solution along with specific vertical accuracy minimums. Should the navigation solution become degraded or if the aircraft is out of the database coverage area, the annunciation “TAWS N/A” is generated in the annunciation window and on the TAWS-A page, the aural message “*TAWS Not Available*” is generated if airborne, some TAWS-A terrain alerts will not be issued, and GPWS alerting (which are not dependent on GPS position) will continue to operate. When the GPS signal is re-established and the aircraft is within the database coverage area, the aural message “TAWS Available” is generated.

TAWS-A also requires radar altimeter input. Should the radar altimeter input fail or become degraded, the annunciation “GPWS FAIL” is generated in the annunciation window and on the TAWS-A Page. The aural message “*GPWS System Failure*” is also generated. The “GPWS FAIL” annunciation will also occur if both GPS altitude and barometric altitude are unavailable. If only the GPWS system has failed, GPWS-based alerts will not be available, while other TAWS-A alerting remains unaffected.

Multiple TAWS or GPWS annunciations cannot be displayed at the same time. When multiple annunciations exist, an asterisk will be present next to the annunciation. The display of each annunciation will alternate with each being displayed for approximately five seconds.



NOTE: Stormscope and XM Lightning are mutually exclusive.

11.1 SiriusXM Weather Products (Optional)



Figure 11-3 SiriusXM Weather Page Functional Diagram

11.1.1 Displaying SiriusXM Weather

To display SiriusXM weather touch the following sequence of keys starting from the Home page.



1. Touch the **Weather** key on the Home page and then touch the **Data Link** key.

Selected
Altitude

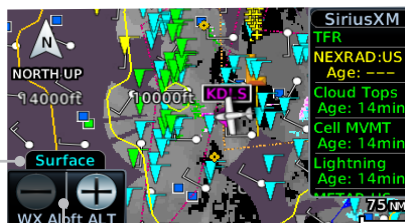


Figure 11-4 SiriusXM Weather Page



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

Weather Overlay
Map Orientation

Touch Legend Key
To Display Legend



Touch Keys To
Select Weather
Product. Green
Bar Indicates
Selected Product.

Touch Keys
To Scroll List
Of Products

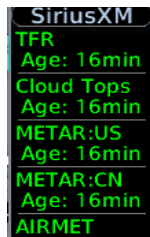
Touch And Drag Menu
To Scroll List Of Products

Figure 11-5 Weather Data Link Menu



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

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

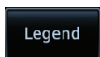


The Timestamp is Collapsed When All Weather Products are Current (Software v6.30 and Later).

Figure 11-6 Timestamp Display

11.1.2 Weather Legend

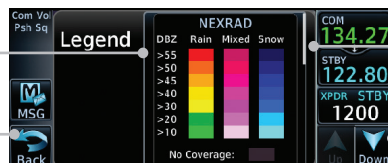
The **Legend** key displays a pop-up legend of the currently used weather products.



1. While viewing the Data Link Weather menu, touch the **Legend** key.

Legend Of Selected Weather Products

Touch To Select Close Legend



Touch Legend And Slide Finger Up And Down To Scroll Legend

Touch Up And Down Keys To Scroll Legend

Figure 11-7 Weather Legend Display

2. Touch the Legend area of the display and while maintaining light pressure against the display, drag your finger up or down to scroll through the legend display for the selected weather products, or use the **Up/Down** keys.
3. Touch the **Back** key to remove the Legend.



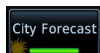
| Weather Product | Expiration Time (Minutes) | Estimated Broadcast Rate (Minutes) |
|------------------------------------|---------------------------|------------------------------------|
| Air Report (AIREP) | 90 | 15 |
| Turbulence | 180 | 15 |
| Temporary Flight Restriction (TFR) | 60 | 15 |
| Terminal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

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

Table 11-1 SiriusXM Weather Products and Data Timing

11.1.15 City Forecast

City Forecast shows the current and future weather conditions for various cities. The forecast period can be selected in the menu by pressing **Forecast Period**.



1. While viewing the Data Link Weather menu, touch the **City Forecast** key.



Figure 11-34 City Forecast



2. Touch the desired forecast time period (Current, 12 Hour, 24 Hour, 36 Hour, or 48 Hour) to display the desired information.



Figure 11-35 Select Forecast Time Period



3. Touch any City Forecast symbol to show detailed information. Touch the **Back** key to return to the Weather display.

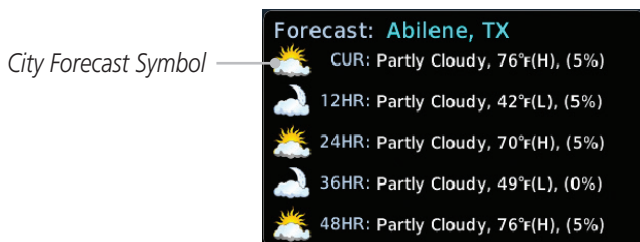


Figure 11-36 City Forecast Conditions Detail



Figure 11-37 City Forecast Legend

11.1.16 Surface Analysis



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.

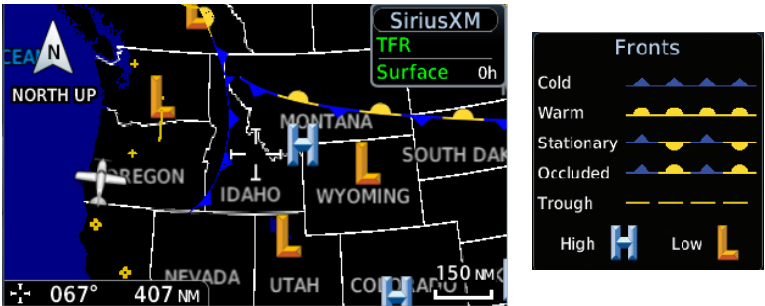


Figure 11-38 Surface Analysis and Map Legend



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



Figure 11-39 Select Forecast Time Period

11.2.2 Clearing the StormScope® Page

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 **MENU**.



2. Touch the **Clear Strikes** key to clear lightning strikes.



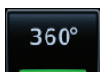
NOTE: The GTN displays StormScope data with or without a heading source. If no heading source is available, the "HDG N/A" annunciation appears in the upper right corner of the page. When flying without a heading source, the pilot must clear all strikes following each heading change.

11.2.3 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.

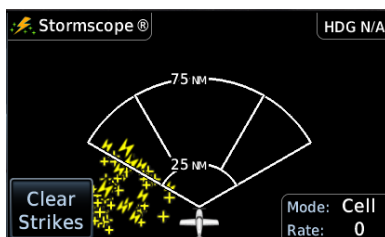
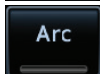


Figure 11-51 StormScope 360° and Arc Display Views

11.2.4 Changing the StormScope® Data Mode

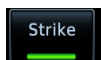
Cell display mode uses a clustering program to locate storm cells instead of individual discharge points. This mode is most useful during periods of heavy storm activity. Strike display mode is used during periods of light electrical activity. It is useful in plotting initial lightning discharges associated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



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



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



11.2.5 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.



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

11.2.6 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. See Section 8.1.1.6 for details about viewing StormScope data on the Map.



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

11.3.3 Connex Settings

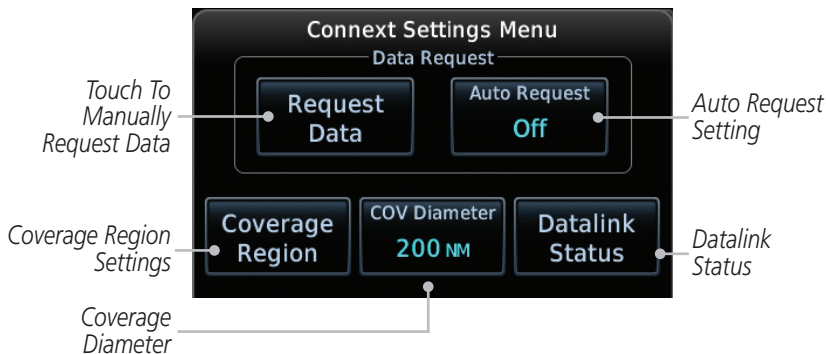
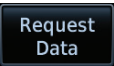


Figure 11-55 Connex Settings Menu

11.3.3.1 Connex Data Request

It is necessary to request the downloading of weather products. Requests can be sent manually or set to automatically update at a selected rate. The Connex weather data may be updated at any time regardless of the automatic update timing by selecting a Manual Request. When multiple requests are made, some products are merged with the old data (SIGMETs/AIRMETs, TAFs, TFRs, and METARs), but the old data of other products is discarded.



1. While viewing the Connex Settings Menu, touch the **Request Data** key to manually request data.
2. Touch the **Auto Request** key to set the Auto Request Period.



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

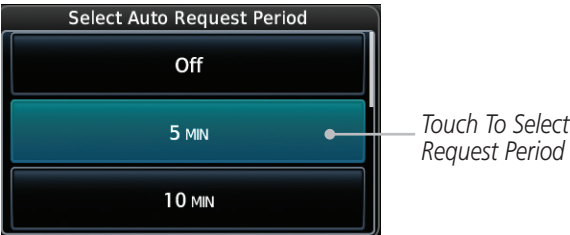


Figure 11-56 Select Auto Request Period

11.4 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 is overlaid on the map indicating the rainfall detected by ground based radar for a specific area. The colors indicating increasing levels of rainfall progresses from light green for light rainfall to magenta for heavy rainfall. 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:

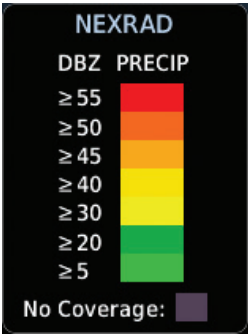


Figure 11-73 FIS-B Weather Precipitation Legend

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).

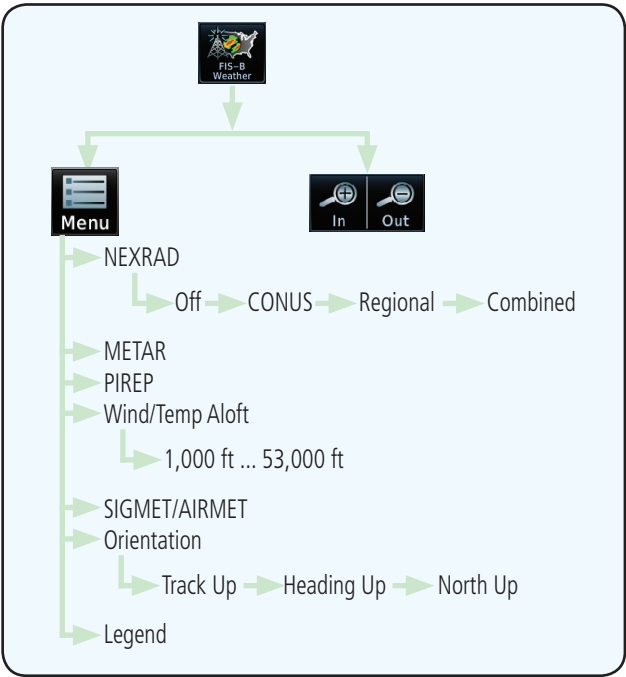


Figure 11-74 FIS-B Weather Functional Diagram

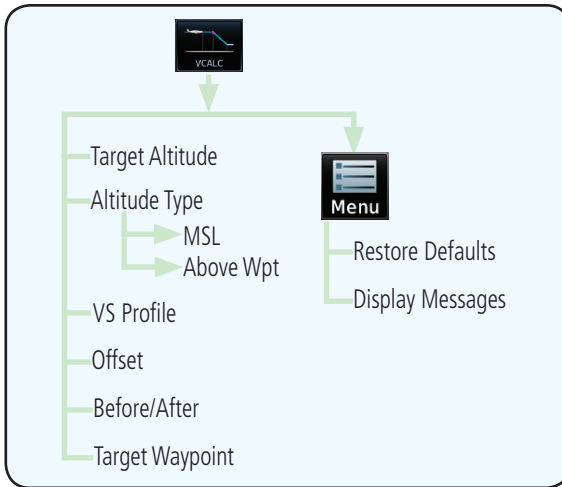


Figure 14-4 VCALC Page Functional Diagram



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

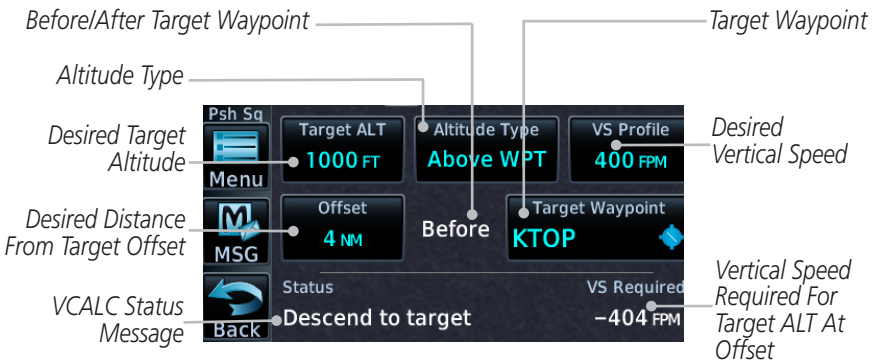


Figure 14-5 VCALC Page



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

15.1 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.

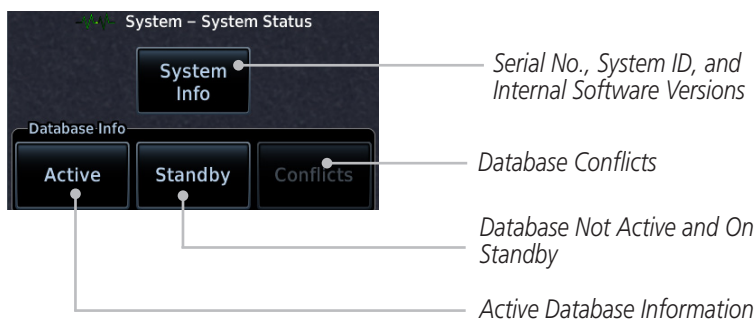


Figure 15-3 System Status Page Description

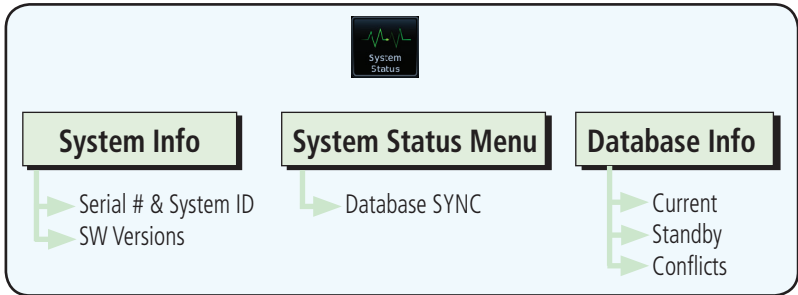


Figure 15-4 System Status Functional Diagram

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

15.2.2 Satellite-Based Augmentation System (SBAS)

SBAS is a system that supports wide area, or regional, augmentation through the use of additional satellite broadcast messages. WAAS, EGNOS, MSAS, and GAGAN are known SBAS providers.

At the time of printing, SBAS providers support the following areas:

- WAAS provides SBAS service for Alaska, Canada, the 48 contiguous states, and most of Central America.
- EGNOS provides SBAS service for most of Europe and parts of North Africa.
- MSAS provides SBAS service for Japan only.
- GAGAN provides SBAS service for India. Available with GPS software v5.2 and later.

1. While viewing the System page, touch **GPS Status**.
2. If desired, touch the **SBAS** key to select an SBAS provider. The SBAS list is based on the Aviation database.
3. Touch the key for the desired SBAS provider.

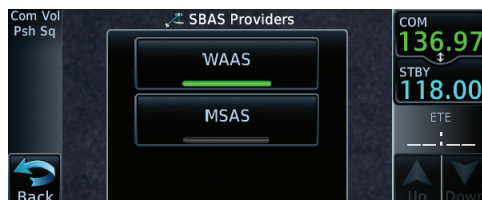


Figure 15-7 SBAS Selection Page

4. Touch the **Back** key to return to the System Status page.



15.2.3 Circle of Uncertainty

The Circle of Uncertainty depicts an area where the ownship location is guaranteed to be when the aircraft location cannot be accurately determined. The area of the Circle of Uncertainty becomes larger as GPS horizontal accuracy degrades and smaller as it improves. The Circle of Uncertainty is shown only when the aircraft is on the ground. The Circle of Uncertainty area is transparent so that features within it may still be seen.



Figure 15-8 Circle of Uncertainty

15.2.4 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

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

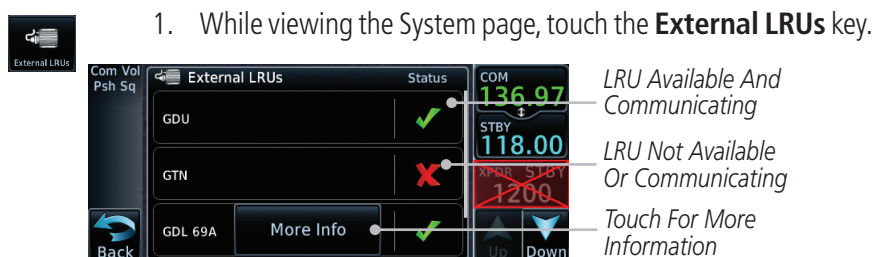
Loss of Position

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.

15.3 External LRUs

The External LRU page displays the external equipment connected to the GTN and their connection status.

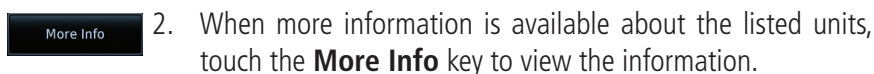
1. While viewing the System page, touch the **External LRUs** key.



The screenshot shows the 'External LRUs' page with a list of units and their status. The units are GDU, GTN, and GDL 69A. GDU has a green checkmark status, GTN has a red X status, and GDL 69A has a green checkmark status. A 'More Info' button is visible next to GDL 69A. Callouts indicate: 'LRU Available And Communicating' for GDU, 'LRU Not Available Or Communicating' for GTN, and 'Touch For More Information' for the 'More Info' button.

Figure 15-9 External LRU Page

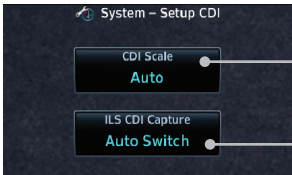
2. When more information is available about the listed units, touch the **More Info** key to view the information.



The screenshot shows a 'More Info' button.



1. While viewing the System Setup page, touch the **CDI** key.



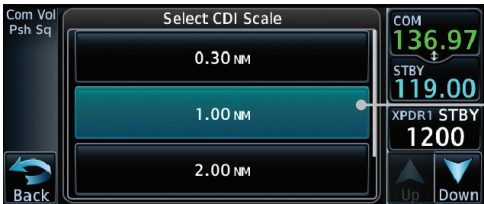
Touch To Choose Auto or Manual CDI Scale Selection

Touch To Select ILS CDI Capture Type

Figure 15-21 CDI Selection



2. Touch the **CDI Scale** key to toggle between automatic selection or to choose the CDI scale manually.



Touch To Select CDI Scale

Figure 15-22 CDI Scale Selection



3. Touch the **ILS CDI Capture** key to select Auto Switch or Manual Selection. 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.

| Message | Description | Action |
|---|---|--|
| CROSSFILL ERROR - GTN Navigation DB mismatch. See CRG for crossfilled items. | The navigation databases do not match between GTNs resulting in a loss of communication between two units. | Check the specified database version of both GTNs and ensure it is up-to-date. Update the specified database if needed. |
| CROSSFILL ERROR - GTN software mismatch. See CRG for crossfilled items. | Crossfill is configured "on" but is not working due to software mismatch. | See section 15.4.5 for a list of crossfilled items that will no longer be crossfilled. Contact dealer to have software versions updated. |
| CROSSFILL STATUS - Crossfill is turned off. | Crossfill is turned off. | No action. |
| DATABASE - A procedure has been modified in a cataloged 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 cataloged 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. |
| DATABASE - Terrain database is not installed, is corrupt, or is not valid for this system. | The terrain database is not available and terrain information alerts will not be displayed. | Re-load this database on the external datacard. |
| DATABASE - Terrain display unavailable for current location. | The aircraft is outside the terrain database coverage area. | Terrain and TAWS functions will be unavailable. If terrain coverage is desired in the area, load appropriate coverage area on the external datacard. |

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| Message | Description | Action |
|---|---|---|
| USER WAYPOINT IMPORT - User waypoint import failed. User waypoint database is full. | User Waypoint catalog is full and the requested user waypoints could not be imported. | Edit the User Waypoint catalog to remove unneeded user waypoints. |
| USER WAYPOINT IMPORT - User waypoints imported successfully - existing waypoints reused. | User waypoints imported and existing waypoints are used instead of creating duplicate waypoints. | No action is necessary; message is informational only. |
| VCALC - Approaching top of descent. | User has configured a vertical descent calculation, and the aircraft is within 60 seconds of the calculated top of descent. | No action is necessary; message is informational only. |
| 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. |
| 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. |

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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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error

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ESA

En route Safe Altitude

ETA

Estimated Time of Arrival

Audio & 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

Wpt Info

FISDL

Flight Information Service Data Link

FLTA

Forward Looking Terrain Avoidance

Map

FPL

flight plan

FREQ

frequency

Traffic

FRZ

freezing

FSS

Flight Service Station

Terrain

ft

foot/feet

Weather

GAGAN

Provides SBAS service for India

Nearest

G/S, GS

glideslope

GDC

Garmin Air Data Computer

Services/ Music

GDL

Garmin Satellite Data Link

GEO

geographic

Utilities

GLS

Global Navigation Satellite Landing System

GMA

Garmin Audio Panel System

System

GMT

Greenwich Mean Time

GMU

Garmin Magnetometer Unit

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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

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Database SYNC is supported by these database types:

- Navigation
- Basemap
- SafeTaxi
- Obstacle
- FliteCharts
- Airport Directory

The database SYNC process may take several minutes, depending on how many databases have been updated. The status of the database transfers to a unit can be viewed on the System Status page under the “Standby” tab. The GTN will display the source of the received databases (for example: “Database SYNC - GTN #2”). If a database SYNC is pending, completed, or not authorized, the status will also be indicated.

When the SYNC is complete, if the aircraft is stopped and has yet to takeoff, the pilot will be prompted with the option to restart and update to the newly transferred databases.



NOTE: *Restarting the GTN must only be performed when the aircraft is on the ground as navigation and communication from the restarted unit will be lost for a period of time.*

18.2.4.1 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.

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18.3 Demo Mode

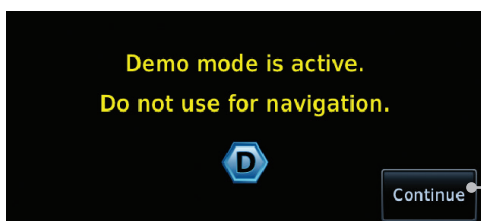
The GTN product contains a “Demo” mode that allows simulation of all operations of the product to allow practice and familiarization while staying on the ground.



WARNING: Do not use the GTN to navigate while Demo mode is active. Do not use or enter Demo mode while airborne.



1. Press in and hold the **Direct-To** key and then apply power to the unit.



Touch To Continue

Figure 18-3 Demo Mode Start Up Display



2. Touch the **Continue** key and Fuel keys as normally needed to start operations.



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

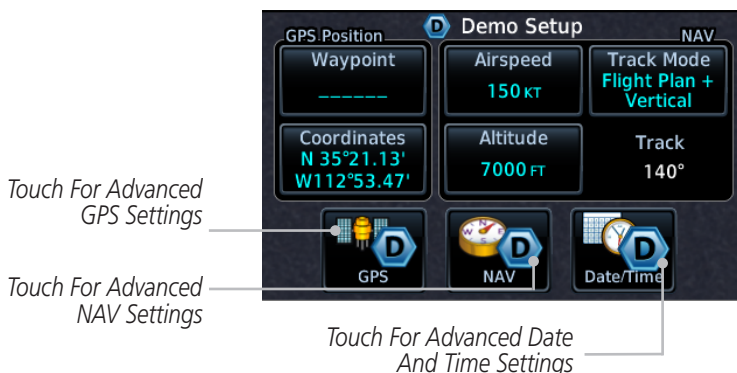


Figure 18-4 Demo Mode Setup



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.

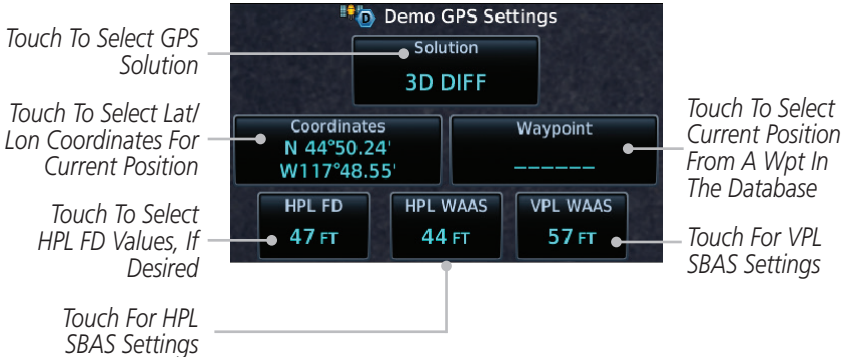


Figure 18-5 Demo Mode GPS Settings



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

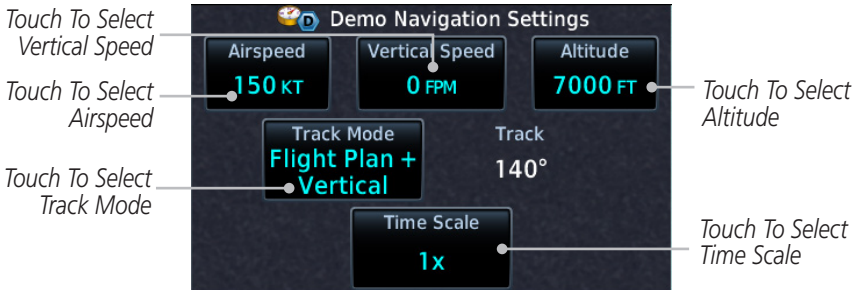


Figure 18-6 Demo Mode Navigation Settings

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 non-bold phrase if the voice command for a 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 15.13.

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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