12.5.7 Precipitation (PRECIP) Data

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 red for heavy rainfall. Review the Limitations section in the front of this guide for the limitations that apply to the Connext data. Rainfall data is color coded as follows:

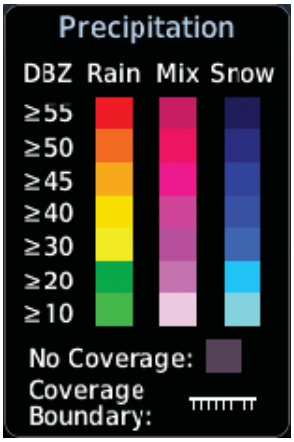


Figure 12-82 Connext PRECIP Weather Map Display and Legend

The "No Coverage" color indicates that no data is available for that area, and rainfall in that area is unknown.

When weather data is received, the airborne system will display that data for 20 minutes. If no new data has been received for a given area, the rainfall will be removed after 20 minutes and the area will revert back to the "No Coverage" color.

The Connext Weather 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).

12.5.7.1 Animating Precipitation Data

NOTE: *Animated Precipitation functionality is available in software version 6.00 and later.*

When Precipitation Data is enabled for display and more than two Precipitation images have been received by the GTN, the Precipitation display can be animated on the Connext Weather page. As new Precipitation images are

received, the GTN will automatically store them for future animation. The GTN can animate up to six Precipitation images from oldest to newest, showing each for one second and the newest for two seconds.

1. While viewing the Connext Weather page with Precipitation enabled for display, press the **Play PRCP** key to start the Precipitation animation.

2. Touch the **Stop PRCP** key to stop the Precipitation animation. The animation will also stop when leaving the page or turning off Precipitation on the Connext weather page.

12.5.8 Lightning

Lightning data shows the approximate location of cloud-to-ground lightning strikes. A strike icon represents a strike that has occurred within a two kilometer (1.08 NM) region. The exact location of the lightning strike is not displayed. Only cloud to ground strikes are reported in the US and extreme southern Canada (cloud to cloud strikes are not reported).

Figure 12-83 Connext Data Link Lightning and Legend

12.5.9 Infrared Satellite Data

Infrared Satellite data is available over North America and Europe and depicts cloud top temperatures from satellite imagery. Brighter cloud top colors indicate cooler temperatures occurring at higher altitudes. Information is updated every half hour.

Figure 12-84 Connext Infrared Satellite Data Map Display and Legend

12.5.10 METARs

NOTE: *Atmospheric pressure reported for METARs is given in hectopascals (hPa), except in the United States, where it is reported in inches of mercury (in Hg). Temperatures are reported in Celsius.*

NOTE: *METAR information is only displayed within the installed aviation database service area.*

METAR (METeorological Aerodrome Report), known as an Aviation Routine Weather Report, is the standard format for current weather observations. METARs are generally updated hourly, but some site are more frequent. Special updates are done as conditions warrant. METARs typically contain information about the temperature, dew point, wind, precipitation, cloud cover, cloud heights, visibility, and barometric pressure. They can also contain information on precipitation amounts, lightning, and other critical data. METARs are shown as colored flags at airports that provide them.

METAR Symbol	Description
	VFR (ceiling greater than 3000 ft. AGL and visibility greater than five miles)
	Marginal VFR (ceiling 1000–3000 ft. AGL and/or visibility three to five miles)
	IFR (ceiling 500 to below 1000 ft. AGL and/or visibility one mile to less than three miles)
	Low IFR (ceiling below 500 ft. AGL or visibility less than one mile)
	Unknown

Table 12-7 METAR Symbols

Figure 12-85 Connext Weather - Graphic METARs and Legend

12.5.11 PIREPs

Pilot Weather Reports (PIREPs) provide timely weather information for a particular route of flight. When significant weather conditions are reported or forecast, Air Traffic Control (ATC) facilities are required to solicit PIREPs. A PIREP may contain non-forecast adverse weather conditions, such as low in-flight visibility, icing conditions, wind shear, and turbulence. PIREPs are issued as either Routine (UA) or Urgent (UUA).

Figure 12-86 Connext Weather - PIREPs

Figure 12-87 Connext Weather - PIREPs Legend

12.5.12 Winds Aloft

Winds Aloft data shows the forecast wind speed and direction at the surface and at selected altitudes. Altitudes can be selected in 3000 foot increments from the surface up to 42,000 feet MSL. Pressing the **WX Aloft ALT +** or **–** soft keys steps down or up in 3,000 foot increments.

Figure 12-88 Connext Weather - Winds Aloft

Figure 12-89 Connext Weather - Winds Aloft Legend

Winds Aloft Altitude

The Winds Aloft Altitude option allows you to select the altitude for the Winds Aloft weather product. Altitude can be selected in 3,000 foot increments from the surface up to 42,000 feet MSL.

Pressing the **WX Aloft ALT +** or **–** soft keys steps down or up in 3,000 foot increments. In the figure shown above, 6,000 feet is selected and Winds Aloft data is shown for winds reported at an altitude of 6,000 feet.

12.5.13 SIGMETs and AIRMETs

SIGMETs (SIGnificant METeorological Information) and AIRMETs (AIRmen's METeorological Information) are broadcast for potentially hazardous weather considered of importance to aircraft. A Convective SIGMET is issued for hazardous convective weather. A localized SIGMET is a significant weather condition occurring at a localized geographical position.

Figure 12-90 Connext Weather Page - AIRMETs/SIGMETs

When enabled, SIGMET/AIRMETs advise the pilot of potentially hazardous weather. SIGMETs are directed to all aircraft. AIRMETs are intended for light aircraft. SIGMET/AIRMET data covers icing, turbulence, dust, and volcanic ash as issued by the National Weather Service. The update rate is selected in the Connext Settings Menu.

Figure 12-91 Connext Weather - AIRMETs/SIGMETs Detail and Legend

When enabled, the following AIRMETs are available for display:

- Icing
- Turbulence
- IFR conditions
- Mountain obscuration
- Surface winds

12.6 FIS-B Weather

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

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. Colors are used to identify the different NEXRAD echo intensities (reflectivity) measured in dBZ (decibels of Z). "Reflectivity" (designated by the letter Z) is the amount of transmitted power returned to the radar receiver. The dBZ values increase as returned signal strength increases. Precipitation intensity is displayed using colors corresponding to the dBZ values. Review the Limitations section in the front of this guide for the limitations that apply to the FIS-B data. An example of how rainfall data is color coded follows:

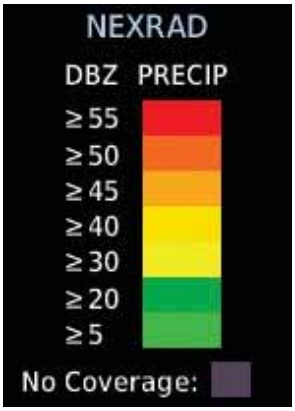


Figure 12-92 FIS-B Weather Precipitation Legend

A cyan checkerboard pattern indicates that no data is available for that area, and rainfall in that area is unknown.

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

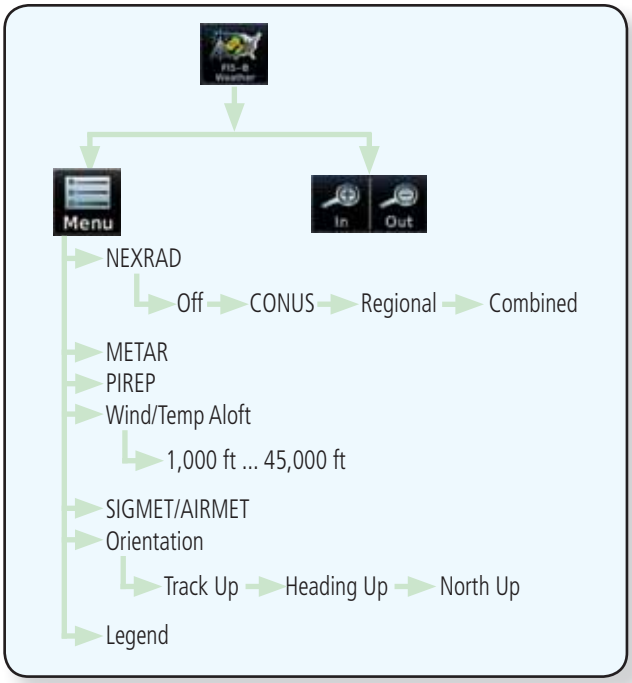


Figure 12-93 FIS-B Weather Functional Diagram

Weather Product	Expiration Time (Minutes)	Transmission Interval (Minutes)	Update Interval (Minutes)
CONUS NEXRAD	60	15	15
Regional NEXRAD	30	2.5	5
AIRMETs	60	5	As Available (Typically 20 minutes)
SIGMETs	60	5	As Available (Typically 20 minutes), then at 15 minute intervals for 1 hour
METARs	90	5	1 minute (where available), As Available otherwise (Typically ≤ 20 minutes)
Winds and Temperatures Aloft	90 or at the end of the valid period	10	12 hours
Pilot Weather Report (PIREP) (Blue - Regular, Yellow - Urgent)	90	10	As available (Typically 20 minutes)
TAFs	60	10	8 hours
TFRs	60	10	20
NOTAMs	60	10	As available (Typically 20 minutes)

Table 12-8 FIS-B Weather Products and Aging

WARNING: *Do not use the indicated data link weather product age to determine the age of the weather information shown by the data link weather product. Due to time delays inherent in gathering and processing weather data for data link transmission, the weather information shown by the data link weather product may be significantly older than the indicated weather product age.*

12.6.1 FIS-B Operation

Weather data reception time is shown in the upper right corner of the screen. An indicated time shows if the aircraft is currently within reception coverage of a ground station with weather broadcast capabilities. The ground system determines the weather coverage area and extent of data that is transmitted by each ground station. The GDL 88 can display weather from multiple ground stations.

1. From the Home page, touch the **Weather** key on the Home page and then touch the **FIS-B Weather** key (if necessary).

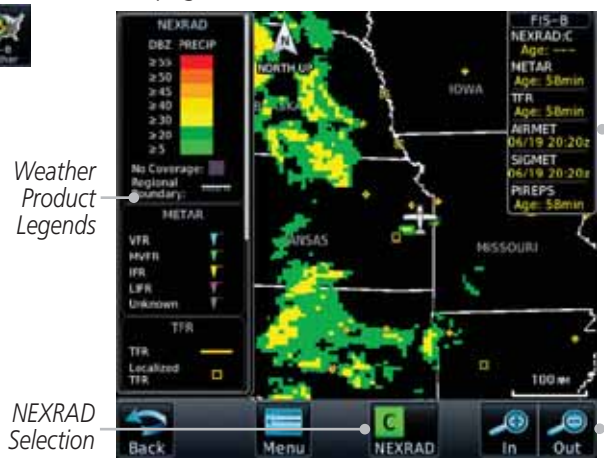


Figure 12-94 FIS-B Weather Page (NEXRAD Key Shown)

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

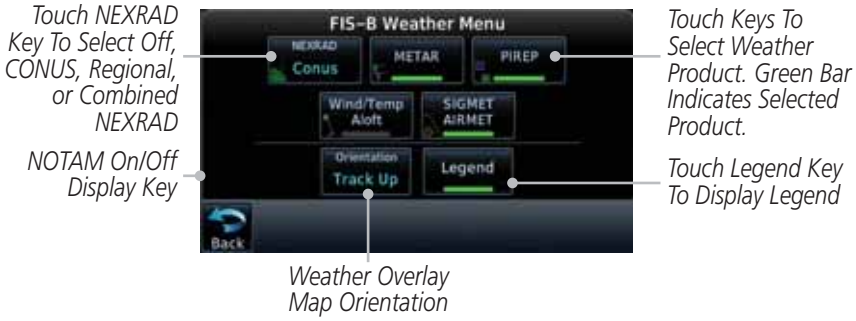


Figure 12-95 FIS-B Weather Data Link Menu

3. Once you selected what items you want to display, touch **BACK** to return to the FIS-B Weather page.

12.6.2 FIS-B NEXRAD

WSR-88D weather surveillance radar or NEXRAD (NEXt generation RADar) is a Doppler radar system that has greatly improved the detection of meteorological events such as thunderstorms, tornadoes, and hurricanes. An extensive network of NEXRAD stations provides almost complete radar coverage of the continental United States, Alaska, and Hawaii. The unobstructed range of each NEXRAD is 124 nautical miles.

12.6.2.1 NEXRAD Abnormalities

There are possible abnormalities regarding displayed NEXRAD images. Some, but not all, causes of abnormal displayed information include:

- Ground Clutter
- Strobes and spurious radar data
- Sun strobes, when the radar antenna points directly at the sun
- Military aircraft deploy metallic dust which can cause alterations in radar scans
- Interference from buildings or mountains, which may cause shadows
- Scheduled maintenance may put a radar off-line

12.6.2.2 NEXRAD Limitations

Certain limitations exist regarding the NEXRAD radar displays. Some, but not all, are listed for the user's awareness:

- The Regional NEXRAD "pixels" are 1.5 minutes (1.5 nautical miles = 2.78 km) wide by 1 minute (1 nautical miles = 1.852 km) tall. The CONUS NEXRAD "pixels" are 7.5 minutes (7.5 nautical miles = 13.89 km) wide by 5 minutes (5 nautical miles = 9.26 km) wide. Above 60 degrees of latitude the Regional NEXRAD "pixels" are 3 minutes/nautical miles. CONUS NEXRAD is not available above 60 degrees of latitude. The intensity level reflected by the pixel will be the highest level sampled within the area covered by each pixel.

12.6.2.3 NEXRAD Intensity

Colors are used to identify the different NEXRAD echo intensities (reflectivity) measured in dBZ (decibels of Z). "Reflectivity" is the amount of transmitted power returned to the radar receiver. Reflectivity (designated by the letter Z) covers a wide range of signals (from very weak to very strong). So, a more convenient number for calculations and comparison, a decibel (or logarithmic) scale (dBZ), is used. The dBZ values increase as the strength of the signal returned to the radar increases.

12.6.2.4 NEXRAD

When enabled, NEXRAD weather information is shown. Composite data from all of the NEXRAD radar sites in the United States is shown. This data is composed of the maximum reflectivity from the individual radar sweeps. The display of the information is color-coded to indicate the weather level severity. Refer to the legend for a description of the color code.

The NEXRAD option has selections of Regional, CONUS, or Combined NEXRAD. CONUS NEXRAD includes a composite of available NEXRAD radar imagery across the 48 states. Regional NEXRAD is a composite of available NEXRAD radar imagery in a local area, showing a more detailed image than CONUS NEXRAD. FIS-B weather data reception requires line-of-site communication between the receiver and the ADS-B ground station. Incomplete Regional and/or CONUS NEXRAD imagery displayed on the MAP and FIS-B Weather Pages of the affected products is an indicator of poor FIS-B reception.

Affected Areas

Any area in the continental United States (CONUS) or Alaska where the distance from ADS-B ground stations, or the combined effect of distance and low altitude, is sufficiently great may cause poor reception. A good source of information for ground station coverage can be found at:

http://www.faa.gov/nextgen/flashmap/

Reception will improve in some affected areas as the FAA completes the NextGen ADS-B ground station infrastructure. However, due to line-of-sight broadcast characteristics, operators with properly installed and functioning equipment may still receive incomplete FIS-B data when signal reception is limited by the distance from ground stations combined with a low altitude.

The example below displays an area where FIS-B data is degraded due to poor reception:

Figure 12-96 Example of Areas Where FIS-B Reception Is Unavailable

Continental US NEXRAD (CONUS)

The Display CONUS NEXRAD selection shows NEXRAD radar information for the entire continental United States. CONUS NEXRAD data is updated every 15 minutes.

Figure 12-97 Weather Page With CONUS Displayed

Regional NEXRAD

The Regional NEXRAD selection shows regional NEXRAD radar information within 500 NM of the aircraft location.

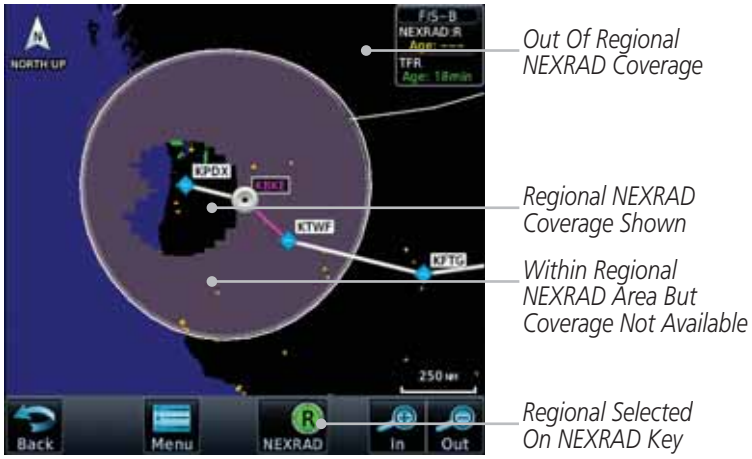


Figure 12-98 Weather Page With Regional NEXRAD Displayed

Combined NEXRAD

Regional NEXRAD data and CONUS NEXRAD data are shown together. The two types of NEXRAD are separated by a white stippled border. This boundary is updated whenever new Regional or CONUS NEXRAD data is received. The radius of the boundary is fixed at 150 NM.

Figure 12-99 Weather Page With Combined NEXRAD Displayed

Selecting NEXRAD in the FIS-B Weather Menu

1. While viewing the FIS-B weather page, touch the **Menu** key to select the NEXRAD choice.
2. Touch the **NEXRAD** key to select Off, Regional, CONUS, or Combined NEXRAD.

Figure 12-100 NEXRAD Source Selection

3. Touch the **Back** key to return to the FIS-B Weather Menu.

Animating NEXRAD FIS-B

NOTE: *Animated NEXRAD functionality is available in software version 6.00 and later.*

When Regional or CONUS NEXRAD is enabled for display and more than two NEXRAD images have been received by the GTN, the NEXRAD display can be animated on the FIS-B Weather page. As new NEXRAD images are received, the GTN will automatically store them for future animation. The GTN can animate up to six NEXRAD images from oldest to newest, showing each for one second and the newest for two seconds.

NOTE: *CONUS/Regional Combined NEXRAD cannot be animated. CONUS and Regional NEXRAD can only be animated when displayed individually.*

1. While viewing the FIS-B Weather page with NEXRAD enabled for display, press the **Play NXRD** key to start the NEXRAD animation.

2. Touch the **Stop NXRD** key to stop the NEXRAD animation. The animation will also stop when leaving the page or turning off NEXRAD on the FIS-B weather page.

12.6.3 FIS-B TFRs

Temporary Flight Restrictions (TFRs) provide detailed information for local short term restrictions. The update rate is approximately every 20 minutes.

Figure 12-101 FIS-B TFR Legend

1. Touch a TFR symbol on the Weather page to view details.

Figure 12-102 FIS-B TFR Detail

2. Touch the **Back** key to return to the Weather display.

12.6.4 FIS-B METARs

When enabled, graphic METARs (METeorological Aviation Reports) are shown as colored flags at airports that provide METAR reports. Press the **METARs** key to enable or disable METARs. Refer to the Legend for a description of the color code. The update rate is every five minutes.

METAR Symbol	Description
	VFR (ceiling greater than 3000 ft. AGL and visibility greater than five miles)
	Marginal VFR (ceiling 1000–3000 ft. AGL and/or visibility three to five miles)
	IFR (ceiling 500 to below 1000 ft. AGL and/or visibility one mile to less than three miles)
	Low IFR (ceiling below 500 ft. AGL or visibility less than one mile)
	Unknown

Table 12-9 METAR Symbols

1. While viewing the FIS-B weather page, touch the **Menu** key to select the METAR choice. Touch an airport symbol for more METAR detail.

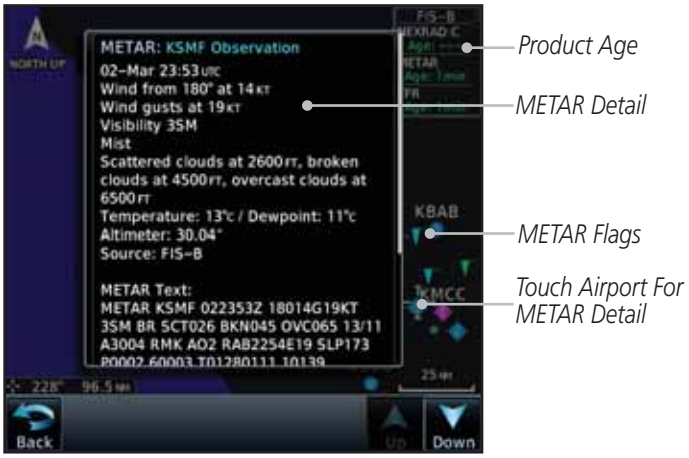


Figure 12-103 METARS

2. Touch the **METAR** key to toggle METARS on or off.

3. Touch the **Back** key to return to the FIS-B Weather page.

12.6.5 FIS-B PIREPs

Pilot Weather Reports (PIREPs) provide timely weather information. When significant weather conditions are reported or forecast, Air Traffic Control (ATC) facilities are required to solicit PIREPs. A PIREP may contain non-forecast adverse weather conditions, such as low in-flight visibility, icing conditions, wind shear, and turbulence. PIREPs are issued as either Routine (UA) or Urgent (UUA). The update rate is approximately every 20 minutes.

1. While viewing the FIS-B weather page, touch the **Menu** key to select the PIREP choice.

2. Touch the **PIREP** key to toggle PIREPs on or off.

Urgent PIREP Symbol (Yellow). Touch For Details.

Routine PIREP Symbol (Blue). Touch For Details.

Figure 12-104 Weather Display With PIREP Information Active

3. Touch a weather information symbol to view details for that item.

Figure 12-105 PIREP Information Detail

4. Touch the **Back** key to remove the detailed information.

5. Touch the **PIREP** key again to turn it off.

12.6.6 FIS-B Winds and Temperatures Aloft

Winds and Temperatures Aloft data shows the forecast wind speed, direction, and Temperature at selected altitudes. Altitudes can be selected in increments from the 1,000 feet up to 53,000 feet. The update rate is every 12 hours.

1. While viewing the Data Link Weather menu, touch the **Wind/ Temp Aloft** key.

Figure 12-106 Winds Aloft

2. Touch the **WX Aloft ALT** − or + keys to increase or decrease the reporting altitude of the winds aloft in increments. The selected altitude is shown in a window above the altitude keys.

3. Touch the **Wind/Temp Aloft** key again to turn it off.

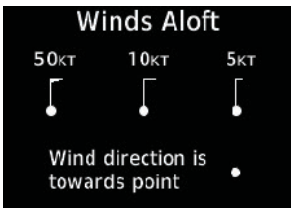


Figure 12-107 FIS-B Winds Aloft Legend

12.6.7 FIS-B SIGMETs and AIRMETs

SIGMETs (SIGnificant METerological Information) and AIRMETs (AIRmen's METerological Information) are broadcast for potentially hazardous weather considered of importance to aircraft. The update rate is approximately every 20 minutes.

Figure 12-108 FIS-B SIGMET/AIRMET Legend

1. While viewing the FIS-B Weather menu, touch the **SIGMET/ AIRMET** key.

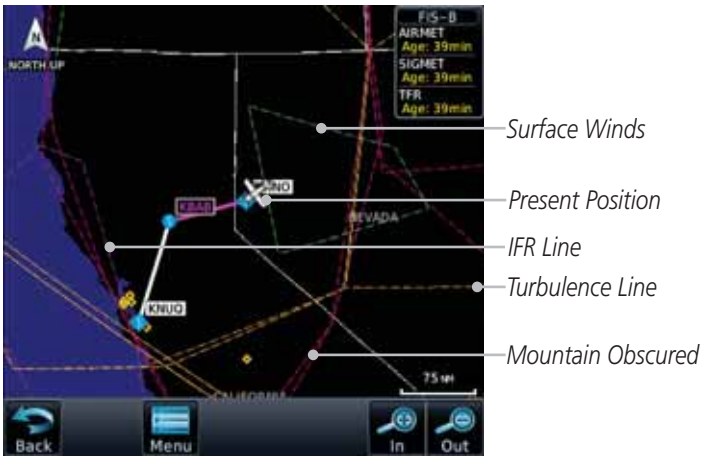


Figure 12-109 FIS-B SIGMETs and AIRMETs

2. Touch a SIGMET/AIRMET line to view details. Touch the **Back** key to return to the Weather display.

Figure 12-110 SIGMET and AIRMET Details

3. Touch the **SIGMET/AIRMET** key again to turn it off.

13 NEAREST

The Nearest function provides detailed information for the 25 nearest airports, VORs, NDBs, Intersections and User waypoints within 200 NM of your current position. In addition, the Nearest pages include the five nearest Flight Service Station (FSS) and center (ARTCC/FIR) points of communication and alert you to any Special Use (SUA) or Controlled Airspace you may be in or near.

Figure 13-1 Nearest Page

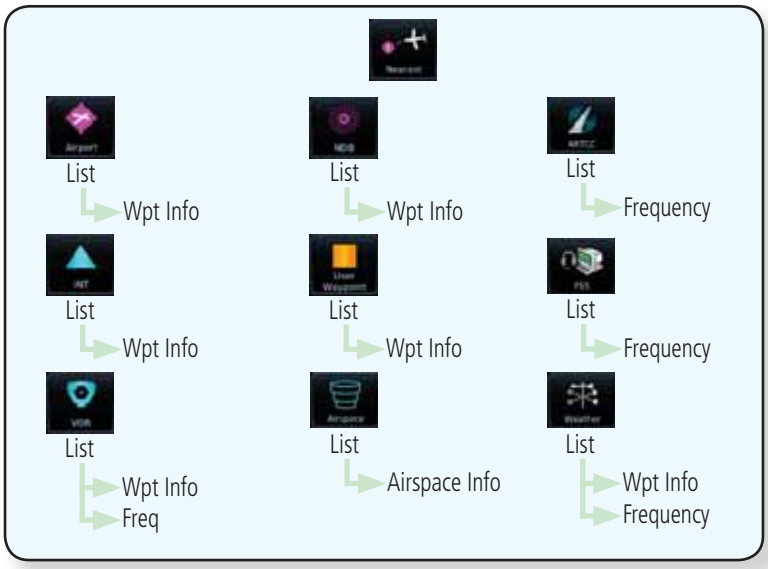


Figure 13-2 Nearest Page Functional Map

13.1 Select a Nearest Page

The available waypoint types are shown on the Nearest page. Touch the key to display the nearest 25 waypoint types (FSS and ARTCC will display up to five items). Not all 25 nearest waypoints can be displayed on the corresponding Nearest page at one time. The Nearest page displays detailed information for five nearest items.

1. On the Home page, touch the **Nearest** key.

2. Touch the desired waypoint type (Airport, VOR, etc.) and then touch the **Up** and **Down** keys on the lower right of the display to navigate through the list of available items. You can also touch an item on the list and drag your finger to scroll the list.
3. Touch the highlighted item to view more detailed information.

4. To navigate Direct-To the waypoint you're viewing, press the **Direct-To** key. The waypoint will be loaded into the Waypoint window of the Direct-To function.

5. Touch the **Activate** key to navigate directly to that waypoint.

13.2 Nearest Airport

The Nearest Airport Page displays the identifier, symbol, bearing and distance, and the length of the longest runway for the 25 nearest airports (within 200 NM of your present position).

The Nearest Airport Page can be configured to exclude shorter runways or undesirable runway surface types, so that the corresponding airports do not appear on the list. You may wish to use this feature to exclude seaplane bases, heliports, or runway lengths which would be difficult or impossible to land upon. See *System - Setup - Nearest Airport Criteria* for information about configuring the Nearest Airport display criteria.

1. While viewing the Nearest function, touch the **Airport** key. A list of the nearest 25 airports within 200 NM will be listed.

Figure 13-3 Nearest Airport

2. Touch the **Up** and **Down** keys to scroll through the list.

3. Touch the **Airport Identifier** key to show the Waypoint Info page for the selected airport.

Figure 13-4 Nearest Airport Waypoint Info

4. Touch one of the tabs (Map, Procedures, Runways, etc.) on the sides of the display for more information about the selected airport.

13.3 Nearest Intersection (INT)

The Nearest Intersection Page displays the identifier, symbol, bearing and distance to the 25 nearest intersections (within 200 NM of your present position).

1. While viewing the Nearest function, touch the **INT** key. A list of the nearest 25 Intersections within 200 NM will be listed.

Figure 13-5 Nearest Intersection List

2. Touch the **Up** and **Down** keys to scroll through the list.

Figure 13-6 Scrolling Down the Nearest Intersection List

3. Touch the **Intersection Identifier** key to show the Waypoint Info page for the selected Intersection.

Figure 13-7 Nearest Intersection Waypoint Detail

13.4 Nearest VOR

The Nearest VOR Page displays the identifier, symbol, bearing and distance to the 25 nearest VORs (within 200 NM of your present position). For each VOR listed, the Nearest VOR Page also indicates the frequency and may be used to quickly tune the Nav radio to the nearby VOR (GTN 750 only).

Touch the VOR Frequency key to place the frequency in the standby field of the Nav window. Touch the **Nav** Active window to flip/flop the Nav frequencies.

1. While viewing the Nearest function, touch the **VOR** key. A list of the nearest 25 VORs within 200 NM will be listed.

Figure 13-8 Nearest VOR List and Information

2. Touch the **Up** and **Down** keys to scroll through the list.

MCI

3. Touch the **VOR Identifier** key to show the Waypoint Info page for the selected VOR.

Figure 13-9 Nearest VOR Waypoint Information

Frequency 113.25

4. Touch the **Frequency** key on this page or from the Nearest VOR List page to place the selected frequency into the Nav Standby window.

Figure 13-10 Nearest VOR Frequency Entry

13.5 Nearest NDB

The Nearest NDB Page displays the identifier, symbol, bearing, distance and frequency to the 25 nearest NDBs (within 200 NM of your present position).

1. While viewing the Nearest function, touch the **NDB** key. A list of the nearest 25 NDBs within 200 NM will be listed.

Figure 13-11 Nearest NDB

2. Touch the **Up** and **Down** keys to scroll through the list.

3. Touch the **NDB Identifier** key to show the Waypoint Info page for the selected NDB.

Figure 13-12 Nearest NDB Waypoint Information

13.6 Nearest User Waypoint

The Nearest User Waypoint Page displays the name, bearing and distance to the 25 nearest user waypoints (within 200 NM of your present position).

1. While viewing the Nearest function, touch the **User Waypoint** key. A list of the nearest 25 User waypoints within 200 NM will be listed.

Figure 13-13 Nearest User Waypoint

2. Touch the **Up** and **Down** keys to scroll through the list.

3. Touch the **User Identifier** key to show the Waypoint Info page for the selected User waypoint.

Figure 13-14 Nearest User Waypoint Information

13.7 Nearest Airspace

The Nearest Airspace Page, alerts you to as many as 25 controlled or special use airspaces near or in your flight path. Alerts are provided according to the following conditions:

- If your projected course will take you inside an airspace within the next ten minutes, the alert message "*AIRSPACE ALERT - Airspace entry in less than 10 minutes*" appears. The Nearest Airspace Page shows the airspace as "Airspace Ahead."
- If you are within two nautical miles of an airspace and your current course will take you inside, the message "*AIRSPACE ALERT - Within 2nm of airspace*" appears. The Nearest Airspace Page shows the airspace as "Airspace Within 2 NM."
- If you are within two nautical miles of an airspace and your current course will take you inside in less than 10 minutes, the message "*AIRSPACE ALERT - Airspace within 2nm and entry in less than 10 minutes*" appears. The Nearest Airspace Page shows the airspace as "Ahead < 2 NM."
- If you have entered an airspace, the message "*AIRSPACE ALERT - Inside Airspace*" appears. The Nearest Airspace Page shows "Inside of airspace."

Note that the airspace alerts are based on three-dimensional data (latitude, longitude and altitude) to avoid nuisance alerts. The alert boundaries for controlled airspace are also sectorized to provide complete information on any nearby airspace. Once one of the described conditions exists, the message annunciator flashes, alerting you of an airspace message (if airspace alert messages are enabled). See *System-Alerts* to set the Arrival Alert Proximity, Airspace Type, and Altitude Buffer values.

***NOTE:** The Airspace Alert setting does not alter the depiction of airspace, or change the Smart Airspace setting for the main map page.*

Figure 13-15 Airspace Sectors

1. While viewing the Nearest function, touch the **Airspace** key. A list of the nearest 25 Airspaces within 200 NM along the aircraft flight path will be listed, depending on the airspace types and values set by the user.

Figure 13-16 Nearest Airspace List

2. Touch the **Up** and **Down** keys to scroll through the list.

3. Touch the **Airspace Identifier** key to show the Waypoint Info page for the selected Airspace.

Figure 13-17 Nearest Airspace Waypoint Information

Once you have been provided an airspace alert message, detailed information concerning the specific airspace is provided on the Nearest Airspace Page. The Nearest Airspace Page displays the airspace name, status ("AIRSPACE ALERT - inside Airspace", "AIRSPACE ALERT - Airspace entry in less than 10 minutes", etc.), and a time to entry (if applicable). By selecting any airspace name listed on the Nearest Airspace Page, additional details are provided — including controlling agency, communication frequencies and floor/ceiling limits.

13.8 Nearest ARTCC

The Nearest ARTCC page displays the facility name, bearing to, distance, and frequency to the five nearest Air Route Traffic Control Center (ARTCC) points of communication (within 200 NM of your present position). For each ARTCC listed, the Nearest ARTCC page also indicates the frequency(s) and may be used to quickly tune the COM transceiver to the center's frequency.

Touch the ARTCC Frequency key to place the frequency in the standby field of the COM window. Touch the **COM** Active window to flip/flop the Com frequencies (GTN 750 only).

1. While viewing the Nearest function, touch the **ARTCC** key. A list of the nearest five ARTCCs within 200 NM will be listed.

Figure 13-18 Nearest ARTCC

2. Touch the **Up** and **Down** keys to scroll through the list as needed.

3. The Frequency category will show "Multiple" keys if multiple frequencies are available. Touch the **Multiple FREQ** key to display the frequencies.

Figure 13-19 Nearest ARTCC Multiple Frequency List

4. Touch the key for the desired frequency to place the selected frequency into the Com Standby window.

Figure 13-20 Selected ARTCC Frequency From List

13.9 Nearest Flight Service Station (FSS)

The Nearest Flight Service Station (FSS) Page displays the facility name, bearing to, distance, and frequency to the five nearest FSS points of communication (within 200 NM of your present position). For each FSS listed, the Nearest FSS Page also indicates the frequency(s) and may be used to quickly tune the COM transceiver to the FSS's frequency.

Touch the FSS Frequency key to place the frequency in the standby field of the COM window. Touch the **COM** Active window to flip/flop the Com frequencies (GTN 750 only). Receive-only frequencies are noted with a white "RX."

1. While viewing the Nearest function, touch the **FSS** key. A list of the nearest five FSSs within 200 NM will be listed.

Figure 13-21 Nearest FSS

2. Touch the **Up** and **Down** keys to scroll through the list, if necessary.

3. The **Frequency** key will show "Multiple FREQ" if multiple frequencies are available. Touch the **Multiple FREQ** key to display the frequencies.

Figure 13-22 Nearest FSS Multiple Frequency List

4. Touch the key for the desired frequency to place the selected frequency into the Com Standby window.

Figure 13-23 Selected FSS Frequency From List

13.10 Nearest Weather Frequency (WX Freq)

The Nearest WX FREQ function displays facility name, bearing to, distance, and frequency for the nearest 25 Automatic Terminal Information Service (ATIS), Automated Service Observing System (ASOS), and Automated Weather Observing Station (AWOS) weather reporting stations within 200 NM.

1. While viewing the Nearest function, touch the **WX FREQ** key. A list of the nearest 25 Weather stations within 200 NM will be listed.

Figure 13-24 Nearest Weather Station

2. Touch the **Up** and **Down** keys to scroll through the list, as needed.

3. Touch the key for the desired frequency to place the selected frequency into the Com Standby window.

Figure 13-25 Nearest Weather Station Selected Frequency

4. Touch the **Weather Station Identifier** key to show the Waypoint Info page for the selected Weather station.

Figure 13-26 Nearest Weather Station Waypoint Information

14 SERVICES/MUSIC

The Services function is available when certain optional features are installed and enabled. The key will be labeled as Music when only the Music feature is enabled. Music is provided through SiriusXM Satellite Radio. The GSR 56 is an Iridium® satellite transceiver that supports voice telephone calls, aircraft position reporting, and world wide weather products.

While viewing the Home page, touch the **Services** key to view the Services page.

Figure 14-1 Services Page

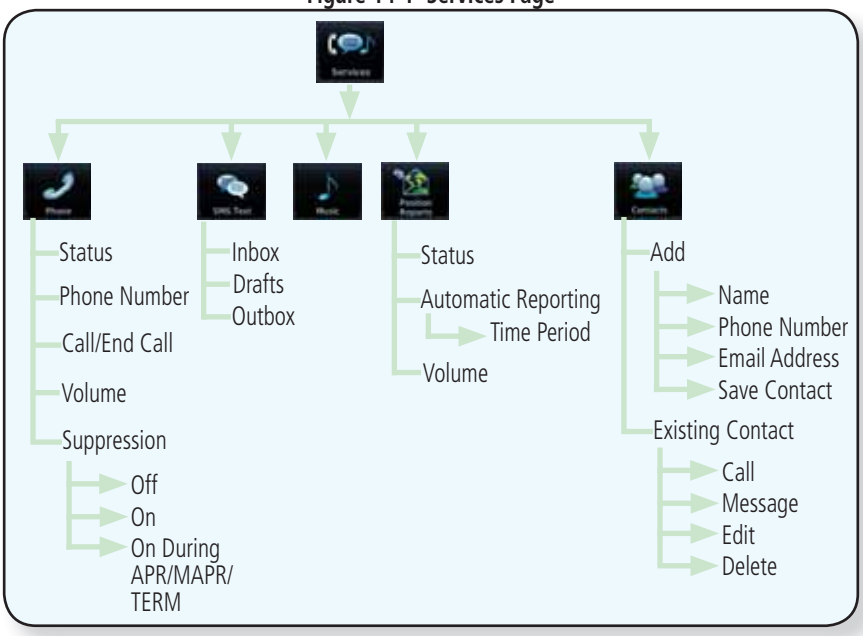


Figure 14-2 Services Functional Diagram

14.1 Music

NOTE: *Refer to the Weather Section for information about SiriusXM Weather products.*

The optional SiriusXM Satellite Radio entertainment feature of the GDL 69A Data Link Receiver is available for the pilot's and passengers' enjoyment. The GDL 69A can receive SiriusXM Satellite Radio entertainment services at any altitude throughout the Continental U.S. Entertainment audio is not available on the GDL 69 Data Link Receiver.

SiriusXM Satellite Radio offers a variety of radio programming over long distances without having to constantly search for new stations. Based on signals from satellites, coverage far exceeds land-based transmissions. SiriusXM Satellite Radio services are subscription-based. For more information on specific service packages, visit http://www.garmin.com/xm/.

Audio entertainment is available through the SiriusXM Satellite Radio Service when activated in the optional installation of the GDL 69A. The GTN unit serves as the display and control head for your remotely mounted GDL 69A. When enabled, the SiriusXM Satellite Radio audio entertainment is accessible in the Music function.

The information on the SiriusXM Satellite Radio display is composed of four areas: the Active Channel, Available Channels, Category of the highlighted channel, and the Volume setting. The Active Channel window shows the Channel Name and Number, Artist, Song Title, and Category.

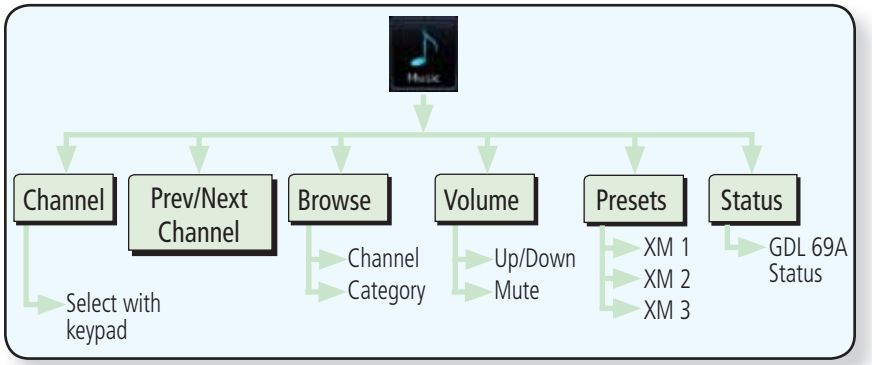


Figure 14-3 Music Functional Diagram

14.2 Activating SiriusXM Satellite Radio Services

The service is activated by providing SiriusXM Satellite Radio with either one or two coded IDs, depending on the equipment. Either the Audio Radio ID or the Data Radio ID, or both, must be provided to SiriusXM Satellite Radio to activate the entertainment subscription. The SiriusXM Satellite Radio Activation Instructions are included with the GDL 69A (also available at www.garmin.com, P/N 190-00355-04).

It is not required to activate both the entertainment and weather service subscriptions with the GDL 69A. Either or both services can be activated. SiriusXM Satellite Radio uses one or both of the coded IDs to send an activation signal that, when received by the GDL 69A, allows it to play entertainment programming.

These IDs are located:

- On the label on the back of the Data Link Receiver
- On the Music Menu

Contact the installer if the Data Radio ID and the Audio Radio ID cannot be located.

NOTE: *Refer to the GDL 69/69A SiriusXM Satellite Radio Activation Instructions (190-00355-04) for further information.*

1. Contact SiriusXM Satellite Radio through the e-mail address listed on their web site (www.xmradio.com) or by the customer service phone number listed on the web site (1-800-985-9200).
2. Follow the instructions provided.

If SiriusXM weather services have not been activated, all the weather product boxes are cleared on the XM Information Page and a yellow Activation Required message is displayed in the center of the Weather Data Link Page (Map Page Group). The Service Class refers to the groupings of weather products available for subscription.

14.3 Music Operation

The GTN 7XX provides control for enjoying SiriusXM Satellite Radio audio entertainment in the aircraft. The Music function allows selecting music categories and specific channels, as well as saving category and channel selections as presets for quick recall. The music volume level may also be managed.

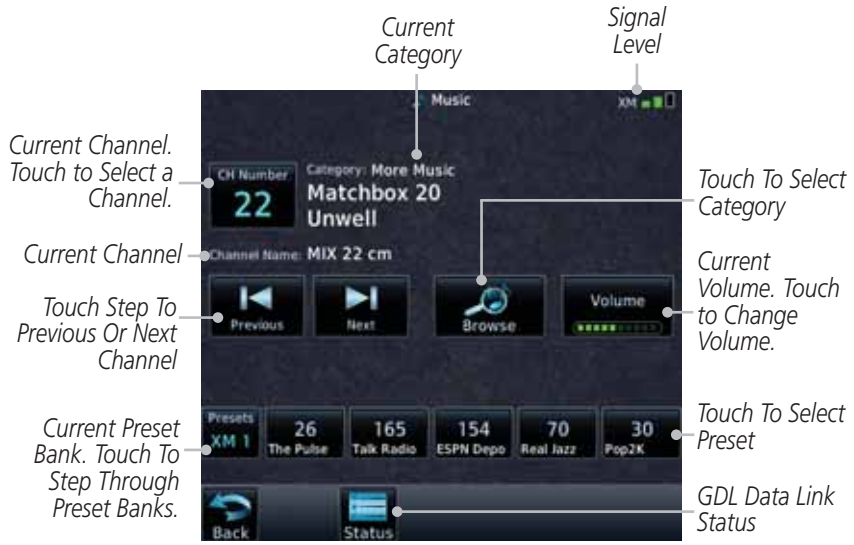


Figure 14-4 Main Music Display

NOTE: *The Music Configuration function can be set so that when there is radio reception or intercom conversation, the music level is dropped to a low, or background level. When the radio or intercom traffic ceases, the level gradually returns to normal.*

14.3.1 Browsing Channels and Categories

The Category window displays the currently selected category of audio. Categories of channels, such as Jazz, Rock, or News, can be selected to list the available channels for a type of music or other contents.

1. While viewing the Music page, touch the **Browse** key and then touch the desired channel to select it.

Figure 14-5 Music Channels

2. Touch the **Category** key to activate Category selection and then touch the desired **Category** to select it.

Figure 14-6 Music Categories

3. The current category will be shown at the top of the display.

14.3.2 Selecting an SiriusXM Satellite Radio Channel by Number

Channels may be selected directly in the selected category using the numeric keypad.

1. While viewing the main Music page, touch the **Channel** key. The Channel Number selection page will appear.

Figure 14-7 Selecting Music Channels

2. Use the numeric keys to enter the number for the desired channel and then touch the **Enter** key.

Figure 14-8 Selecting Music Channels with the Numeric Keypad

14.3.3 SiriusXM Satellite Radio Volume

The Volume control allows you to set the audio volume level, as well as mute the audio.

1. While viewing the Music page, touch the **Volume** key.

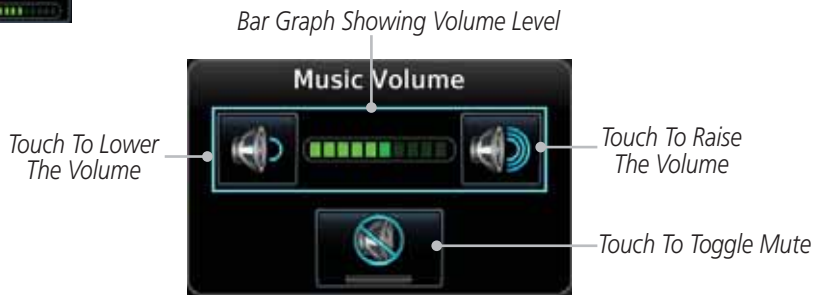
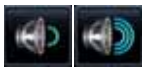


Figure 14-9 Music Volume Control



2. Touch the **Up** or **Down** Volume keys to adjust the radio volume.

3. Touch **MUTE** to toggle muting of the radio volume.

4. Touch **MUTE** again or the **Volume** key to unmute the radio volume.

14.3.4 SiriusXM Satellite Radio Channel Presets

The Music Menu allows you to store the Active Channel into a selected preset position for easy later recall. A delay of several seconds can occur when setting or recalling a preset.

Figure 14-10 Music Presets

14.3.4.1 Saving a Preset

1. While viewing the desired channel, select the preset bank for saving the preset (XM 1, XM 2, or XM 3) by touching the **Presets** key until the desire bank is shown.

2. Touch the desired Preset key and hold it for three seconds.

14.3.4.2 Recalling a Preset

1. Touch the **Presets** key to select the preset bank (XM 1, XM 2, or XM 3).

2. Touch the desired Preset key.

14.3.5 GDL 69/69A Data Link Receiver Troubleshooting

Some quick troubleshooting steps listed below can be performed to find the possible cause of a failure.

- Ensure the owner/operator of the aircraft in which the Data Link Receiver is installed has subscribed to SiriusXM Satellite Radio
- Ensure the SiriusXM Satellite Radio subscription has been activated
- Perform a quick check of the circuit breakers to ensure that power is applied to the Data Link Receiver

For troubleshooting purposes, check the Menu on the Music Page or the GDL 69 Box on the System - External LRUs Page for Data Link Receiver (GDL 69/69A) status, serial number, and software version number.

It may take several minutes for all subscribed data to become available after power-up.

Text Color	Description
White	Subscribed
Grey	Not Subscribed
Green	Available

Table 14-1 Product Status

1. Touch the **Status** key on the Music page to display the GDL 69/69A Status.

Figure 14-11 GDL 69 Status Page

2. The GDL status information is provided on this page.

3. Touch the **Menu** key to display the GDL Status Menu.

Figure 14-12 GDL Status Menu

4. Touch the **Lock Activation** key if this is for the initial subscription or a change in the subscription. Touch the **OK** key to continue the operation.

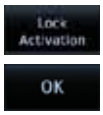


Figure 14-13 Lock Activation

14.4 Iridium Phone Operation (Optional)

Optional satellite telephone operation is available through the Iridium® satellite system that is interfaced through the Garmin GSR 56.

Figure 14-14 Services Phone Page

14.4.1 Status

The Status section shows the Call Time, Phone Status, and Call Suppression selected. The Call Time value shows the length of the call time for the current call using the Iridium phone. Phone Status shows the current operating status of the Iridium phone.

Status	Description
Idle	The Iridium phone is not using the GSR 56 for communicating at this time.
Initializing	The GSR 56 and its driver are currently initializing.
Connected	The GSR 56 is connected to the called number.
Connecting Call	The GSR 56 is in the process of connecting to the called number.
Changing Volume	The volume level on the GSR 56 is changing.
Busy	The phone is in use by another service and the call may not be made.
Dialing	The GSR 56 is dialing the called number.
Incoming Call	A call is being made to the GSR 56.
Hanging Up	The GSR 56 is disconnecting from the current call.
Unavailable	The GSR 56 is currently not usable by the Iridium phone system.

Table 14-2 Iridium Phone Status

14.4.2 Making a Phone Call

1. While viewing the Iridium Phone page, touch **Phone**, select a phone number, or select one from Contacts.

Figure 14-15 Making a Phone Call

2. Touch **Enter** to accept the selected number.

3. Touch the **Call** key.

Figure 14-16 Phone Call In Progress

Touchtone Entry

4. To make a direct call with a keypad, touch the **Touchtone Entry** key.

Figure 14-17 Touchtone Entry Pad

End Call

5. After completing the call, touch the **End Call** key.

14.4.3 Answering a Phone Call

An incoming phone call will generate a pop-up announcing the call. When a call is accepted, the pop-up will show that the call is connected and the cumulative call time will be shown.

1. When an incoming call is available, touch the **Enter** key or the **ANSWER** key to answer the call. Or, press the **Ignore** key to not answer the call and hang up.

Figure 14-18 Incoming Call Pop-Up

2. After a called is accepted and connected, the connection time will be shown on the pop-up. Touch the **ATT** soft key to attenuate the call volume; touching it again will return to normal volume. Touch the **HANG UP** soft key to end the call.

14.4.4 Suppress Visuals

Call Suppression controls calling when use of the Iridium phone system is allowed.

NOTE: *The "Suppress Visuals" setting only affects the visual indication of an incoming call/text. It does not inhibit the phone ringer or incoming SMS chime. Garmin recommends that you inhibit the audio from the GSR 56 unless a phone call is active.*

Status	Description
Off	Call Suppression is turned off. Calls may be transmitted and received through the Iridium phone.
On	Call Suppression is turned on. The incoming call pop-up will not be shown. The call may still be answered on the phone page. Outgoing calls are not affected.
On During APR/ MAPR/TERM	Call Suppression is turned on during Approach, Missed Approach, and Terminal operations. The incoming call pop-up will not be shown. The call may still be answered on the phone page. Outgoing calls are not affected.

Table 14-3 Call Suppression

1. While viewing the Iridium Phone page, touch the **Suppression** key.
2. Touch the desired Call Suppression type.

Figure 14-19 Select Call/SMS Suppression

3. Or, press **Back** to return to the Phone page without making a selection.

14.4.5 Phone Volume

Use the Phone Volume controls to adjust the loudness of the phone calls you hear. Volume controls will only be available when the Idle, Connected, or Changing Volume states are displayed.

Adjusting the Phone Volume with the Soft Keys

1. While viewing the Iridium Phone page, touch the **VOL** keys to adjust the phone volume.

Figure 14-20 Select Soft Keys for Phone Volume Adjustment

2. The phone volume level is shown as a bar graph.

14.4.6 SMS Text Operation

Send and receive text messages through the GSR 56 phone connection.

1. While viewing the Services page, touch the **SMS Text** key.

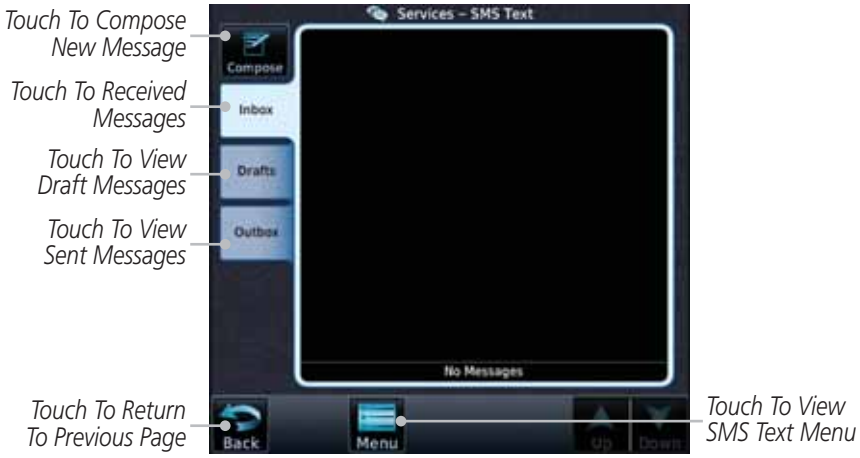


Figure 14-21 SMS Text Page

2. Select Compose, Inbox, Drafts, or Outbox.

14.4.6.1 SMS Text Messaging Menu

The SMS Text Messaging Menu allows you to sort, mark, or delete messages and select call suppression.

Figure 14-22 SMS Text Messaging Menu

1. Touch the **Time** key to sort messages by Time or the **Address** key to sort by Address.

2. Touch the **Suppression** key and then touch the call suppression choice. The current choice will be shown on the **Suppression** key.

3. While viewing the Inbox, Drafts, or Outbox, touch the **Mark All As Read** to tag the messages as having been read.

4. Touch the **Delete All Messages** to delete the messages in the viewed category.

14.4.6.2 Composing a SMS Text Message

1. While viewing the SMS Text page, touch the **Compose** key.

Figure 14-23 Compose a New SMS Text Message

2. Touch the **To** window to select the recipient. Select either a Phone Number or E-mail Address.

Figure 14-24 Select Destination for the SMS Text Message

3. Use either the keypad or select from the Contacts.
4. Touch the **Message** window to enter the text for the message. Use the keypad to create the message.
5. Touch **Send** to send the message. Touch **Save** to save the message as a draft. Touch **Delete** to delete this message.

14.4.6.3 A Failed SMS Text Message

1. While viewing the Services page, touch the **SMS Text key** and touch the Outbox tab. A failed message is noted with an "x."

Figure 14-25 SMS Text Message List Showing a Failed Message

2. Touch the failed message. Touch the **Send Again** key to resend the message. Touch the **Delete** key to delete the message.

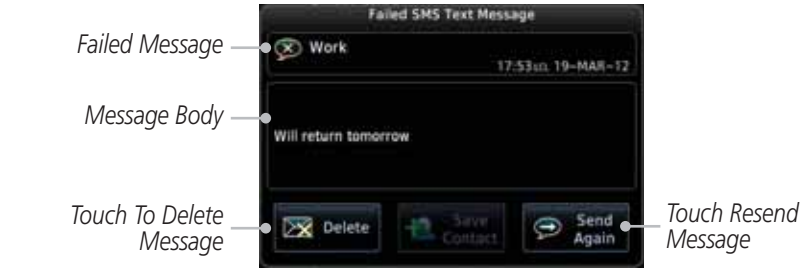


Figure 14-26 Resend a Failed SMS Text Message

14.4.7 Position Reporting

Position Reporting is a system which collects system variables and transmits them over the Iridium® satellite at a given interval through the GSR 56.

1. While viewing the Services page, touch the **Position Reports** key.

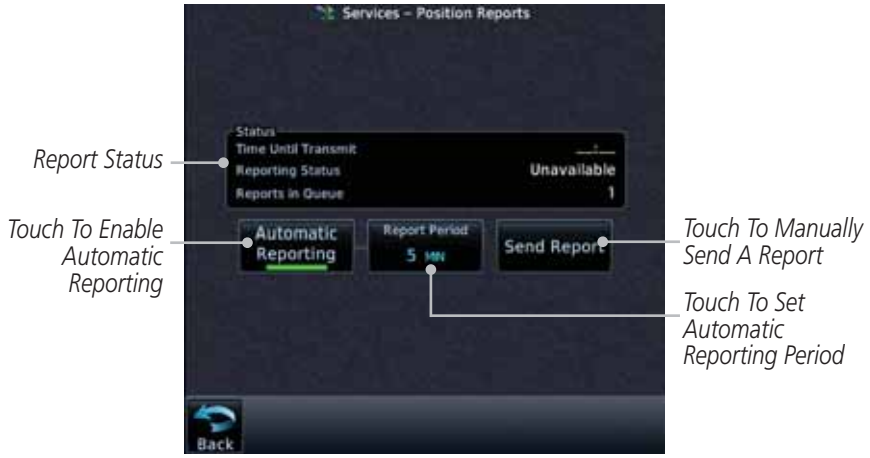


Figure 14-27 Services Position Reporting

2. Touch the **Automatic Reporting** key to enable Automatic Reporting.

3. After Automatic Reporting is enabled, touch the **Report Period** key to set the Reporting Period.

4. Select the Report Period with the keypad and press **Enter**.

5. When Automatic Reporting is disabled, touch the **Send Report** key to manually send a report.

14.4.7.1 Status

The Status window shows the time until the next data transmission and the status of the reporting system.

NOTE: *The GSR 56 does not report its serial number until 90 seconds after power up of the GTN. As a result, for that period, the product info for the GSR 56 will show "Waiting."*

14.4.7.2 Position Reporting Status

The Time Until Transmit field is a countdown timer that shows the time until the next data transmission. This field is blank when the aircraft is on the ground. Position Reporting will be enabled when the aircraft is in the air.

Status	Description
Idle	The reporting system is not using the GSR 56 for reporting at this time.
Initializing	The GSR 56 and its driver are currently initializing.
Transferring	A position report is currently being transmitted.
Unavailable	The GSR 56 is currently not usable by the reporting system.

Table 14-4 Position Reporting Status

Figure 14-28 Position Reporting Status

14.4.8 Contacts

The Phone Book may hold up to 128 entries. A phone number may be entered and dialed without saving it to the Phone Book. Note that it is necessary to dial a "1," the area code, and then the number.

14.4.8.1 Creating a Contact

1. While viewing the Services page, touch the **Contacts** key.

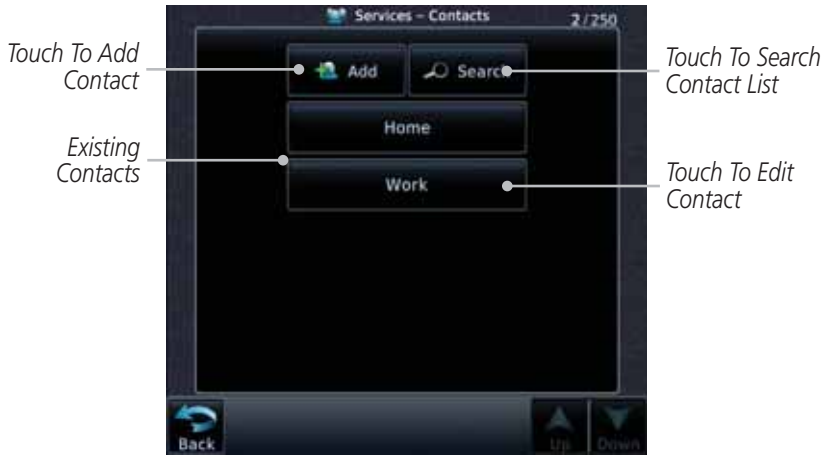


Figure 14-29 Contact List

2. Touch the **Add** key to add a new contact.

Figure 14-30 Add a New Contact

3. Use the keypad to enter the information for each item and then touch the **Save Contact** key.

14.4.8.2 Using a Contact

1. While viewing the Contacts page, touch an existing contact.

Figure 14-31 Using the Contact List

2. Touch the desired function for the selected Contact.

15 UTILITIES

The Utilities page provides a group of features that will support your flight planning to make them easier and more efficient. The Vertical Calculator (VCALC) calculates the time to begin descent and vertical speed required to reach a desired altitude at the chosen location. The Flight Timers feature provides a number of timer types to assist in monitoring your time in flight. RAIM Prediction predicts if GPS coverage is available for your current location or at a specified waypoint at any time and date. RAIM performs checks to ensure that the GTN unit has adequate satellite geometry during your flight. The Trip Planning feature allows the pilot to view desired track (DTK), distance (DIS), estimated time en route (ETE), en route safe altitude (ESA) and estimated time of arrival (ETA) information for a direct-to, point-to-point between two specified waypoints or for any programmed flight plan. The Fuel Planning feature will display fuel conditions along the active direct-to or flight plan when equipped with fuel flow (FF) and/or fuel on board (FOB) sensors. The DALT/TAS/Winds feature performs calculations about Altitude, Airspeed, and Winds. The Scheduled Messages function allows you to create scheduled messages by Message, Type, and setting a Timer. The Checklists function provides a built-in method of reviewing your aircraft checklist. The Clean Screen function will lock the touchscreen so the display can be cleaned without activating any functions.

Figure 15-1 Utilities Home Page

Figure 15-2 Utilities Functional Diagram

15.1 Vertical Calculator (VCALC)

The Vertical Calculator (VCALC) function allows you to create a three-dimensional profile which guides you from your present position and altitude to a final (target) altitude at a specified location. This is helpful when you'd like to descend to a certain altitude near an airport. Once the profile is defined, message alerts and additional data can be configured on the Map Page to keep you informed of your progress.

Figure 15-3 VCALC Target

VCALC is inhibited in the following conditions:

- Groundspeed is less than 35 knots
- No active flight plan or direct-to destination
- SUSP mode
- Vectors-to-Final mode
- VLOC mode
- After the FAF on an approach

WARNING: *Do not use VCALC messages as the only means of either avoiding terrain/obstacles or following ATC guidance. VCALC provides advisory information only and must be used in concert with all other available navigation data sources.*

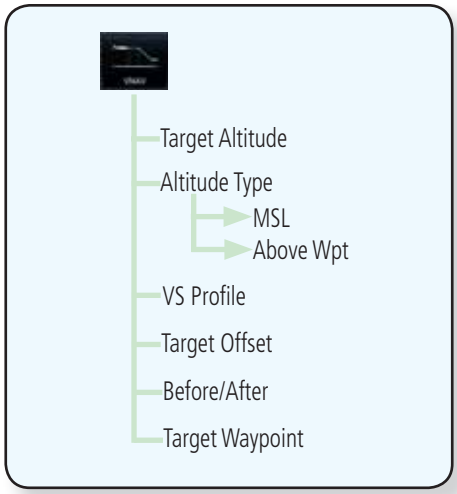


Figure 15-4 VCALC Page Functional Diagram

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

Figure 15-5 VCALC Page

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

15.1.1 Target Altitude

This sets the desired ending altitude for the VCALC setup.

1. While viewing the VCALC page, touch **Target ALT**.

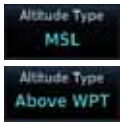
Figure 15-6 Select VCALC Target Altitude

2. Use the numeric keypad to select the desired Target Altitude and then touch the **Enter** key.

15.1.2 Altitude Type

This value selects the altitude reference that will be used for VCALC calculations.

1. While viewing the VCALC page, touch **Altitude Type**.



2. Touching the **Altitude Type** key will toggle between MSL and Above WPT. "Above WPT" is only available for waypoints that are airports.

15.1.3 Vertical Speed (VS) Profile

This value sets the desired vertical speed.

1. While viewing the VCALC page, touch **VS Profile**.

Figure 15-7 Select VCALC Vertical Speed

2. Use the numeric keypad to select the desired Vertical Speed and then touch the **Enter** key.

15.1.4 Target Offset

The Target Offset is a pilot-selected distance value that represents the geographical location where you wish to arrive at the target altitude. This distance is measured from the Target Waypoint and, in a separate data field on the VCALC page, designated as either before or after the Target Waypoint.

1. While viewing the VCALC page, touch the **Offset** key.

Figure 15-8 Select VCALC Target Offset

2. Use the numeric keypad to select the desired Target Offset and then touch the **Enter** key.

15.1.5 Before/After Target Waypoint

This setting designates whether the offset distance defines a point before you reach the target reference waypoint or after you reach the waypoint. The "After" selection is not available for the last waypoint in a flight plan.

1. While viewing the VCALC page, touch the **Before/After** key.

2. Touching the **Before/After** key will toggle between Before and After the Target Waypoint.

15.1.6 Target Waypoint

Select the waypoint in the flight plan that will be used for planning a descent. When using a flight plan, the target waypoint is a reference that can be specified from the waypoints contained in the flight plan. By default, the last waypoint in the flight plan is selected.

1. While viewing the VCALC page, touch **Target Waypoint**.

Figure 15-9 Select VCALC Target Waypoint List

2. A list of the remaining waypoints in the flight plan will be shown. Touch the desired waypoint to select it as the Target Waypoint.

15.1.7 Display VCALC Messages

Selecting **Display Messages** will allow the display of messages about the VCALC function when they occur. With **Display Messages** not selected, VCALC messages will not be displayed.

1. While viewing the VCALC page, touch **Display Messages** to toggle the display of VCALC messages in the Message function.

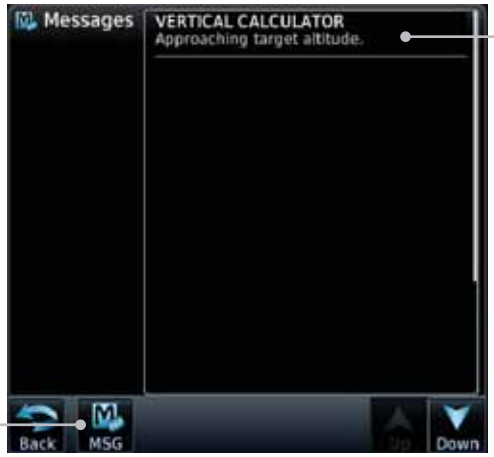


Figure 15-10 VCALC Approaching Target Altitude Message

2. Touch the **MSG** key to toggle the display of available messages.

15.1.8 Restore VCALC Defaults

While viewing the VCALC page menu, touching the **Restore Defaults** key will reset all of the VCALC values back to their default values. The Target Waypoint will not be changed.

15.2 Flight Timers

The Flight Timers function provides count up/down timers, plus automatic recording of departure time, and total trip time. Departure and total trip time recording can be configured to run either any time unit power is on, or only when your ground speed exceeds the in-air threshold set by the installer (for example, 30 knots). A flexible Generic Timer is available for general timing needs.

NOTE: *When a count up timer is used, the preset value has no function.*

1. While viewing the Utilities page, touch the **Flight Timers** key.

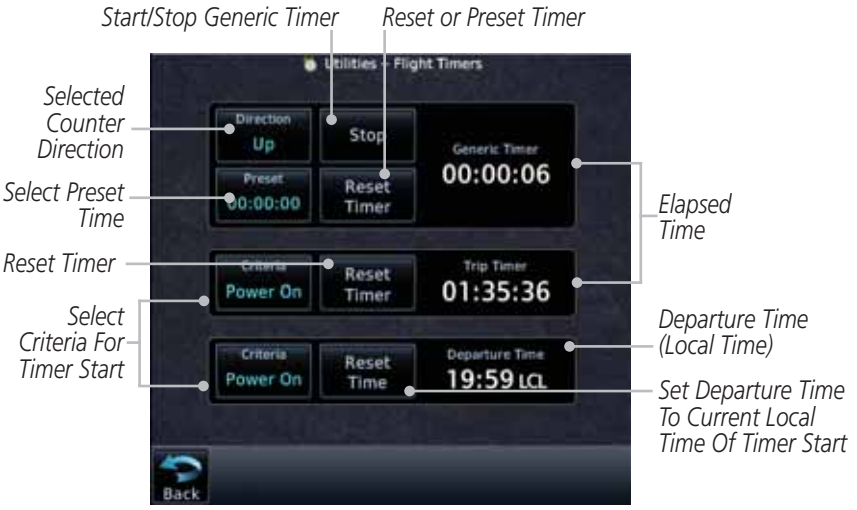


Figure 15-11 Utility Flight Timers Page

2. If the Generic Timer Direction counter is set to "Up," the Reset Timer key will be shown and when touched will return the timer to 00:00:00. If the Direction counter is set to "Down," the Preset Timer key will be shown and the key will return the timer to the Preset time value.
3. Touch each key as desired to set up timer operation.

15.3 RAIM Prediction

RAIM Prediction predicts if GPS coverage is available for your current location or at a specified waypoint at any time and date. RAIM performs checks to ensure that the GTN unit has adequate satellite geometry during your flight. RAIM availability is near 100% in Oceanic, En Route and Terminal phases of flight. Because the FAA's TSO requirements for non-precision approaches specify significantly better satellite coverage than other flight phases, RAIM may not be available when flying some approaches. The GTN unit automatically monitors RAIM during approach operations and warns you if RAIM is not available. In such cases, use a non-GPS based approach. RAIM prediction helps you plan for a pending flight to confirm GPS operation during an approach.

RAIM prediction only predicts the availability of Fault Detection (FD) integrity in the absence of SBAS corrections. It cannot predict the availability of LPV or L/VNAV approaches. The FAA provides a NOTAM service for LPV approach availability.

1. While viewing the Utilities page, touch the **RAIM Prediction** key.

Figure 15-12 Utility RAIM Prediction Page

2. Touch the **Waypoint** key and select the waypoint for RAIM Prediction.

3. Touch the **Arrival Date** key and select the date of arrival at the selected waypoint.

4. Touch the **Arrival Time** key and select the local time of expected arrival at the selected waypoint.

5. When the Waypoint, Arrival Date, and Arrival Time values have been entered, touch the **Compute RAIM** key to determine if RAIM is available.

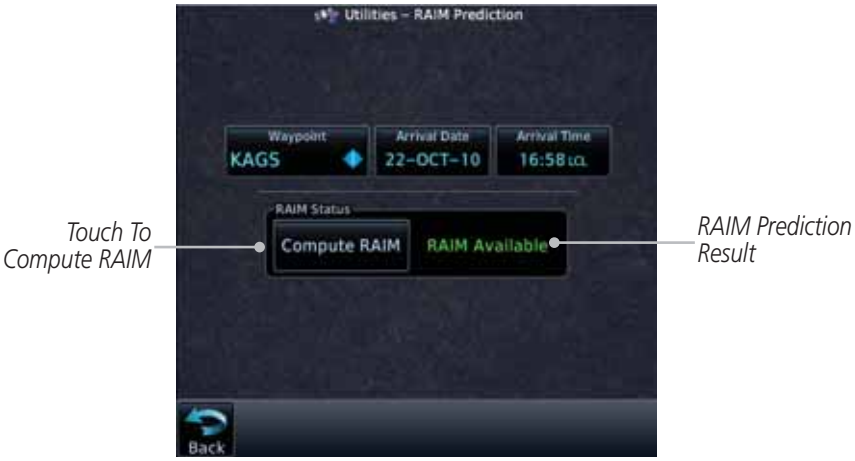


Figure 15-13 RAIM Prediction Completed

15.4 Trip Planning

The GTN 7XX allows the pilot to view desired track (DTK), distance (DIS), estimated time en route (ETE), en route safe altitude (ESA) and estimated time of arrival (ETA) information for a direct-to, point-to-point between two specified waypoints or for any programmed flight plan. This item also displays the sunrise/sunset times for your destination waypoint (for the selected departure date). All times are based on the time set in System-Setup. For trip planning inputs: departure time and date are manually entered, while ground speed can be provided by sensor data, if selected.

The trip statistics are calculated based on the selected starting and ending waypoints and the trip planning inputs.

In Flight Plan mode with a stored flight plan selected, and the entire flight plan (CUM) selected, the waypoints are the starting and ending waypoints of the selected flight plan.

In Flight Plan mode with a stored flight plan selected, and a specific leg selected, the waypoints are the endpoints of the selected leg.

In Point-To-Point mode these are manually selected waypoints (if there is an active flight plan, these default to the endpoints of the active leg).

Some of the calculated trip statistics are dashed when the selected leg of the active flight plan has already been flown.

- Desired Track (DTK) - DTK is shown as nnn° and is the desired track between the selected waypoints. It is dashed unless only a single leg is selected.
- Distance (DIS) - The distance is shown in tenths of units up to 99.9, and in whole units up to 9999.
- Estimated time en route (ETE) - ETE is shown as hours:minutes until less than an hour, then it is shown as minutes:seconds.
- Estimated time of arrival (ETA) - ETA is shown as hours:minutes and is the local time at the destination.
  - If in Point-To-Point mode then the ETA is the ETE added to the departure time.
  - If a flight plan other than the active flight plan is selected it shows the ETA by adding to the departure time all of the ETEs of the legs up to and including the selected leg. If the entire flight plan is selected, then the ETA is calculated as if the last leg of the flight plan was selected.
  - If the active flight plan is selected the ETA reflects the current position of the aircraft and the current leg being flown. The ETA is calculated by adding to the current time the ETEs of the current leg up to and including the selected leg. If the entire flight plan is selected, then the ETA is calculated as if the last leg of the flight plan was selected.
- En Route safe altitude (ESA) - The ESA is shown as nnnnnFT.
- Destination sunrise and sunset times - These times are shown as hours:minutes and are the local time at the destination.

NOTE: *The capability of using Sensor Data for the trip planning functions is available in SW Versions 2.00, 4.10, and later.*

15.4.1 Point-To-Point Mode

The Trip Planning Point-to-Point mode shows trip calculations between two selected points: either two waypoints from the database or from your present position to a selected waypoint.

1. While viewing the Utilities page, touch the **Trip Planning** key.

2. Touch the **Mode** key to toggle to Point-to-Point.

3. Touch the **P.POS** key to toggle between using your present position as the From waypoint when selected or a waypoint selected from the database when **P.POS** is deselected. If **P.POS** is selected, the Lat/Lon of the present position will be shown in the From position.

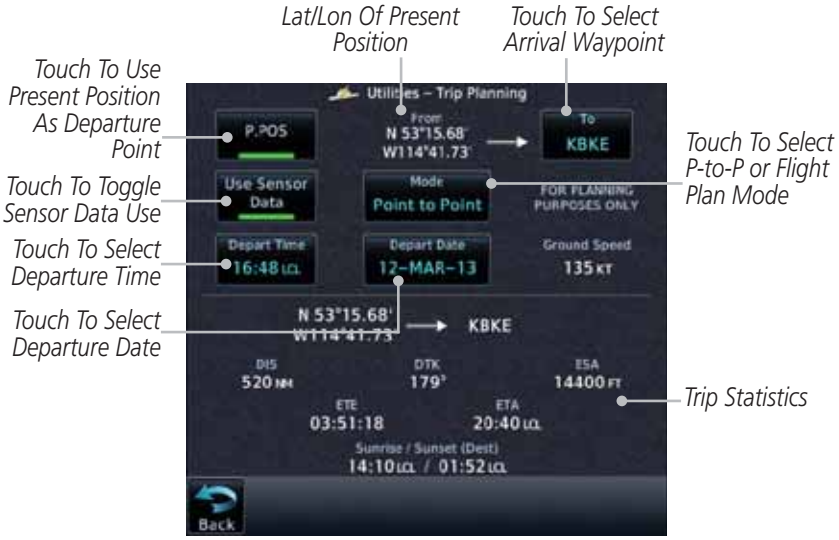


Figure 15-14 Utility Trip Planning Page (Point-To-Point Mode) - Sensor Data Used

4. If **P.POS** is not selected for the From point, touch the **From** key and then use the keypad to select a waypoint from the database and touch **Enter**.

Figure 15-15 Selecting a From Waypoint

5. Touch the **To** key and then use the keypad to select a waypoint from the database for the destination waypoint and touch **Enter**.

6. Touch the **Depart Time** key and then use the keypad to select the departure time (local time at From waypoint) and touch **Enter**.

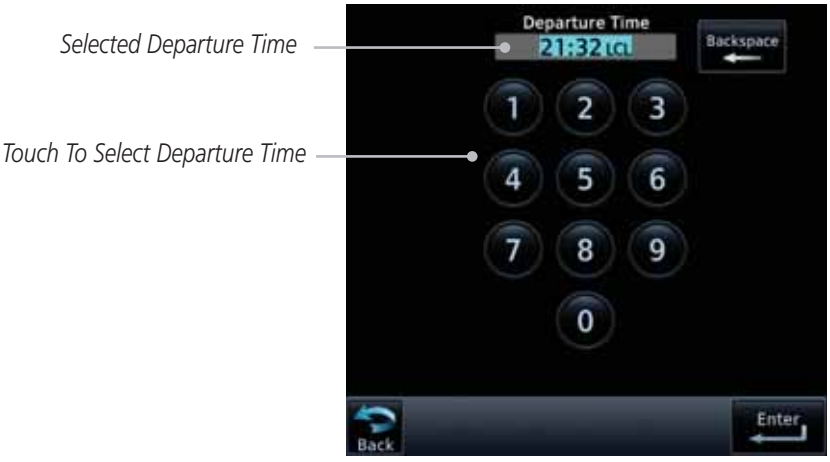


Figure 15-16 Selecting Departure Time

7. Touch the **Depart Date** key and then the Departure Date page to select the departure year, month, and day and then touch **Enter**.

Figure 15-17 Selecting Departure Date

8. Touch the **Ground Speed** key and then the keypad to select the average ground speed for the trip and touch **Enter**.

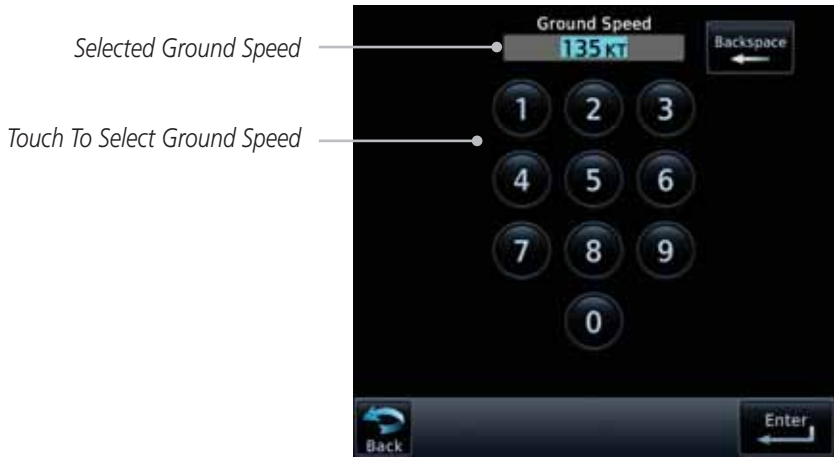


Figure 15-18 Selecting Expected Average Ground Speed

9. After completing the Trip Planning selections, the trip statistics will be shown in the lower half of the display.

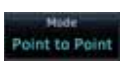
Figure 15-19 Utility Trip Planning Page With Computed Data (Point-To-Point Mode)

Figure 15-20 Utility Trip Planning Page With Computed Data (Point-To-Point Mode) - Use Sensor Data Selected

NOTE: *When Local Time is selected in the Setup-Date/Time feature, Sunrise/ Sunset calculations in the Trip Planning feature are based on the From waypoint time zone. For instance, a flight plan originating in the Pacific time zone and ending in the Central time zone would show Sunset/Sunrise times at the destination in Pacific time. This potential offset does not occur when UTC time is used.*

15.4.2 Flight Plan Mode

The Trip Planning Flight Plan mode shows trip calculations between two legs of the flight plan or the cumulative flight plan.



1. Touch the **Mode** key to select Flight Plan mode, if required.

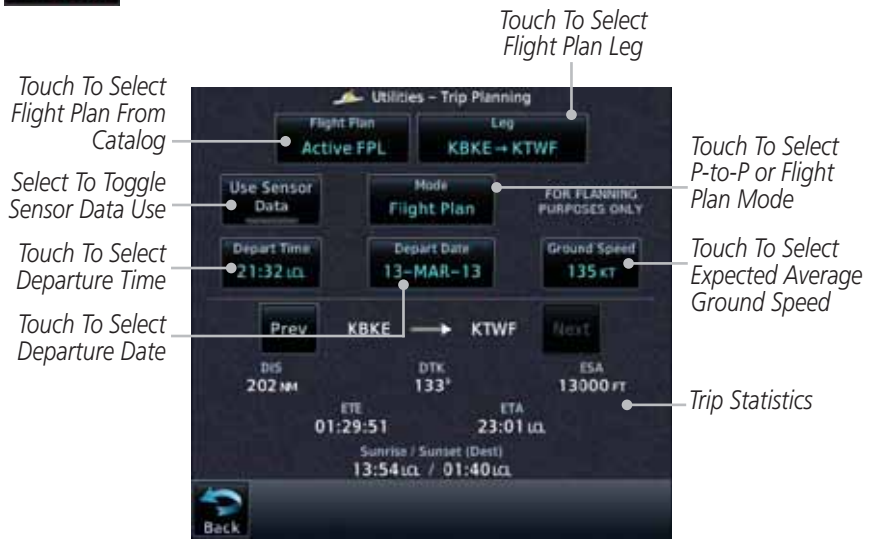


Figure 15-21 Utility Trip Planning Page (Flight Plan Mode)

2. Touch the **Flight Plan** key to select the flight plan.

Figure 15-22 Select Flight Plan

3. Touch the **Leg** key to select the flight plan leg. If the "Cumulative" selection is chosen, statistics will relate to the entire flight plan.

Touch To Select Flight Plan Leg (Cumulative FPL Shown)

Figure 15-23 Select Flight Plan Leg

4. Touch the **Depart Time** key and then use the keypad to select the departure time (local time at From waypoint) and touch **Enter**.

5. Touch the **Depart Date** key and then the Departure Date page to select the departure year, month, and day and then touch **Enter**.

6. Touch the **Ground Speed** key and then the keypad to select the average ground speed for the trip and touch **Enter**.

7. Statistics for the current flight plan leg are displayed in the lower half of the display.

Figure 15-24 Utility Trip Planning Page Computed Data View (Flight Plan Mode)

Figure 15-25 Utility Trip Planning Page Computed Data View (Flight Plan Mode) - Use Sensor Data Selected

8. Touch the **Next** key to view statistics for the next leg in the flight plan.

15.5 Fuel Planning

Fuel Planning — This item displays fuel conditions along the active direct-to or flight plan. You may manually enter fuel flow, ground speed (GS) and fuel on board figures for planning purposes. Fuel planning figures can be displayed not only for the currently active flight plan or direct-to, but also point-to-point between two specified waypoints and for any programmed flight plan.

Fuel on board and fuel flow may be manually entered in the unit start-up sequence and used to recalculate fuel on board as it is consumed. When fuel flow or fuel on board is manually entered, the figures are retained the next time you view the page (with fuel on board continuously recalculated).

NOTE: *The capability of using Sensor Data for the trip planning functions is available in SW Versions 2.00, 4.10, and later.*

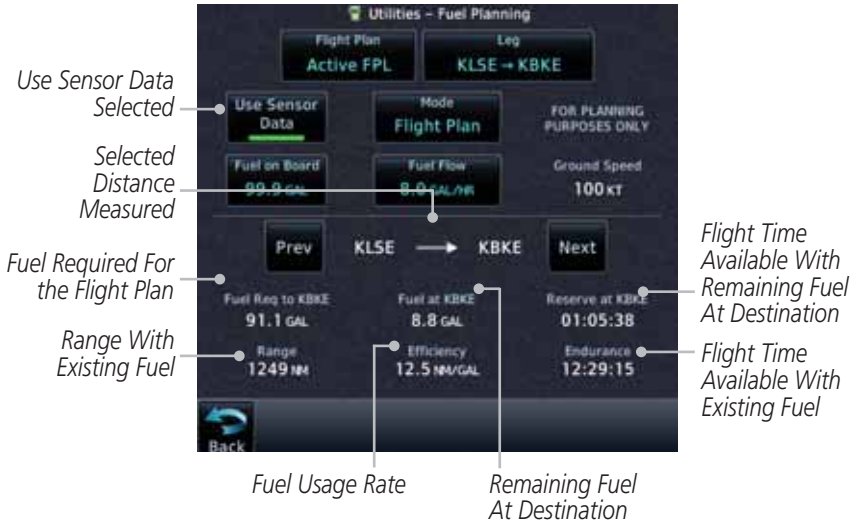


Figure 15-26 Utility Fuel Planning Page (Flight Plan Mode) - Use Sensor Data Selected

15.5.1 Point-To-Point Mode

The Fuel Planning Point-to-Point mode shows fuel calculations between two selected points: either two waypoints from the database or from your present position to a selected waypoint.

1. While viewing the Utilities page, touch the **Fuel Planning** key.

2. Touch the **Mode** key to toggle to Point-to-Point.

3. Touch the **P.POS** key to toggle between using your present position as the From waypoint when selected or a waypoint selected from the database when **P.POS** is deselected. If **P.POS** is selected, the Lat/Lon of the present position will be shown in the From position.

Figure 15-27 Utility Trip Planning Page (Point-To-Point Mode) - Use Sensor Data Selected

4. If **P.POS** is not selected for the From point, touch the **From** key and then use the keypad to select a waypoint from the database and touch **Enter**.

Figure 15-28 Selecting the From Waypoint

5. Touch the **To** key and then use the keypad to select a waypoint from the database for the destination waypoint and touch **Enter**.

6. Touch the **Fuel on Board** key and then use the keypad to select the current amount of fuel on board and touch **Enter**.

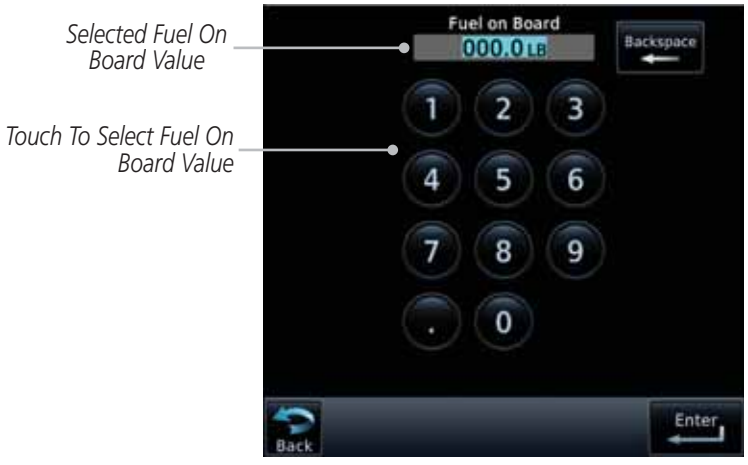


Figure 15-29 Selecting Current Fuel On Board

7. Touch the **Fuel Flow** key and then use the keypad to select the average fuel flow and touch **Enter**.

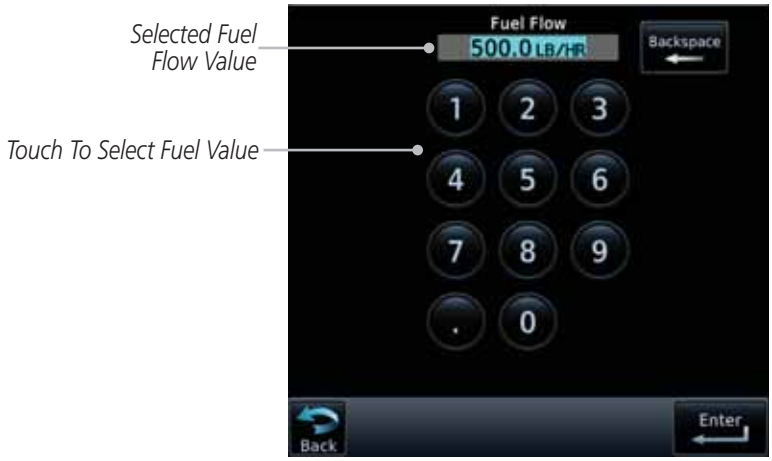


Figure 15-30 Selecting Fuel Flow

8. Touch the **Ground Speed** key and then the keypad to select the average ground speed for the trip and touch **Enter**.

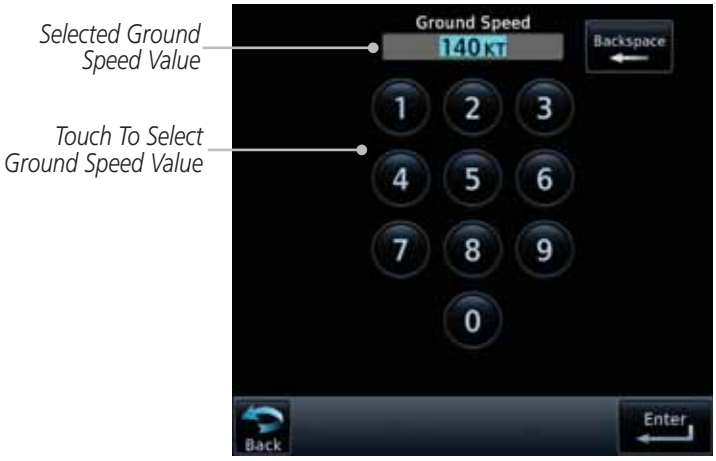


Figure 15-31 Selecting Ground Speed

15.5.2 Flight Plan Mode

The Fuel Planning Flight Plan mode shows fuel calculations between two legs of the flight plan or the cumulative flight plan.

1. Touch the **Mode** key to select Flight Plan mode, if required.

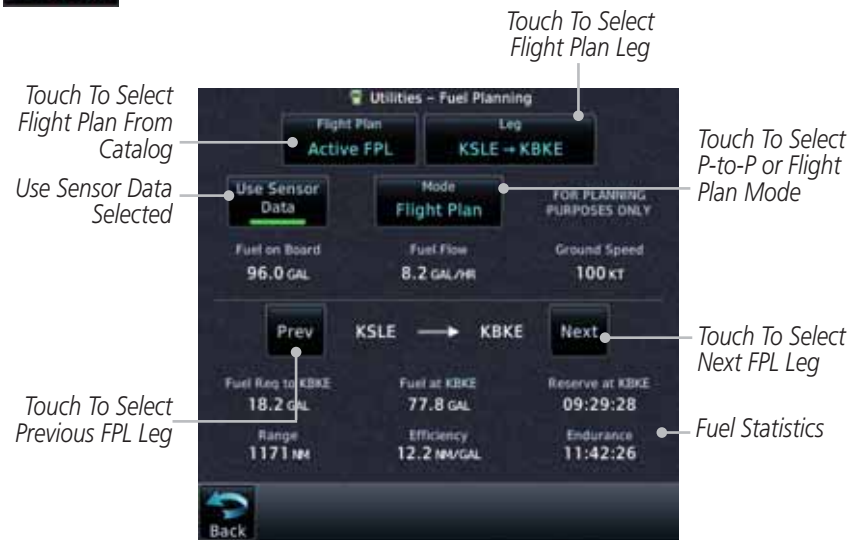


Figure 15-32 Utility Fuel Planning Page (Flight Plan Mode)

2. Touch the **Flight Plan** key to select the flight plan.

Figure 15-33 Select Flight Plan

3. Touch the **Leg** key to select the flight plan leg. If the "Cumulative" selection is chosen, statistics will relate to the entire flight plan.

Touch To Select Flight Plan Leg (Cumulative FPL Shown)

Figure 15-34 Select Flight Plan Leg

4. If desired, touch the **Fuel on Board** key and then use the keypad to select the Fuel on Board value and touch **Enter**.

5. If desired, touch the **Fuel Flow** key and then use the keypad to select the Fuel Flow value and touch **Enter**.

6. Touch the **Ground Speed** key and then the keypad to select the average ground speed for the trip and touch **Enter**.

7. Statistics for the current flight plan leg are displayed in the lower half of the display. The Cumulative flight plan is shown.

8. Touch the **Previous** and **Next** keys to view statistics for the previous and next legs in the flight plan.

15.6 DALT/TAS/Winds

Density Alt / TAS / Winds — indicates the theoretical altitude at which your aircraft performs depending upon several variables, including indicated altitude (Indicated ALT), barometric pressure (BARO) and total air temperature (TAT; the temperature, including the heating effect of speed, read on a standard outside temperature gauge). This item computes true airspeed (TAS) and density altitude, based upon the factors above. Also, this feature determines winds aloft — the wind direction and speed — and a head wind/tail wind component, based on true airspeed, aircraft heading (HDG) and ground speed. When a FADC provides pressure altitude and the Use Sensor Data option is selected, the Baro key will not be present in the edit mode and the Baro indication will not be shown in computed results.

Figure 15-35 Utility DALT/TAS/Winds Page Using Indicated Altitude and Not Using Sensor Data

Figure 15-36 Utility DALT/TAS/Winds Page Using Sensor Data and Pressure Altitude

NOTE: *The capability of using Sensor Data for the trip planning functions is available in SW Versions 2.00, 4.10, and later.*

Figure 15-37 Utility DALT/TAS/Winds Page Using Manually Entered Data

1. Touch the **Indicated ALT** key and then the keypad to select the Indicated Altitude and then touch **Enter**.

Figure 15-38 Select Indicated Altitude Value

2. Touch the **BARO** key and then the keypad to select the Barometric Pressure and then touch **Enter**.

Figure 15-39 Select Barometric Pressure Value

3. Touch the **CAS** key and then the keypad to select the Calibrated Air Speed and then touch **Enter**.

Figure 15-40 Select Calculated Air Speed Value

4. Touch the **TAT** key and then the keypad to select the Total Air Temperature and touch **Enter**.

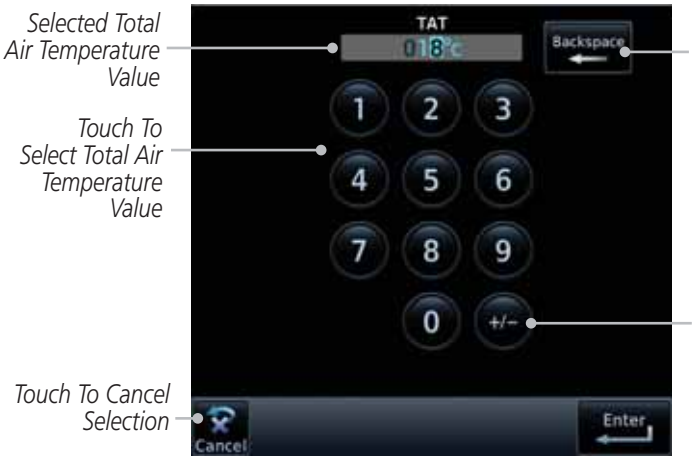


Figure 15-41 Select Total Air Temperature Value

5. Touch the **TRK** key and then the keypad to select the Track Angle and then touch **Enter**.

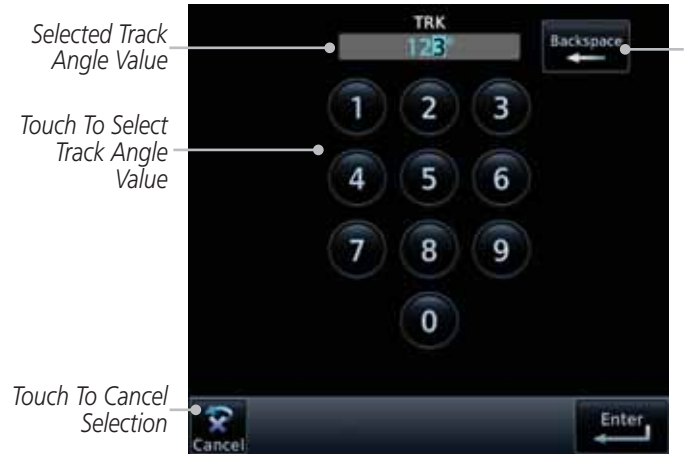


Figure 15-42 Select Track Angle Value

6. Touch the **HDG** key and then the keypad to select the Heading value and then touch **Enter**.

Figure 15-43 Select Heading Value

7. Touch the **Ground Speed** key and then the keypad to select the average ground speed for the trip and then touch **Enter**.

15.7 Clean Screen Mode

The Clean Screen mode makes the touchscreen inactive so the display can be manually cleaned. The front bezel, keypad, and display can be cleaned with a microfiber cloth or with a soft cotton cloth dampened with clean water. DO NOT use any chemical cleaning agents. Care should be taken to avoid scratching the surface of the display.

1. While viewing the Utilities page group, touch the **Clean Screen** key to start Screen Cleaning Mode.

Figure 15-44 Utilities Page

2. Touch the **HOME** key to exit Screen Cleaning Mode.

Figure 15-45 Screen Cleaning Mode

15.8 Scheduled Messages

The Scheduled Messages utility displays reminder messages (such as "Change oil", "Switch fuel tanks", "Overhaul", etc.). One-time, periodic, and event-based messages are allowed. One-time messages appear once the timer expires and reappear each time the GTN-series unit is powered on, until the message is deleted. Periodic messages automatically reset to the original timer value, once the message is displayed. Event-based messages do not use a timer, but rather a specific date and time.

NOTE: *This feature is available in SW Versions 5.00, and later.*

1. While viewing the Utilities page group, touch the **Scheduled Messages** key to start the Scheduled Messages function.

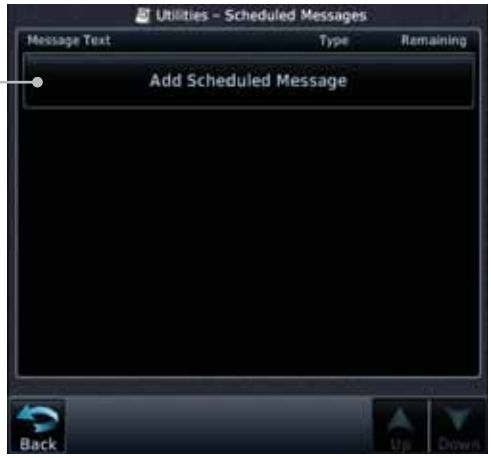


Figure 15-46 Scheduled Messages Page

2. Touch the **Message** selection and enter the desired message to be displayed. Touch the **Type** selection to choose the message type. Touch the **Timer** selection to set the countdown time for the message to be displayed.

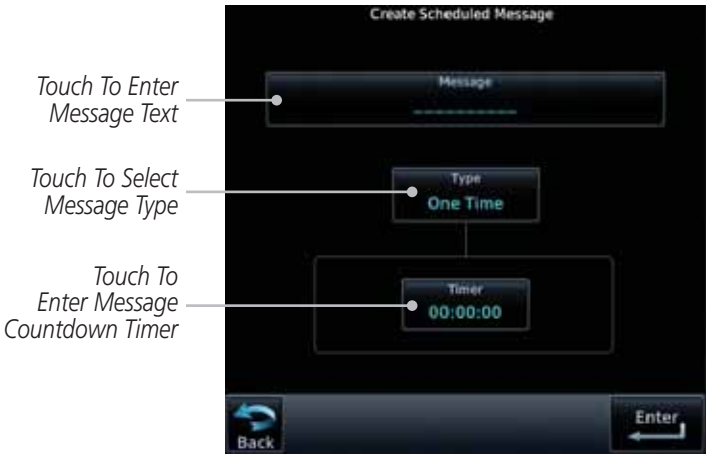


Figure 15-47 Create a Scheduled Message

2. After completing the selections, touch the **Enter** key.

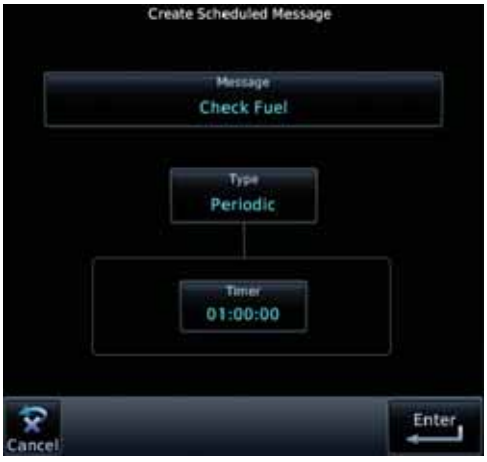


Figure 15-48 Sample Scheduled Message

15.9 Checklists

The Checklists function provides a built-in method of reviewing your aircraft checklist. Checklists are created using the Garmin Checklist Editor software (available online) and stored on the data card as "chklist.ace." As each Checklist is completed, you can advance to the next one in order. In the Checklist Menu, you can access any Checklist, or group of Checklists, and clear the current or all Checklists.

NOTE: *This feature is available in SW Versions 5.10, and later. In software version 6.00 and later, the installer may configure the title of this feature to be Task Lists or Checklists.*

15.9.1 Checklists Menu

1. While viewing the Utilities page group, touch the **Checklists** key to start the Checklists function.
2. Touch the **Menu** key to select an option from the Checklist Menu.

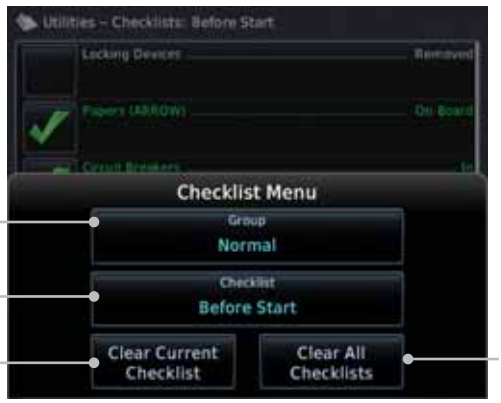


Figure 15-49 Utility Checklist Menu

Figure 15-50 Select a Checklist from the Checklist Menu

15.9.2 Viewing Checklists

1. While viewing the Utilities function, touch the **Checklist** key. Use the existing Checklists in the order provided or touch the **Menu** key to select another checklist.

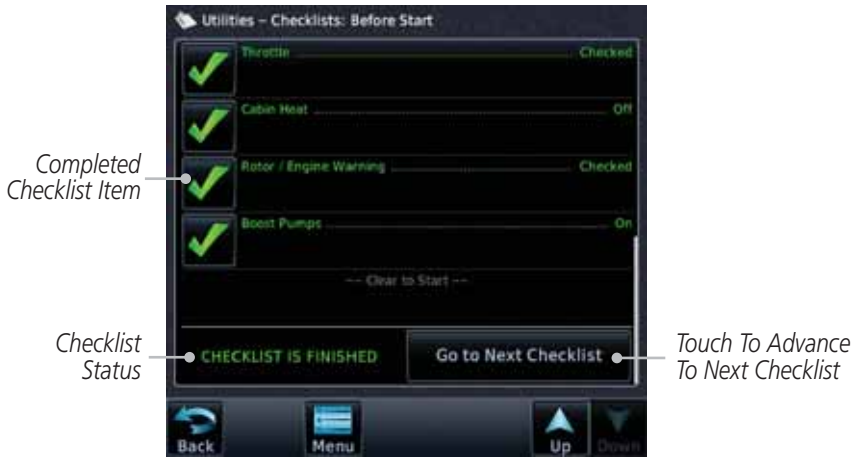


Figure 15-51 Checklist Completion

2. After completing the Checklist, touch **Go to Next Checklist**, **Menu**, or **Back** to exit the Checklist function.

NOTE: *All checklists are cleared after a power cycle.*

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16 SYSTEM

The System function allows you to change unit settings, customize operation to your preferences, and check on the operation of your unit. The System pages cover System Status, Database Info and transfer, GPS Status, External LRUs, Setup, Alerts, Units, Audio, Backlight control function, and Connext Setup.

1. From the Home page, touch the **System** key.

Figure 16-1 System Home Page

2. Touch the desired key to reach that function. To return to the System page, touch the **Back** key.

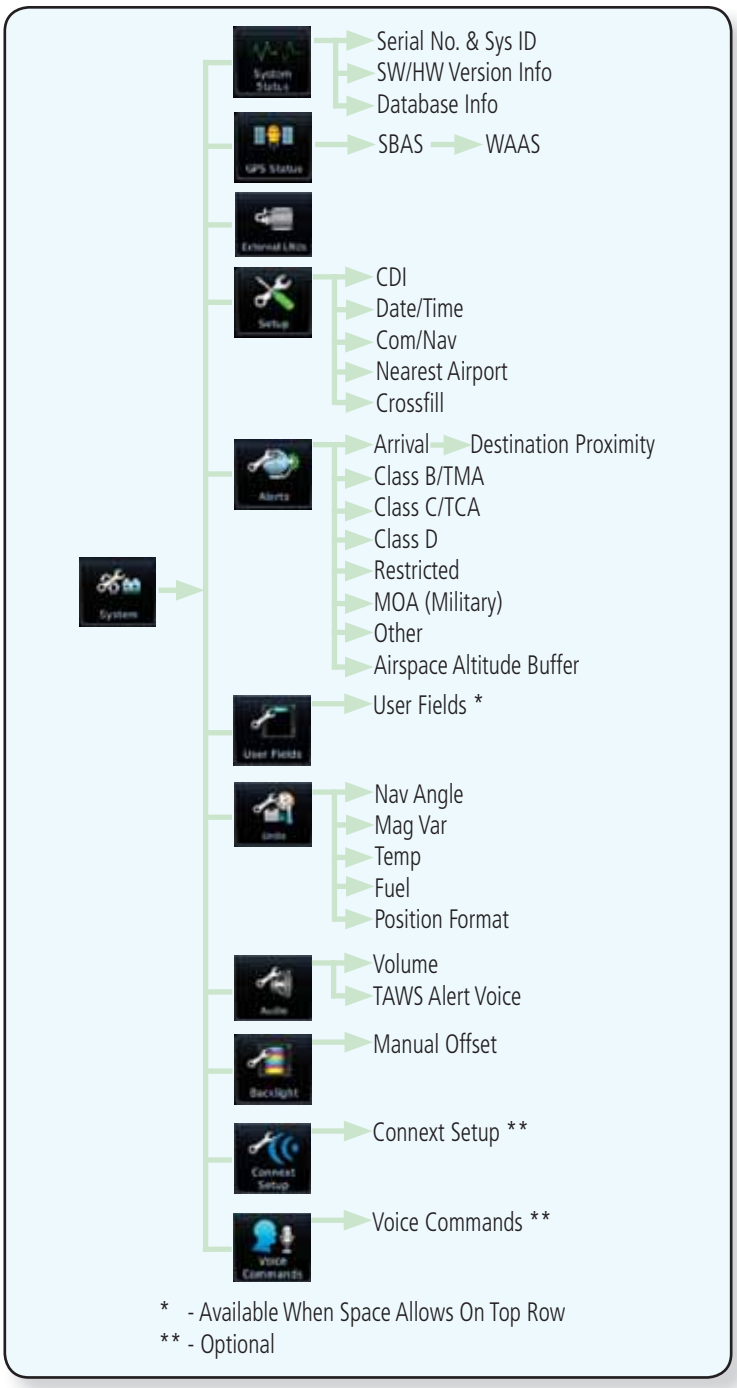


Figure 16-2 System Function Summary

16.1 System Status

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

Figure 16-3 System Status Functional Diagram

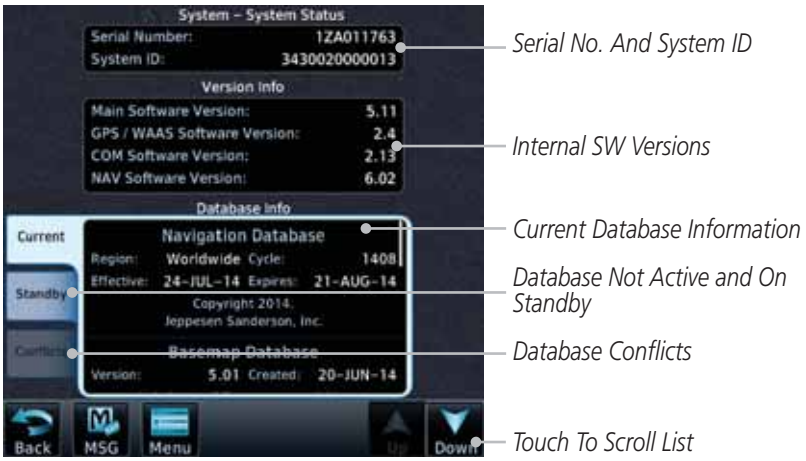


Figure 16-4 System Function System Status Page Description

1. While viewing the System page, touch **System Status**.
2. Use the **Up** and **Down** arrow keys as needed to view the Database Information.

3. Touch the **Back** key to return to the System page.

16.1.1 Serial Number and System ID

The System Status section shows the unit Serial Number and the System ID.

16.1.2 Version Information

The software versions of the GTN unit are displayed. This information is useful when contacting Customer Support.

16.1.3 Database Information

The Database Information section lists the name of the database, its version, and expiration date for the currently used databases, and also contains the Database SYNC function. Standby databases are listed for databases not currently used, but available on the data card. Database conflicts will be shown in the Conflicts section.

***NOTE:** The data contained in the terrain and obstacle databases comes from government and private agencies. Garmin accurately processes and cross-validates the data, but cannot guarantee the accuracy and completeness of the data.*

The following databases are stored on Supplemental Data Cards provided by Garmin:

- **Terrain** – The terrain database contains terrain mapping data. It is updated periodically and has no expiration date. Approximately one minute is required to verify the rotorcraft terrain database on start up.
- **Obstacles** – The obstacles database contains data for obstacles, such as towers, that pose a potential hazard to aircraft. Obstacles 200 feet and higher are included in the obstacle database. The rotorcraft database includes all reported obstacles regardless of height. It is very important to note that not all obstacles are necessarily charted and therefore may not be contained in the obstacle database. This database is updated on a 56-day cycle. Obstacles will still be shown after the database has expired.

Several obstacle database options are available. Obstacle databases created for GTN software version 5.10 or later include all power lines or only HOT lines depending on the type of obstacle database installed. Hazardous Obstacle Transmission (HOT) Lines are those power lines that are co-located with other FAA-identified obstacles. The installed obstacle database type can be verified on the System Status page. Power line data is available for the contiguous United States as well as small parts of Canada and Mexico.

- **SafeTaxi** – The SafeTaxi database contains detailed airport diagrams for selected airports. These diagrams aid in following ground control instructions by accurately displaying the aircraft position on the map in relation to taxiways, ramps, runways, terminals, and services. This database is updated on a 56-day cycle. SafeTaxi will still be shown after it has expired.
- **FliteCharts** – The FliteCharts database contains procedure charts for the United States only. This database is updated on a 28-day cycle. If not updated within 180 days of the expiration date, FliteCharts no longer functions.
- **Basemap** - The Basemap database contains land and water data, such as roads, boundaries, rivers, and lakes.
- **Aviation** – The Navigation database is updated on a 28 day cycle. Navigation database updates are provided by Garmin and may be downloaded from the Garmin web site “http://fly.garmin.com” or from Jeppesen at "http://www.jeppdirect.com/Garmin" onto a Garmin provided Supplemental Datacard. Contact Garmin at http://fly.garmin.com for navigation database updates and update kits.
- **Charts** – The optional ChartView database is updated on a 14 day cycle. The ChartView database is provided directly from Jeppesen. Contact Jeppesen (www.jeppesen.com) for ChartView subscription and update information.

NOTE: *Do not use SafeTaxi or Chartview functions as the basis for ground maneuvering. SafeTaxi and Chartview functions do not comply with the requirements of AC 20-159 and are not qualified to be used as an airport moving map display (AMMD). SafeTaxi and Chartview are to be used by the flight crew to orient themselves on the airport surface to improve pilot situational awareness during ground operations.*

Database Name	Function	Where Stored	Update Cycle	Provider	Notes
Aviation	Airport, NAVAID, Waypoint, and Airspace information	Internal memory	28 days	fly.garmin.com	Updates installed via SD card and copied into internal memory. For helicopter applications an Aviation database that includes additional heliports is available.
SafeTaxi	Airport surface diagrams	Internal memory	56 days	fly.garmin.com	Updates installed via SD card and copied into internal memory
Terrain	Topographic map, Terrain/TAWS	SD card	As required	fly.garmin.com	Systems using HTAWS require a 2.5 arc-second database.
Obstacle	Obstacle information for map, and TAWS	Internal memory	56 days	fly.garmin.com	Updates installed via SD card and copied into internal memory. Databases that include HOT lines and power lines are available for use with GTN software version 5.10, or later. For helicopter applications, Obstacle databases that include additional low height obstacles and power lines are available.
Basemap	Boundary and road information	Internal Memory	As required	fly.garmin.com	Updates installed via SD card and copied into internal memory
FliteCharts	FAA-published terminal procedures	SD card	28 days	fly.garmin.com	Disables 180 days after expiration date.
ChartView	Jeppesen terminal procedures	SD card	14 days	Contact Jeppesen	Optional feature that requires Garmin dealer enablement. Disables 70 days after expiration date.

Table 16-1 Database List

16.1.3.1 Database Info

The Database Info page shows the Current databases, databases on Standby on the SD card for future use, and database conflicts. Current databases show all databases that are currently being used. Standby databases are loaded onto the card, but are not being used. Database conflicts are shown and can be resolved in the Conflicts tab.

16.1.3.2 Database Sync Operation

Database SYNC allows the GTN to synchronize databases from a single unit. The pilot only needs to update a single database card and the new databases are automatically SYNC'd through the units connected in the cockpit and configured for Database Syncing.

Database SYNC is supported by these database types:

- Navigation
- Obstacle
- SafeTaxi
- Airport Directory
- Chartview (when support is added by Jeppesen)
- FliteCharts
- Basemap

When Database SYNC is enabled in the LRUs and a database card is inserted that is created for Database SYNC, the GTN will coordinate with the other LRUs in the cockpit to determine which unit has the newest databases. Once the determination has occurred, the connected LRUs will begin to transfer the databases. This process may take several minutes. 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 (in this example: "Database SYNC - GTN #2"). If a database transfer is pending, completed, or not authorized, the status will also be indicated.

When the transfer is complete, if there are new and current databases to be used, and if the aircraft is stopped and has yet to takeoff, the pilot will be prompted with the option to restart the unit that has the new databases transferred to it. During the restart process, the unit will prompt you to update (transfer from the card to the unit's memory) to the newer databases so they can be used.

NOTE: *This feature is available in SW Versions 5.10, and later.*

NOTE: *When a database card is inserted into a GTN that does not support certain types of databases (charts in a GTN 6XX or an airport directory in any GTN), the GTN is still capable of SYNCing the database to other LRUs that do support that database.*

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.*

1. With the GTN turned off, insert the database card.
2. Turn the GTN on. The Database SYNC will occur automatically in the background. During the Database SYNC process, normal operation of the GTN is not affected.
3. On the System Status page, touch the **Standby** tab to view the transfer process.

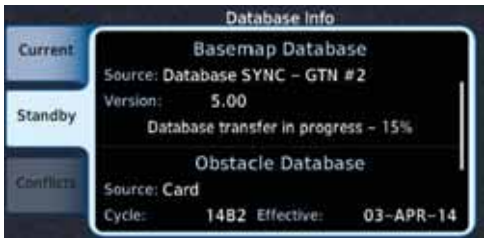


Figure 16-5 Database Transfer In Process

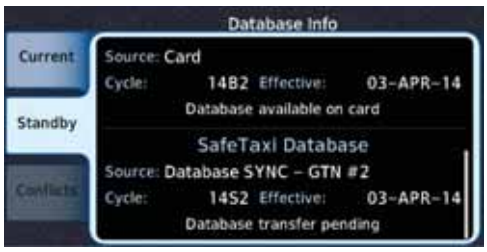


Figure 16-6 Database Pending

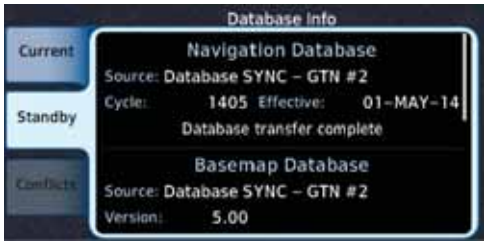


Figure 16-7 Database Transfer Complete

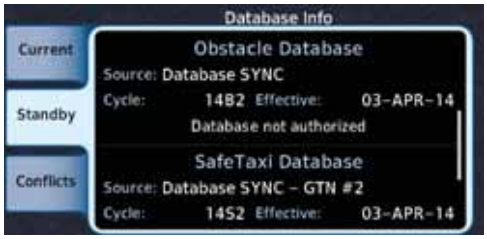


Figure 16-8 Database Transfer Not Authorized

4. Once all of the database transfers have completed, if the GTN determines that at least one of the newly transferred databases is effective and the aircraft is on the ground and stopped prior to a flight, a pop-up and confirmation will be presented to restart the GTN. No pop-up will appear if the aircraft is moving or has been in the air since the GTN was turned on.

Yes

5. Touch **Yes** to continue updating the database.

Figure 16-9 System Restart - Step 1

6. Touch **OK** to complete the restart process. Following the restart, the pilot will be prompted to update to the effective databases (just like when a new database card is inserted).

Figure 16-10 System Restart - Step 2

WARNING: *The unit will reset and all GPS navigation and moving map functions may be lost while the unit regains GPS position. Communication functions will be lost for a few seconds while the unit resets. Additionally, if the user selects to update databases at that point, the ability to interact with the GMA 35 audio panel, or change com frequencies will be lost until all databases are updated.*

7. When the unit restarts, the pilot will be prompted to update the GTN to the newly transferred databases.

16.1.3.3 Database Sync Setup

When the GTN installer option is turned on to allow Database SYNC, the pilot controls are available to turn Database SYNC on or off (Database SYNC is turned on by default).

To change the Database SYNC preference:

1. While viewing the System Status page, touch the **Menu** key and then touch the **Database SYNC** key to enable or disable the Database SYNC feature. Once the feature is enabled, Database SYNC will occur automatically when a card is inserted into the GTN.

Figure 16-11 Database Sync from System Status Menu

OK

2. Touch **OK** at the prompt to confirm the enabling of Database SYNC.

Figure 16-12 Prompt to Continue Database Transfer

16.1.3.4 Standby Databases

The GTN supports a standby copy of each database, allowing the pilot to pre-load the next cycle without losing the active cycle. The GTN will automatically treat any received database (via SD card or Database SYNC) as the standby database until it is activated by the pilot. The standby databases are listed on the System Status page.

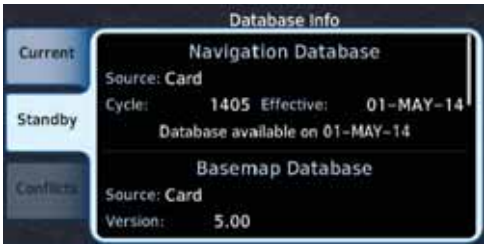


Figure 16-13 Database Standby Display

The GTN will use Database SYNC in the background to SYNC the standby database with other LRUs in the cockpit. As a result, when the standby database becomes effective, the pilot will be prompted on all LRUs to update to the new database.

If a the standby database is out of date or not yet effective, the pilot will not be prompted to update to that database until it becomes effective. This prevents the pilot from accidentally overwriting the effective, active database.

If the pilot does actually want to overwrite the active database with a not yet effective or out of date database, they can do so by pressing and holding the small right knob while applying power to the GTN.

16.1.3.5 Resolving Database Conflicts

If the GTN determines that there are multiple LRUs with the newest cycle of a database, but they have different regions or types of that database (i.e.; Fixed-wing vs. Rotorcraft navigation database, different regions of the navigation database, or different obstacle database types) then a database conflict will occur. When a database conflict occurs, that database will not be SYNC'd until the pilot resolves the conflict. Initiate the resolve conflicts function on the unit that has the databases to send to the other units.

Conflicts

1. Touch the **Conflicts** tab, and then touch **Resolve Conflicts** on the LRU with the desired databases.

Figure 16-14 Database Conflicts

OK

2. Touch **OK** at the prompt to continue conflict resolution.

Figure 16-15 Confirm Conflict Resolution

3. Once touched, the desired database will be SYNC'd to the other LRUs and "Initiated" will be displayed on the **Resolve Conflicts** field.

Figure 16-16 Database Conflicts Resolved (Initiated)

16.2 GPS Status

16.2.1 GPS Status Page

The GPS Status Page provides a visual reference of GPS receiver functions, including current satellite coverage, GPS receiver status, position accuracy, and displays your present position (in latitude and longitude) and altitude. The GPS Status Page also displays the current UTC time at the top right of the page.

The Satellite Status Page is helpful in troubleshooting weak (or missing) signal levels due to poor satellite coverage or installation problems. You may wish to refer to this page occasionally to monitor GPS receiver performance and establish a normal pattern for system operation. Should problems occur at a later date, you may find it helpful to have an established baseline from which to compare.

1. While viewing the System page, touch **GPS Status**.

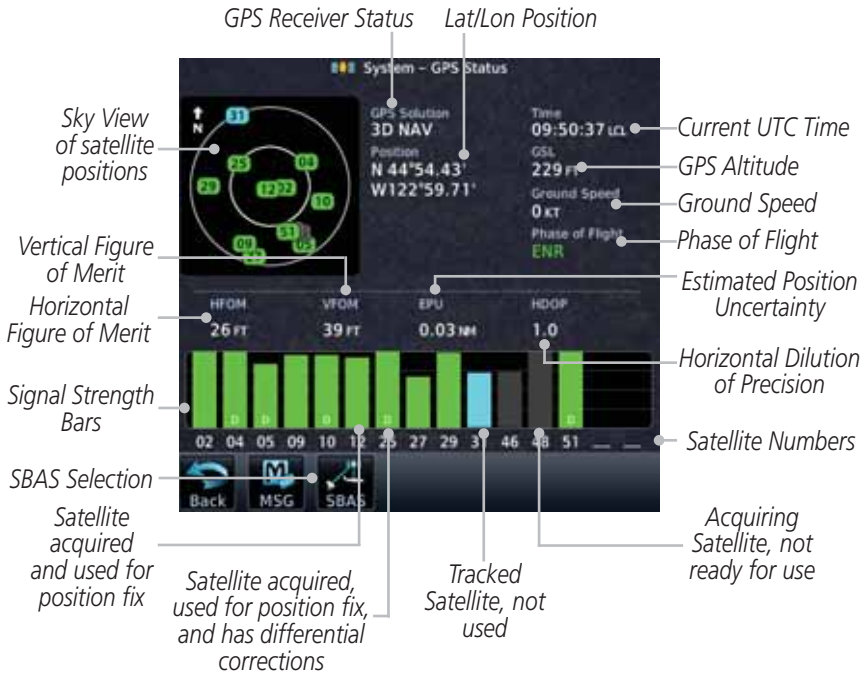


Figure 16-17 GPS Status Page

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 16-18 SBAS Provider List

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

As the GPS receiver locks onto satellites, a signal strength bar appears for each satellite in view, with the appropriate satellite number (01-32, SBAS satellites will have higher numbers) underneath each bar. The progress of satellite acquisition is shown in the following stages:

Graph Symbol	Description
No signal strength bars	The receiver is looking for the satellites indicated.
Grey signal strength bars	The receiver has found the satellite(s) and is collecting data.
Yellow signal strength bars	The receiver has collected the necessary data but the satellite is not being used in the position solution as it has been excluded.
Cross-hatch cyan signal strength bars	The receiver has found the satellite(s) but it has been excluded by the FDE program as a faulty satellite.
Solid cyan signal strength bars	The receiver has collected the necessary data, but is not using the satellite in the position solution.
Solid green signal strength bars	The receiver has collected the necessary data and the satellite is being used in the position solution.
D	The "D" character inside the bars indicates differential corrections (e.g. WAAS) are being used for that satellite.

Table 16-2 Signal Strength Bar Graph Description

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

The sky view display at the left of the page shows the satellites currently in view as well as their respective positions. The outer circle of the sky view represents the horizon (with north at the top of the circle); the inner circle represents 45° above the horizon and the center point shows the position directly overhead.

Each satellite has a 30-second data transmission that must be collected (hollow signal strength bar) before the satellite may be used for navigation (solid signal strength bar). Once the GPS receiver has determined your position, the GTN unit indicates your position, altitude, track and ground speed. The GPS receiver status field also displays the following messages under the appropriate conditions:

GPS Signal Message	Description
Acquiring	The GPS receiver is acquiring satellites for navigation. In this mode, the receiver uses satellite orbital data (collected continuously from the satellites) and last known position to determine the satellites that should be in view.
3D Nav	The GPS receiver is in 3D navigation mode and computes altitude using satellite data.
3D Diff Nav	The GPS receiver is in 3D navigation mode and differential corrections are being used.
LOI	The "LOI" (Loss Of Integrity) annunciator (bottom left corner of the screen) indicates that satellite coverage is insufficient to pass built-in integrity monitoring tests.

Table 16-3 GPS Signal Messages

The GPS Status Page also indicates the accuracy of the position fix, using Horizontal Figure of Merit (HFOM), Vertical Figure of Merit (VFOM), and Estimated Position Uncertainty (EPU). HFOM and VFOM represent the 95% confidence levels in horizontal and vertical accuracy. The lowest numbers are the best accuracy and the highest numbers are worse. EPU is the horizontal position error estimated by the Fault Detection and Exclusion (FDE) algorithm, in feet or meters.

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

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

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

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

16.2.2 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, and MSAS 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.

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 16-19 SBAS Selection Page

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

16.2.3 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 16-20 Circle of Uncertainty

16.3 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.

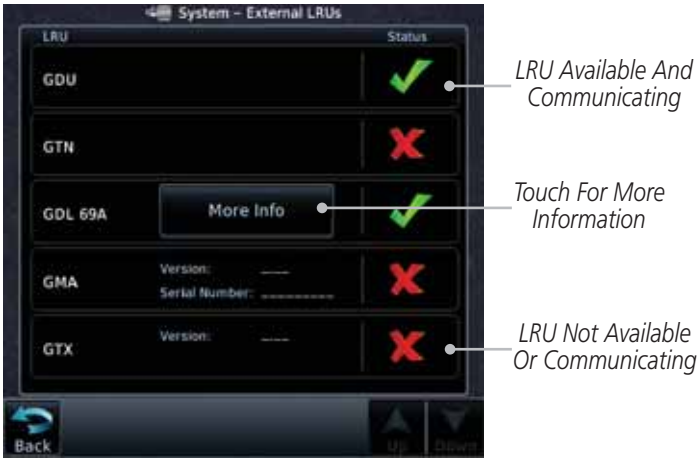


Figure 16-21 External LRU Page

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

16.3.1 GDL 69 (and GDL 69A) Status

The GDL 69 Status page displays the serial numbers for the Data Radio for the GDL 69/69A and the Audio Radio for the GDL 69A. Subscription status displays the level of service available for your particular subscription. The Weather Products section lists the products available for your particular subscription.

1. While viewing the External LRUs page, touch **More Info** for the GDL 69 LRU.

Figure 16-22 GDL 69/69A Status Page

2. Touch the **Menu** key to display the GDL 69 Status Menu.

Figure 16-23 GDL Status Menu

3. Touch the **Lock Activation** key if this is for the initial subscription or a change in the subscription. Touch the **OK** key to continue the operation.

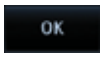


Figure 16-24 Lock Activation

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

16.3.2 GDL 88 Status

The GDL 88 Status page displays information about the status of the GDL 88.

Status	Description
On	Application is on/running. Required ownship input data is available and meets the performance criteria.
Available to Run	Application is configured. Required input data is available and meets the performance criteria. This state represents that the ASA Application is manually or automatically selected off.
Unavailable – Fault	Required Input data is not available due to a failure or the ASA Application process is failed.
Unavailable to Run	Required Input data is available but does not meet the performance criteria or is not available due to Non-Computed Data (NCD) conditions.

Table 16-4 Traffic Application Status

1. While viewing the External LRUs page, touch **More Info** for the GDL 88 LRU.

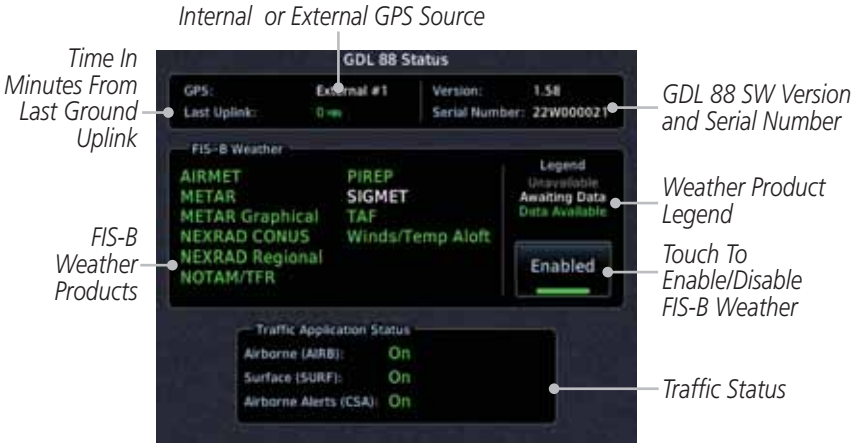


Figure 16-25 GDL 88 Status

2. Touch the **Enabled** key to toggle whether FIS-B Weather is enabled/disabled for use.

16.3.3 GSR 56 Status

The GSR 56 Status page displays information about the status of the GSR 56.

More Info

1. While viewing the External LRUs page, touch **More Info** for the GSR 56 LRU.

Figure 16-26 GSR 56 Status

Connext Registration

2. Touch the **Connext Registration** key to display the Connext Registration display.

Figure 16-27 Connext Registration Page

16.4 Setup

System Setup allows setting the time convention, Com channel spacing, crossfilling to a second GTN or GNS unit, and Nearest Airport search filtering.

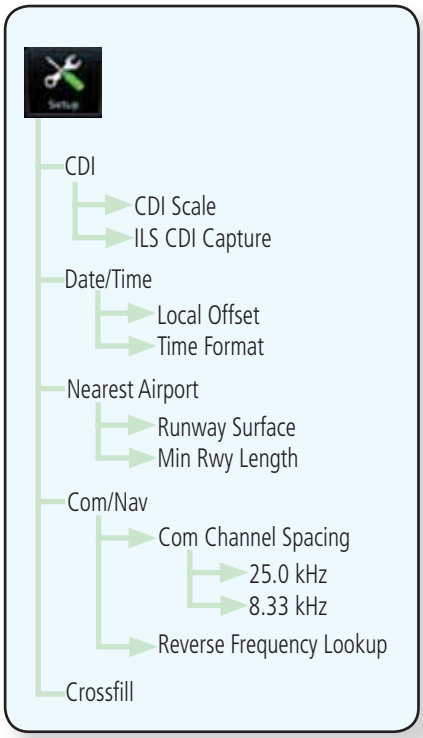


Figure 16-28 System Setup Functions

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

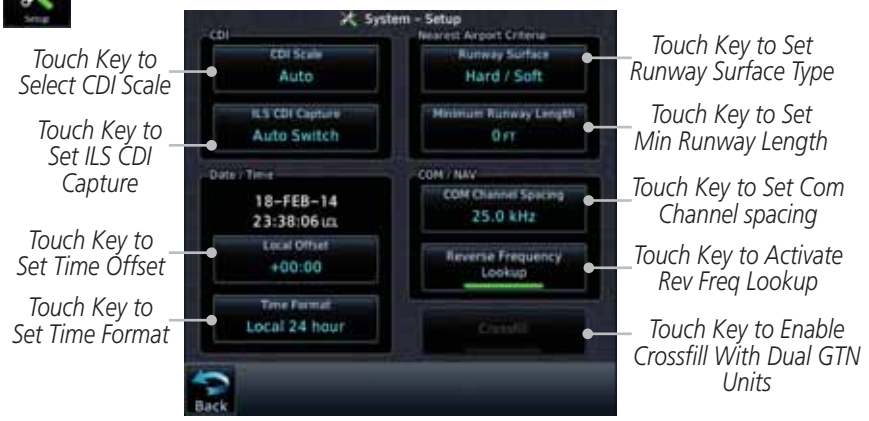


Figure 16-29 System Setup Page

2. After making the desired selections, touch the **Back** key to return to the Setup page.

16.4.1 Date/Time

The Date/Time setting provides selection of time format (local or UTC; 12- or 24-hour). UTC (also called "GMT" or "Zulu") date and time are calculated directly from the GPS satellites' signals and cannot be changed.

Figure 16-30 System Date and Time Setup

1. While viewing the System Setup page, touch **Local Offset** to set the time offset for local time.

2. Use the keypad to select the desired local offset and then touch **Enter**.

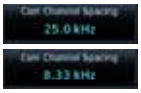
3. While viewing the System Setup page, touch the **Time Format** key to select local 12 hour, local 24 hour, or UTC time.

Figure 16-31 Select System Time Format

4. Touch the key for the desired time format.

16.4.2 Com Channel Spacing

Com transceiver channel spacing may be selected between 8.33 kHz and 25.0 kHz.



While viewing the System Setup page, touch **Channel Spacing** to toggle between 8.33 kHz and 25.0 kHz channel spacing.

16.4.3 Reverse Frequency Look-Up

The identifier and frequency type will be shown for the selected Com and Nav frequencies for the nearest stations that are in the database when the unit is receiving a valid position input. Station Identifiers with a "+" sign will have more stations associated with this frequency than just the type displayed.

1. While viewing the System Setup page, touch the **Reverse Frequency Lookup** key to toggle the function.

Figure 16-32 Reverse Frequency Lookup Selected

16.4.4 Nearest Airport Criteria

Nearest Airport Criteria defines the surface type and minimum runway length used when determining the 25 nearest airports to display on the Nearest Airport Page. A minimum runway length and/or surface type may be entered to prevent airports with small runways, or runways that do not have an appropriate surface, from being displayed. The default settings are "0 feet (or meters)" for runway length and "any" for runway surface type.

Figure 16-33 Select Nearest Airport Criteria

1. While viewing the System Setup page, touch **Runway Surface** to display the options. Touch the desired surface type.

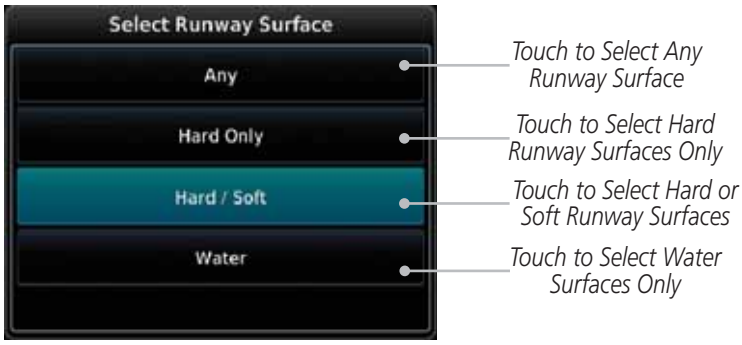


Figure 16-34 Nearest Airport Runway Surface Type

2. Touch **Minimum Runway Length** to display the keypad for selecting the minimum runway length. Select the desired minimum runway length with the numeric keypad. A selection of "0" will allow any length.

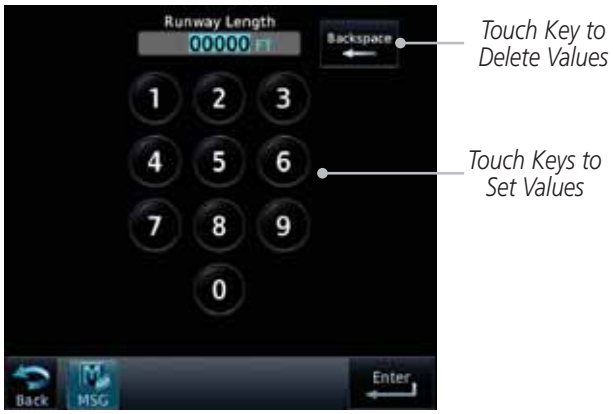


Figure 16-35 Nearest Airport Runway Length

3. After selecting the runway length, touch the **Enter** key to save the entered values or touch the **Back** key to return to the System Setup page without saving a value.

16.4.5 Crossfill

Dual units may be interfaced to crossfill information between the two units. This option will not be available unless dual units are configured.

When Crossfill is turned on with one GTN, it is automatically turned on in the other GTN. Some items are always crossfilled regardless of the crossfill setting; others are dependent on the crossfill setting.

The GTN can be can also be interfaced with the GNS 400W/500W units. The GTN can automatically send the Active Flight Plan and active Direct-To course to the GNS unit. The GTN User Waypoints can be manually sent to the GNS unit. The GNS unit can manually send its User Waypoints to the GTN unit.

Waypoint names longer than six characters, or duplicates, sent from the GTN unit to the GNS unit will replace some characters with a "+" sign, while leaving significant characters to aid in identification (such as, USR003 becomes US+003).

NOTE: *Upon crossfill being activated, the GTNs may take up to 10 seconds to crossfill the flight plans. The pilot must verify the flight plan in each unit prior to use. The GTN and GNS units must have databases with the same cycle.*

NOTE: *When GPS navigation is lost in either unit, crossfilling may not be available until GPS is restored in both units. Crossfilling will resume once the flightplan is changed on one of the units or crossfill is re-enabled.*

NOTE: *If two GTN 7XX units are crossfilled, then the same type (ChartView or FlightCharts) and version (cycle number and effective dates) for the chart database must be installed on both units in order for the correct chart to be overlaid on the main map page.*

16.4.5.1 GTN-to-GTN Crossfilling

This data is always crossfilled:

- User waypoints
- Flight plan catalog
- Alerts (traffic pop-up acknowledgement, missed approach waypoint pop-up acknowledgement, altitude leg pop-up acknowledgement)
- External sensors (transponder status and commands, synchro heading)
- System setup:
  - User-defined NAV frequencies to store favorites
  - Date/Time convention
  - Nearest airport criteria
  - Units (Nav angle, Distance/Speed, etc.)

- User-defined COM frequencies to store favorites
- CDI Scale setting
- ILS CDI Capture setting

NOTE: *There is an installer option to turn on a system message that will be provided anytime crossfill is turned off to alert the pilot that flight plans are not being crossfilled.*

This data is crossfilled only if crossfill is turned on by the pilot:

- Active navigation (flight plan)

1. While viewing the System Setup page, touch the **Crossfill** key to toggle between Enabled and Disabled Crossfill.

or

2. When Crossfill is about to be enabled, you will be prompted to note that data will be overwritten in the other unit. Touch **OK** to enable Crossfill or touch **Cancel** to return to the System Setup page without enabling Crossfill.

Figure 16-36 Confirming Crossfill Selection

16.4.5.2 GTN-GNS Crossfilling

- GTN to GNS – Active flight plans, active direct-to, User waypoints
- GNS to GTN – User waypoints

1. While viewing the System Setup page, touch the **GNS Crossfill Settings** key to reach the GNS Crossfill settings.

Figure 16-37 GTN-GNS Crossfill Selection

NOTE: *When the active flight plan on the GTN contains legs or features that are not supported by the GNS, those legs will not be crossfilled and will not be present in the active flight plan on the GNS.*

2. Touch **Auto GNS Crossfill** to enable Crossfill and send the Active Flight Plans and the active Direct-To course to the GNS unit.
3. Touch the Transfer User Waypoints key to transfer the User Waypoints from the GTN unit to the connected GNS unit.

Figure 16-38 GTN-GNS Crossfill

16.4.6 CDI Scale Selection

The CDI source and ILS CDI Capture type may be selected manually or automatically. The selected CDI Scale will be reflected in the annunciation bar at the bottom of the display.

CDI Scale Selection allows you to define the scale for the course deviation indicator (both on the GTN unit's on-screen CDI and the external CDI). The scale values represent full scale deflection for the CDI to either side. The default setting is "Auto". At this setting, the CDI scale is set to 2.0 NM during the "en route" phase of flight. Within 31 NM (terminal area) of your destination airport, the CDI scale linearly ramps down to 1.0 NM over a distance of 1 NM. Likewise, when leaving your departure airport the CDI scale is set to 1.0 NM and gradually ramps up to 2 NM beyond 30 NM (from the departure airport). During GPS approach operations the CDI scale gradually transitions down to an angular CDI scale. At 2.0 NM before the final approach fix (FAF), CDI scaling is tightened from 1.0 NM to the angular full scale deflection (typically the angular full-scale deflection is 2.0°, but will be as defined for the approach).

If a lower CDI scale setting is selected (i.e., 1.0 or 0.3 NM), the higher scale settings are not selected during ANY phase of flight. For example, if 1.0 NM is selected, the GTN unit uses this for en route and terminal phases and ramps down further during an approach. Note that the Horizontal Alarm (HAL) protection

limits listed below follow the selected CDI scale, unless corresponding flight phases call for lower HAL. For example, if the 1.0 NM CDI setting is selected, full-scale deflection during approach will still follow the approach CDI scale settings.

CDI Scale	Horizontal Alarm Limit
Auto (oceanic)	2.0 NM
±2.0 NM or Auto (en route)	2.0 NM
±1.0 NM or Auto (terminal)	1.0 NM
±0.3 NM or Auto (approach)	0.3 NM

Table 16-5 CDI Scale and Horizontal Alarm Limits

An "auto" ILS CDI selection allows the GTN unit to automatically switch the external CDI from the GPS receiver to the VLOC receiver, when intercepting the final approach course. Or, select "manual" to manually switch the external CDI connection, as needed (using the **CDI** key). If the unit is installed with a KAP140/KFC225 autopilot, automatic switching will not take place.

Figure 16-39 CDI Selection

1. While viewing the System Setup page, touch the **CDI Scale** key to allow automatic selection or to choose a CDI Scale manually.

Figure 16-40 CDI Scale Selection

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

16.5 Alerts Settings

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

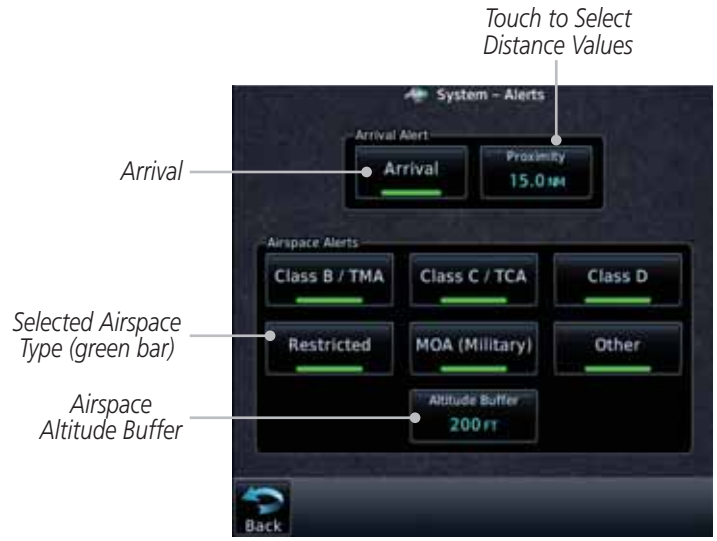


Figure 16-41 Alerts Setup Page

1. While viewing the System page, touch the **Alerts** key.

2. Touch the **Arrival** key to toggle activation. A green bar will appear when it is active.

3. Touch the **Proximity** key to set the Proximity distance values. A numeric keypad will appear. Select the desired values and then touch **Enter**.

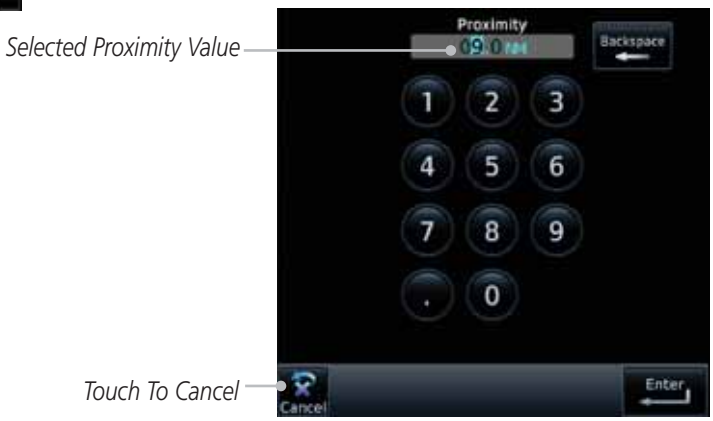


Figure 16-42 Airspace Alert Proximity Selection

4. Touch the **Altitude Buffer** key to set the buffer altitude value. A numeric keypad will appear. Select the desired value and then touch **Enter**.

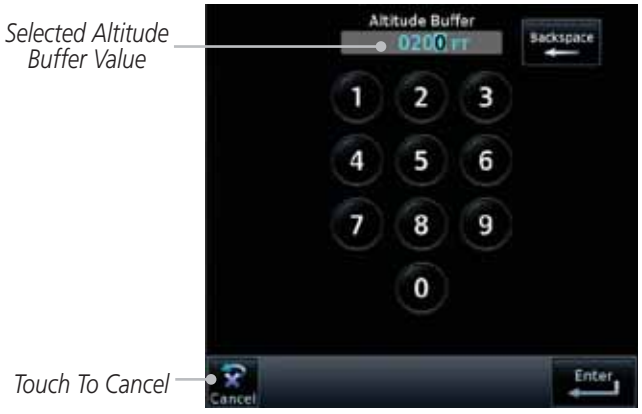


Figure 16-43 Airspace Alert Altitude Buffer Selection

5. Touch the Airspace type keys to toggle activation. A green bar will appear when it is active.

NOTE: *The Airspace Alert setting does not alter the depiction of airspace, or change the Smart Airspace setting for the main map page.*

NOTE: *Airspace alerts for Prohibited airspace cannot be disabled.*

16.6 Units Settings

The Units Setup page allows you to select the conventions for the various units that are displayed.

Units Type	Units Values
Altitude/Vertical Speed	Feet(FT/FPM), Meters (M/MPS)
Distance/Speed	Nautical Miles (NM/KT), Kilometers (KM/KPH), Statue Miles (SM/MPH)
Fuel	Gallons (GAL), Imperial Gallons (IG), Kilograms (KG), Liters (LT), or Pounds (LB)
Nav Angle	Magnetic (°), True (°T), User (°u)
Magnetic Variation	Enter numeric value, E or W
Position Format	LAT/LON, MGRS, UTM
Pressure	Inches of Mercury (IN), Hectopascals (HPA), Millibars (MB)
Temperature	Celsius (°C) or Fahrenheit (°F)

Table 16-6 System Units Setup

16.6.1 Setup Units

Use these settings to set the units for values displayed in the unit operation.

1. While viewing the System page, touch the **Units** key.

Figure 16-44 System Units Page

2. Touch the key for the desired units. A window with a list of unit values will appear. Touch the desired value on the list.

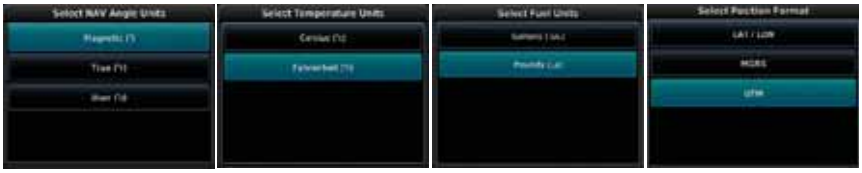


Figure 16-45 Setup Units Selection Windows

3. After making the desired selections, touch the **Back** key to return to the Setup page.

16.6.2 Setting a User-Configured (Manual) Nav Angle

There are three variation (heading) options: Magnetic, True, and User. If "Magnetic" is selected, all track, course and heading information is corrected to the magnetic variation computed by the GPS receiver. The "True" setting references all information to true north. The "User" selection allows the pilot to enter values between 0º and 179º E or W.

NOTE: *When changing the Nav angle, the DTK on the Flight Plan page for an approach does not change until that approach is reloaded.*

1. While viewing the System page, touch **Units** key.
2. Touch the **Nav Angle** key and then the **User** key.

Figure 16-46 Nav Angle Selections

3. After User is selected, touch the **Magnetic Variation** key to set the value.

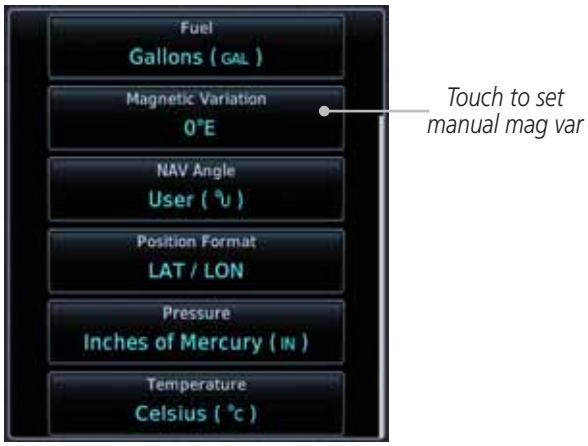


Figure 16-47 Magnetic Variation is Available for Editing

4. Touch the keys on the numeric keypad to set the Magnetic Variation and then touch **Enter**.

Figure 16-48 Numeric Keypad for Setting Manual Magnetic Variation

5. The User Nav Angle value will be used for all angular values. Remember to change the value when traveling to an area requiring another value.

Figure 16-49 User (Manual) Magnetic Variation

16.6.3 Position Format Selection

There are three Position Formats available: Lat/Lon, the Military Grid Reference System (MGRS), and the Universal Transverse Mercator (UTM) grid system. The format selected will be shown in all locations where position information is shown.

NOTE: *The Position Format Selection function is available in SW Versions 4.10, and later.*

Figure 16-50 MGRS Position Format Shown On Waypoint Info Page

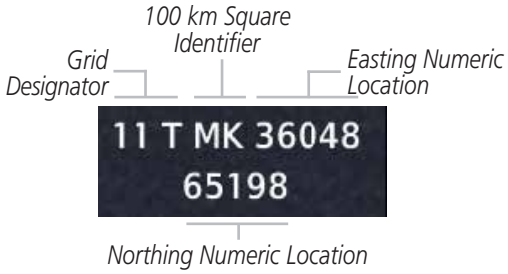


Figure 16-51 MGRS Position Format Detail

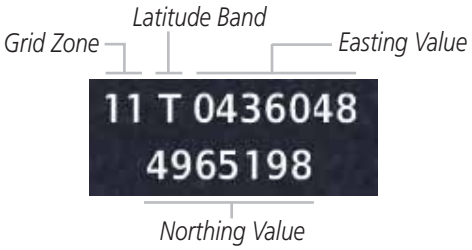


Figure 16-52 UTM Position Format Detail

1. While viewing the System page, touch **Units** key.
2. Touch the **Position Format** key.

Figure 16-53 Position Format Selection

3. Touch the desired Position format.

16.7 User Fields

The User Fields selection allows you to configure the data field type shown at the top of the display in the center fields when they are not occupied by controls for an audio panel or transponder. The data shown in each field may be selected from a list after touching the desired field.

NOTE: *Data Field Types that use the term "Destination" refer to the final destination in the flight plan.*

NOTE: *ETE to Destination is not available when a procedure is loaded and there are waypoints in the Enroute section of the flight plan.*

1. While viewing the System page, touch the **User Fields** key, then touch an available field in the top of the display.

Figure 16-54 User Fields Selection

2. Touch the **Data**, **Function**, or **Page** tab to display a list of available selections. A list of information types will be displayed.

3. 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.

Figure 16-55 Map Data Field Type Selections

The options available are shown in the following tables. Selections available vary depending on installed equipment.

Data Field Type	
ACTV WPT - Active Waypoint	MSA - Minimum Safe Altitude
B/D APT - BRG/DIS from Dest APT [1]	OAT (static) - Static Air Temperature
BRG - Bearing to Current Waypoint	OAT (total) - Total Air Temperature
DIS - Distance to Current Waypoint	RAD ALT - Radar Altimeter
DIS to Dest - Distance to Destination [2]	Time - Current Time
DTK - Desired Track	Time to TOD - Time to Top of Descent
ESA - Enroute Safe Altitude	TKE - Track Angle Error
ETA - Estimated Time of Arrival	TRK - Track
ETA at Dest - ETA at Destination	Trip Timer - Timer Display
ETE - Estimated Time Enroute	VOR/LOC - Tuned VOR/LOC Info
ETE to Dest - ETE to Destination	VSR - Vertical Speed Required
Fuel Flow - Total Fuel Flow	Wind - Wind Speed and Direction
GS - GPS Ground Speed	XTK - Cross Track Error
GSL - GPS Altitude	OFF - Do Not Display Data Field
Generic Timer - Timer Display	

Table 16-7 Data User Field Selections

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

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

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

Table 16-8 Function User Field Selections

Note 1: With TAWS-A enabled.

Note 2: With HTAWS enabled.

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

Table 16-9 Page User Field Selections

16.8 Audio

The Audio Settings allows the adjustment of the volume the click sound when controls are touched.

1. While viewing the System page, touch **Audio** key.

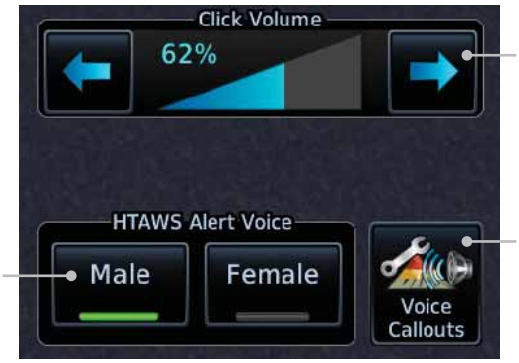


Figure 16-56 System Audio Selection

2. Touch the Arrow keys to adjust the Key Click Volume.

3. Touch the **Male** or **Female** key to select the audio voice type.

4. When HTAWS is installed, a Voice Call Outs option may be available. Touch the **Voice Callouts** key to select the Max Voice Call Out value.

NOTE: *VCOs are available down to 100 feet above terrain when HTAWS is installed and use GSL above terrain to generate callouts (no radar altimeter required). If a radar altimeter is interfaced to the GTN, alerts are available down to 50 feet and the height above terrain from the radar altimeter is used to generate the callouts.*

5. Touch the **MAX Voice Callout** key to select the value.

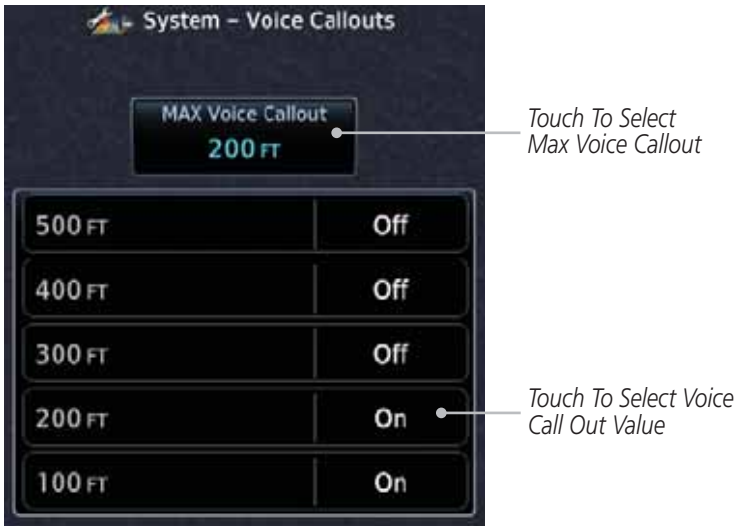


Figure 16-57 Select Voice Call Out Value

6. Touch **Back** when complete.

16.9 Backlight Settings

The backlighting of the display and bezel keys can be adjusted automatically or manually. The default setting (automatic backlighting adjustment) uses photocell technology to automatically adjust for ambient lighting conditions. Photocell calibration curves are pre-configured to optimize display appearance through a broad range of cockpit lighting conditions. A manual offset creates a deviation form the normal curve. Manual adjustments may be made from +100% to -10%. The negative adjustment is limited to prevent the backlight from being accidently decreasing the backlight to the point where the display of information could not be seen.

The backlight offset function is not available when a dimmer input is active. The GTN is capable of accepting lighting inputs from the built-in photocell, aircraft dimmer bus, or both. If the lighting is not satisfactory, contact the installer to adjust the curves.

Manual backlighting adjustment can be accomplished using the existing instrument panel dimmer bus or the following procedures.

1. While viewing the System page, touch the **Backlight** key.

2. Touch the **Arrow** keys to adjust the Backlight level.

Figure 16-58 Backlight Level Selection

3. After making the desired selections, touch the **Back** key to return to the System page.

16.10 Connext Setup - GSR 56

This page provides information about the GSR 56 and the Connext Registration page. See section *16.3.3 GSR 56 Status* for more details.

1. While viewing the System page, touch **Connext Setup** to access the GSR 56 LRU Status page.

2. Touch **Connext Registration** to set up the Connext account. Follow the information provided in *16.3.3 GSR 56 Status*.

16.11 Connext Setup - Flight Stream 210

The GTN can interface with the Flight Stream 210 Bluetooth transceiver. Using the Flight Stream 210 and the GTN, flight plans can be sent and received over Bluetooth. In addition, GPS position is provided from the GTN and attitude can be forwarded from a connected GDU. The GTN can also configure the Flight Stream's Bluetooth.

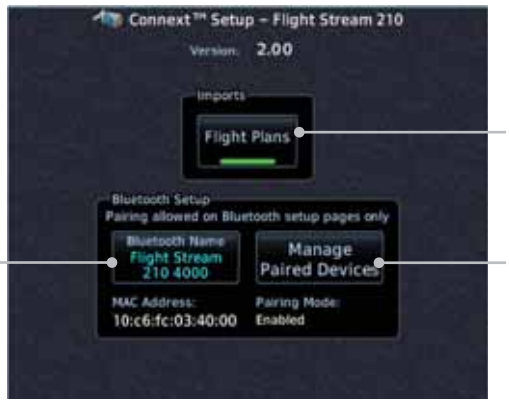


Figure 16-59 Connext Setup for Flight Stream 210

NOTE: *Turning Flight Plan imports off will remove the ability of the GTN to receive flight plans from the Flight Stream 210. This could be used if there are repeated erroneous attempts by a portable device application to send flight plans to the GTN.*

16.11.1 Operation

Data output from the GTN and Flight Stream 210 occurs automatically and requires no pilot action (such as, flight plan, GPS position, and attitude). Additionally, ADS-B traffic and weather can be output from the Flight Stream when connected to a GDL 88 and XM WX and SiriusXM satellite radio information can output when connected a GDL 69.

From the Connext Setup page, the pilot can enable/disable flight plan importing, change the Flight Stream Bluetooth name, and manage paired devices.

The device status indicates if the portable device is connected and communicating with the Flight Stream. The "Auto-Reconnect" setting determines if the Flight Stream will automatically connect to up to four devices when in range. When this setting is disabled, the pilot must initiate the connection from the device. Removing a device from this page by pressing "Remove" will require the device to be paired again before transferring data.

NOTE: *If the pairing is removed from either device (portable device or GTN) it must be removed on the other device before a new pairing to that same device is established again. Essentially, pairing must be removed on both devices before repairing.*

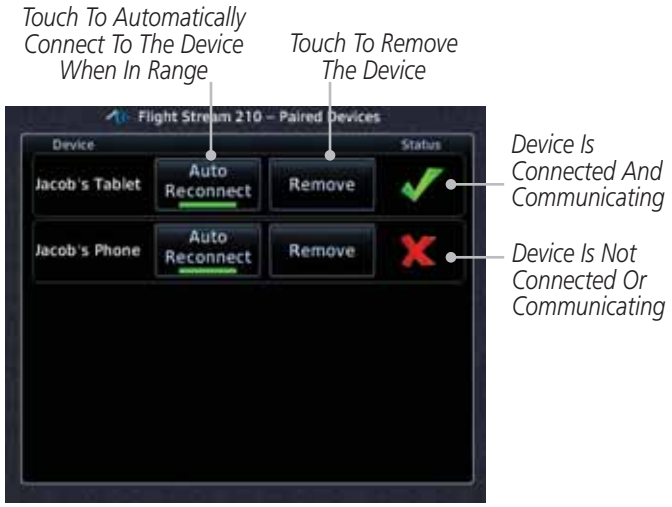


Figure 16-60 Managing Paired Devices

16.11.2 Pairing a Device

New devices can only be paired with the Flight Stream when it is in "Pairing Mode". The Flight Stream will be in pairing mode when the GTN is navigated to the Connext Setup page and/or the Manage Paired Devices page. The pairing must be initiated by the portable device. Pop-ups displayed on the portable device and GTN will be displayed to confirm the pairing.

Figure 16-61 Confirm Pairing With A New Device

Selecting "Manage Paired Devices" opens a page that lists all of devices paired to the Flight Stream 210.

16.12 Connext Setup – GMA 35c

NOTE: *This feature is available in software version 6.00 or later.*

The GTN can interface with the GMA 35c Bluetooth audio panel. Using the GMA 35c and the GTN, audio or telephone calls from a portable device can be streamed over Bluetooth to the GMA. The GTN can also configure the Bluetooth functions of the GMA 35c.

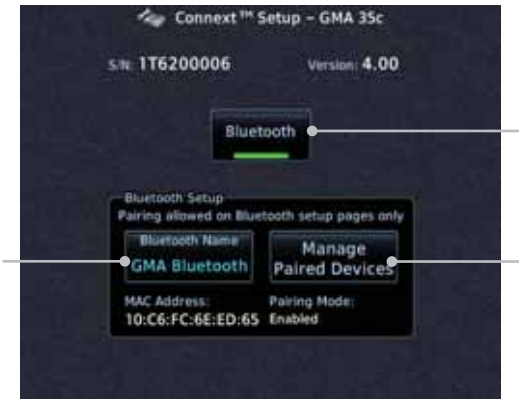


Figure 16-62 Connext Setup for GMA 35c

From the Connext Setup page, the pilot can enable/disable Bluetooth, change the GMA 35c Bluetooth name, and manage paired devices. On the Paired Devices page, the device status indicates if the portable device is connected and communicating with the GMA 35c. Only one portable device can be connected to the GMA 35c at a time. To connect a different device when one is already connected, the existing connection must be ended by removing the portable device pairing from the GMA 35c or by disconnecting or disabling Bluetooth on the portable device. Removing a device from this page by pressing "Remove" will require the device to be paired again before streaming audio.

NOTE: *If the pairing is removed from either device (portable device or GMA) it must be removed on the other device before a new pairing to that same device is established again. Essentially, pairing must be removed on both devices before repairing.*

New devices can only be paired with the GMA 35c when it is in "Pairing Mode". The GMA will be in pairing mode when on the Connext Setup page or the Manage Paired Devices page. The pairing must be initiated by the portable device. A pop-up will be displayed on the portable device to confirm the pairing.

16.13 Voice Command

NOTE: *This feature is available in software version 6.00, or later.*

The Voice Command page allows controlling the voice command function and viewing the voice command status and recent commands. Voice Commands are only available when connected to a compatible Garmin audio panel and when enabled by the installer.

Figure 16-63 Voice Command Setup

1. While viewing the System page, touch the **Voice Commands** key.

2. Touch the **Voice Commands** key to toggle activation. A green bar will appear when Voice commands are active.

3. Touch the **Command History** key to open a list of recently spoken commands.

Figure 16-64 Voice Command History

17 MESSAGES

When a Message has been issued by the unit, the Message (**MSG**) key/annunciator in the lower left of the display will blink. Touch the **MSG** key to view the messages. After viewing the messages, touch the **Back** key to return to the previously viewed page. The Messages provide an aid to troubleshooting system operation.

System messages are not crossfilled between GTN units. Each GTN will display messages based on data received by that unit. This may result in duplication of messages between units, however the pilot should view messages on both GTN units when more than one is installed to ensure all messages are received.

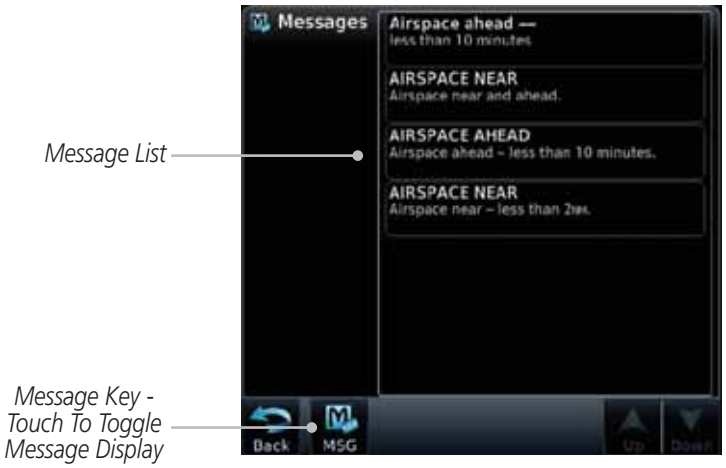


Figure 17-1 Message Display

Message	Description	Action
ABORT APPROACH - GPS approach no longer available.	This message is triggered outside the MAP if the GTN system can no longer provide approach level of service. Vertical guidance will be removed from the external CDI/HSI display.	Initiate a climb to the MSA or other published safe altitude, abort the approach, and execute a non-GPS based approach.
AIRSPACE ALERT - Inside airspace.	The aircraft inside an airspace type for which alerts are configured.	No action is necessary; message is informational only.
AIRSPACE ALERT - Airspace within 2 nm and entry in less than 10 minutes.	The aircraft is within 2 nm and predicted to enter an airspace type, within 10 minutes, for which alerts are configured.	No action is necessary; message is informational only.
AIRSPACE ALERT - Airspace entry in less than 10 minutes.	The aircraft is predicted to enter an airspace type, within 10 minutes, for which alerts are configured.	No action is necessary; message is informational only.
AIRSPACE ALERT - Within 2 nm of airspace.	The aircraft is within 2nm of an airspace type for which alerts are configured.	No action is necessary; message is informational only.
APR GUIDANCE AVAILABLE - Press "Enable APR Output" before selecting APR on autopilot.	The GTN is configured for KAP140/KFC225 autopilot, and approach guidance is now available.	Press the "Enable APR Output" key on the GTN, this will cause the autopilot to go into ROL mode. Engage the autopilot into approach mode. See section 6.14 for additional information.

Message	Description	Action
APPROACH DOWNGRADE - Approach downgraded. Use LNAV minima.	Approach has been downgraded from LPV or LNAV/VNAV, to an LNAV approach. Vertical guidance will be removed from the external CDI/HSI display.	Continue to fly the approach using published LNAV minimums.
APPROACH NOT ACTIVE - Do not continue GPS approach.	GPS approach could not transition to active (e.g., the GTN is on an approach and did not have the required HPL/VPL to get into at least LNAV, so is still in TERM).	Abort the approach, and execute a non-GPS based approach.
AUDIO PANEL - Audio panel needs service.	The GMA 35 is reporting to the GTN that it needs service. The audio panel may continue to function.	Contact dealer for service.
AUDIO PANEL - Audio panel is inoperative or connection to GTN is lost.	The GTN is configured for Garmin audio panel control (GMA 35) and the GTN cannot communicate with the GMA 35. No control of the GMA 35 will be possible.	Remove power from the GMA 35 audio panel by pulling the circuit breaker labeled "Audio." The pilot will be able to communicate with the Com 2 radio. Contact dealer for service.
CDI SOURCE - Select appropriate CDI source for approach.	Aircraft is on a GPS approach but CDI is set to VLOC, or aircraft is on VLOC approach and CDI is set to GPS *and* aircraft is less than 2 nm from the FAF.	Select the appropriate CDI source for approach.

Message	Description	Action
CDI/HSI FLAG - Main lateral/ vertical flag on CDI/HSI is inoperative.	The Main Lateral Superflag or Main Vertical Superflag output has been turned off due to an over-current condition.	Verify course guidance is valid and correct by crosschecking with the GTN on-screen CDI and other navigational equipment. Contact dealer for service.
COM RADIO - Com radio needs service.	The com radio is reporting that it needs service. The com radio may continue to function.	Cycle the power to the COM radio. Contact dealer for service.
COM RADIO - Com radio may be inoperative.	The com radio is not communicating properly with the system.	Press and hold the volume knob or the external com remote transfer (COM RMT XFR) switch, if installed – this will force the com radio to 121.5 MHz. Contact dealer for service.
COM RADIO - Com overtemp or undervoltage. Reducing transmitter power.	Com radio is in overtemp or undervoltage mode and transmitting power has been reduced to prevent damage to the com radio. Radio range will be reduced.	Decrease length of com transmissions, decrease cabin temperature and increase cabin airflow (especially near the GTN). Check aircraft voltage and reduce electrical load as necessary. Contact dealer for service if this message persists.
COM RADIO - Com locked to 121.5 MHz. Hold remote com transfer key to exit.	Com radio is locked to 121.5 MHz.	The external com remote transfer (COM RMT XFR) switch has been held and the com radio is tuned to 121.5. To exit this mode, hold the com remote transfer (COM RMT XFR) switch for two seconds.

Message	Description	Action
CONFIGURATION - Terrain/TAWS configuration is invalid. GTN needs service.	TAWS is inoperative due to a configuration problem with the GTN. This message will be accompanied by a TER FAIL annunciation.	Contact dealer for service.
CONFIGURATION MODULE - GTN configuration module needs service.	The GTN cannot communicate with its configuration module. The GTN may still have a valid configuration.	Contact dealer for service.
COOLING - GTN overtemp. Reducing backlight brightness.	Backlight brightness has been reduced due to high display temperatures. The backlight level will remain high enough to be visible in daylight conditions.	Decrease cabin temperature and increase cabin airflow (especially near the GTN). Contact dealer for service if this message persists.
COOLING FAN - The cooling fan has failed.	The GTN cooling fan is powered, but it is not turning at the desired RPM.	Decrease cabin temperature and increase cabin airflow (especially near the GTN) to prevent damage to the unit. Contact dealer for service.
CROSSFILL ERROR - Crossfill is inoperative. See CRG for crossfilled items.	Crossfill is not working due to loss of communication with other GTN or due to one GTN needing service.	See section 16.4.1.4 for a list of crossfilled items that will no longer be crossfilled. Contact dealer for service.

Message	Description	Action
CROSSFILL ERROR - GTN software mismatch. See CRG for crossfilled items.	Crossfill is configured "on" but is not working due to software mismatch.	See section 16.4.1.4 for a list of crossfilled items that will no longer be crossfilled. Contact dealer to have software versions updated.
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 STATUS - Crossfill is turned off.	Crossfill is turned off.	No action.
DATABASE - Chart function unavailable.	The GTN is configured for ChartView or FliteCharts and chart verification has failed.	Contact dealer for service.
DATABASE - Chart database valid until [DATE].	The GTN is configured for ChartView or FliteCharts and the chart database has or is about to expire.	Verify chart database expiration date on the System – System Status page. Update chart database if necessary for operations.
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.

Message	Description	Action
DATABASE - Verify user-modified procedures in stored flight plans are correct.	A stored flight plan contains procedures that have been manually updated, and a navigation database update has occurred.	Verify that the user-modified procedures in stored flight plans are correct.
DATABASE - Verify airways in stored flight plans are correct.	A stored flight plan contains an airway that is no longer consistent with the current navigation database.	Verify that the airways in stored flight plans are correct. Modify stored flight plans as necessary to include the current airways by re-loading those airways to the stored flight plan routes.
DATABASE - Terrain or Obstacle database not available.	The terrain or obstacle database is missing or corrupt.	Re-load these databases on the external data card.
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 data card.
DATACARD ERROR - SD card is invalid or failed.	External data card has an error and the unit is not able to read the databases.	ChartView, FlightCharts, and Terrain databases will not be accessible by the unit. Contact dealer for service.
DATACARD REMOVED - Reinsert SD card.	External data card was removed.	Reinsert data card.
DATALINK - ADS-B fault: UAT receiver.	The GDL 88 has detected a UAT receiver fault.	Contact dealer for service.
DATALINK - ADS-B fault: 1090 receiver.	The GDL 88 has detected a 1090 receiver fault.	Contact dealer for service.

Message	Description	Action
DATALINK - GDL 69 is inoperative or connection to GTN is lost.	The GTN is configured for a Garmin datalink (GDL 69 or 69A) and the GTN cannot communicate with the datalink. Data from the datalink will not be available.	Contact dealer for service.
DATALINK - GDL 88 ADS-B failure. Unable to transmit ADS-B messages.	GDL 88 is not able to transmit an ADS-B message due to a failure with the GDL 88 system or antenna(s).	Contact dealer for service.
DATALINK - GDL 88 ADS-B fault.	The GDL 88 has detected a fault with one of the GDL 88 UAT/1090 antennas.	Contact dealer for service.
DATALINK - GDL88 ADS-B fault. Pressure altitude input is invalid.	The GDL 88 has lost communication with the pressure altitude source.	Contact dealer for service.
DATALINK - GDL88 ADS-B is not transmitting position. Check GPS devices.	The GDL 88 has detected a position input fault.	Contact dealer for service.
DATALINK - GDL88 ADS-B traffic has failed.	GDL 88 may have lost GPS position. The GDL 88 has detected an internal failure.	Contact dealer for service.

Message	Description	Action
DATALINK - GDL88 configuration module needs service.	The GDL 88 has detected a configuration module fault.	Contact dealer for service.
DATALINK - GDL88 control input fault. Check transponder is in correct mode.	The GDL 88 has lost communication with the transponder.	Contact dealer for service.
DATALINK - GDL88 CSA failure.	The GDL 88 is reporting to the GTN that the CSA application has failed. Traffic alerting on ADS-B traffic is unavailable.	Ensure the aircraft has a clear view of the sky. If the problem persists. Contact dealer for service.
DATALINK - GDL88 external traffic system has a low battery.	The GDL 88 is reporting that the external traffic system has a low battery.	Contact dealer for service.
DATALINK - GDL 88 external traffic system has been in standby for more than 60 seconds.	The aircraft is airborne and the GDL 88 is reporting that the external traffic system has been in standby for more than 60 seconds.	Set the TAS/TCAS/TCAD traffic device to "operate" on the traffic page if traffic alerts are desired.
DATALINK - GDL88 external traffic system inoperative or connection lost.	The GDL 88 has detected a TAS/TCAS input fault.	Contact dealer for service.

Message	Description	Action
DATALINK - GDL 88 is inoperative or connection to GTN is lost.	The GTN is configured for a Garmin datalink (GDL 88) and the GTN cannot communicate with the datalink. Data from the datalink will not be available.	Contact dealer for service.
DATALINK - GDL88 needs service.	GDL 88 has detected an internal fault.	Contact dealer for service.
DATALINK - GSR56 is inoperative or connection to GTN is lost.	The GTN is configured for a Garmin GSR 56 and the GTN cannot communicate with the GSR 56. GSR Weather, Position Reporting, and Phone Services will be unavailable.	Close the GSR 56 circuit breaker and ensure the GSR 56 is receiving power. Contact dealer for service.
DATALINK - GSR56 data services inoperative; registration required.	The GSR 56 is not registered. GSR Weather, Position Reporting, and Phone Services will be unavailable.	Contact dealer for service.
DATA LOST - Pilot stored data was lost. Recheck settings.	User settings such as map detail level, nav range ring on/off, traffic overlay on/off, and alert settings have been lost.	Recheck settings.
DATA SOURCE - Pressure altitude source inoperative or connection to GTN lost.	The GTN is configured to receive pressure altitude but is not receiving it from any source.	If the GTN is being used to forward pressure altitude to a transponder, the transponder will not be receiving pressure altitude from the GTN while that message is present. Contact dealer for service.

Message	Description	Action
DATA SOURCE - Heading source inoperative or connection to GTN lost.	The GTN is configured to receive heading information but is not receiving it from any source.	Heading up map displays will not be available. Contact dealer for service.
DATA SOURCE - Radar Altimeter source inoperative or connection to GTN lost.	The GTN is configured to receive radio altitude information but is not receiving it from any source.	50 foot aural annunciation is unavailable for HTAWS installations. Contact dealer for service.
DEMO MODE - Demo mode is active. Do not use for navigation.	The GTN is in Demo Mode and must not be used for actual navigation.	Do not use for navigation. Power cycle the GTN to exit demo mode. Also ensure that the Direct-To key is not stuck.
FLIGHT PLAN IMPORT - Flight plan import failed. Catalog is full.	The flight plan catalog is full and the requested flight plan could not be imported.	Edit the flight plan catalog to remove unneeded flight plans.
FLIGHT PLAN IMPORT - Flight plan import failed.	The requested flight plan could not be imported because the GTN was unable to decode the contents of the flight plan.	Check for proper operation of the needed components. If the problem persists. Contact dealer for service.
FLIGHT PLAN IMPORT - New imported flight plan(s) available for preview.	The GTN has received a new flight plan that is available for preview by the pilot.	No action is necessary; message is informational only.

Message	Description	Action
FPL WAYPOINT LOCKED - Stored flight plan waypoint is not in current navigation database.	A stored flight plan waypoint is no longer in the current navigation database.	Verify stored cataloged flight plans and procedures. Modify stored flight plans as necessary to include waypoints that are in the current navigation database.
FPL WPT MOVED - Stored flight plan waypoint has changed location.	A stored flight plan waypoint has moved by more than 0.33 arc minutes from where previously positioned.	Verify stored cataloged flight plans and procedures. Modify stored flight plans as necessary to include waypoints that are in the current navigation database.
GLIDESLOPE - Glideslope receiver needs service.	The glideslope board is indicating that it needs service. The glideslope board may continue to function.	Verify glideslope deviation indications with another source and crosscheck final approach fix crossing altitude. If another glideslope source is not available for verification, fly a GPS based approach. Contact dealer for service.
GLIDESLOPE - Glideslope receiver has failed.	The glideslope board is not communicating property with the system.	Fly an approach that does not use the glideslope receiver (VOR, LOC, GPS). Contact dealer for service.
GNS CROSSFILL - GTN user waypoint(s) replaced with GNS user waypoints.	A user waypoint from the GNS replaced one or more existing waypoints on the GTN.	Ensure that the waypoints on the GNS have unique names before transferring to the GTN to avoid overwriting existing waypoints.
GNS CROSSFILL - Catalog full; not all GNS waypoint(s) transferred.	A user waypoint from the GNS could not be created because the user waypoint catalog is full.	Remove some of the waypoints from the catalog to make room for the waypoints from the GNS.

Message	Description	Action
GNS CROSSFILL - Waypoint transfer failed.	Waypoint transfer failed/incomplete.	The data transfer should be reattempted.
GPS NAVIGATION LOST - Insufficient satellites. Use other navigation source.	GPS position has been lost due to lack of satellites.	Wait for GPS satellite geometry to improve. Ensure the aircraft has a clear view of the sky. Use a different GPS receiver or a non-GPS based source of navigation. Contact dealer for service.
GPS NAVIGATION LOST - Erroneous position. Use other navigation source.	GPS position has been lost due to erroneous position.	Use a different GPS receiver or a non-GPS based source of navigation. Contact dealer for service.
GPS RECEIVER - GPS receiver has failed. Check GPS coax for electrical short.	Internal communication to the SBAS board is inoperative.	Use a different GPS receiver or a non-GPS based source of navigation. Contact dealer for service.
GPS RECEIVER - Low internal clock battery.	The GPS module indicates that its clock battery is low. Almanac data may have been lost. The unit will function normally, but may take a longer than normal period to acquire a GPS position.	Contact dealer for service.
GPS RECEIVER - GPS receiver needs service.	The GPS module is reporting that it needs service. The GPS module may continue to function.	Use a different GPS receiver or a non-GPS based source of navigation. Contact dealer for service.

Message	Description	Action
GPS SEARCHING SKY - Ensure GPS antenna has an unobstructed view of the sky.	The GPS module is acquiring position and may take longer than normal. This message normally occurs after initial installation or if the unit has not been powered for several weeks.	No action is necessary; message is informational only.
GTN - GTN needs service.	The GTN has lost calibration data that was set by Garmin during manufacturing.	Contact dealer for service.
HOLD EXPIRED - Holding EFC time has expired.	The selected Expect Further Clearance (EFC) time for a user-defined hold has passed.	No action is necessary; message is information only.
HTAWS - Invalid Terrain Database.	The terrain database is of insufficient resolution for use with HTAWS.	Load HTAWS specific terrain database on the external SD card.
INTERFACE ADAPTER - GAD 42 configuration needs service.	GAD 42 indicates a configuration error.	Verify all input/output data from/ to the GAD 42 Interface Adapter. Contact dealer for service.
INTERFACE ADAPTER - GAD 42 needs service.	GAD 42 indicates it needs service. The GAD 42 may continue to function.	Verify all input/output data from/ to the GAD 42 Interface Adapter. Contact dealer for service.
INTERNAL SD CARD ERROR - GTN needs service.	Internal SD card has an error. This card is not accessible by the user.	Contact dealer for service.

Message	Description	Action
INTERNAL SD CARD REMOVED - GTN needs service.	Internal SD card was removed or failed. This card is not accessible by the user.	Contact dealer for service.
KEY STUCK - HOME key is stuck.	The HOME key has been in pressed position for at least 30 seconds. This key will now be ignored.	Verify the HOME key is not pressed. Press the Home key again to cycle its operation. Contact dealer for service if this message persists.
KEY STUCK - Direct-To key is stuck.	The Direct-To key has been in pressed position for at least 30 seconds. This key will now be ignored.	Verify the Direct-To key is not pressed. Contact dealer for service if this message persists.
KNOB STUCK - Volume knob is stuck in the pressed position.	The Volume knob has been in pressed position for at least 30 seconds. This knob press will now be ignored.	Verify the volume knob is not pressed. Contact dealer for service if this message persists.
KNOB STUCK - Dual concentric inner knob is stuck in the pressed position.	The dual concentric inner knob has been in pressed position for at least 30 seconds. This knob press will now be ignored.	Verify the dual concentric knob is not pressed. Contact dealer for service if this message persists.
LOCKED FLIGHT PLAN Cannot activate a flight plan containing a locked waypoint.	The user is trying to activate a flight plan that contains a locked waypoint.	Unlock the flight plan by modifying stored flight plans as necessary to include waypoints, procedures, and airways that are in the current navigation database.

Message	Description	Action
LOSS OF INTEGRITY (LOI)- Verify GPS position with other navigation equipment.	Antenna may be shaded from satellites. The GPS module has reported a loss of integrity.	Make sure the aircraft is clear of hangars, buildings, trees, etc. Use a different GPS receiver or a non-GPS based source of navigation. Contact dealer for service if this message persists.
MAGNETIC NORTH APPROACH - Verify NAV angles are referenced to magnetic north (magnetic variation).	The NAV angle is not set to Magnetic and a magnetic approach is loaded.	Change NAV angle setting to Magnetic.
MAGNETIC VARIATION - Aircraft in area with large mag var. Verify all course angles.	MagVar is flagged as unreliable in the MagVar database. This normally occurs when operating at high latitudes that do not support a Nav Angle of Magnetic.	Verify that the geographical region supports navigation based on magnetic variation.
MARK ON TARGET - Waypoint creation has failed. MOT requires GPS position.	Mark on target waypoint creation has failed because of missing GPS position.	Wait for GPS satellite geometry to improve. Ensure the aircraft has a clear view of the sky. Reattempt waypoint creation. Contact dealer for service.
NAV ANGLE - NAV Angles are referenced to True North (T).	Nav angle is set to True.	No action is necessary; message is informational only.

Message	Description	Action
NAV ANGLE - NAV Angles are referenced to a User set value (U).	Nav angle is set to User.	No action is necessary; message is informational only.
NON-WGS84 WAYPOINT - See CRG. Location may be different than where surveyed for [WPT].	The active waypoint is not referenced to the WGS84 datum. See Note 1 at the end of the table.	No action is necessary; message is informational only.
OBS - OBS is not available due to dead reckoning or no active waypoint.	OBS requires an active waypoint and is not supported in dead reckoning mode.	No action is necessary; message is informational only.
PARALLEL TRACK - Parallel track not supported past IAF.	Parallel track is not supported on approaches.	No action is necessary; message is informational only.
PARALLEL TRACK - Parallel track not supported for turns greater than 120 degrees.	Parallel track is not supported for turns greater than 120 degrees due to the acute angle.	No action is necessary; message is informational only.
PARALLEL TRACK - Parallel track not supported for leg type.	Parallel track is not supported on current leg type.	No action is necessary; message is informational only.

Message	Description	Action
REMOTE KEY STUCK - Remote OBS key is stuck.	The remote OBS (OBS MODE SEL) key/switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the OBS MODE SEL key/ switch is not stuck. Contact dealer for service if this message persists.
REMOTE KEY STUCK - Remote CDI key is stuck.	The remote CDI (CDI SRC SEL) key/switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the CDI SRC SEL key/switch is not stuck. Contact dealer for service if this message persists.
REMOTE KEY STUCK - Com push-to-talk key is stuck.	The Push To Talk key/ switch has been in pressed position for at least 30 seconds. This input will now be ignored and the com radio will no longer transmit.	Verify the Push To Talk key/switch is not stuck. Contact dealer for service if this message persists.
REMOTE KEY STUCK - Com remote transfer key is stuck.	The remote com transfer (COM RMT XFR) key/switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the COM RMT XFR key/ switch is not stuck. Contact dealer for service if this message persists.

Message	Description	Action
REMOTE KEY STUCK - Com remote frequency increment key is stuck.	The remote com frequency increment (COM CHAN UP) key/ switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the COM CHAN UP key/ switch is not stuck. Contact dealer for service if this message persists.
REMOTE KEY STUCK - Com remote frequency decrement key is stuck.	The remote com frequency decrement (COM CHAN DN) key/ switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the COM CHAN DN key/ switch is not stuck. Contact dealer for service if this message persists.
REMOTE KEY STUCK - Nav remote transfer key is stuck.	The remote nav transfer (NAV RMT XFR) key/ switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the NAV RMT XFR key/ switch is not stuck. Contact dealer for service if this message persists.

Message	Description	Action
REMOTE KEY STUCK - Remote go around key is stuck.	The remote go around (RMT GO ARND) key/ switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the RMT GO ARND key/ switch is not stuck. Contact dealer for service if this message persists.
REMOTE KEY STUCK - TAWS inhibit key is stuck.	The TAWS INHIBIT discrete input has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the TAWS INHIBIT key/switch is not stuck. Contact dealer for service if this message persists.
REMOTE KEY STUCK - Alert Acknowledge key is stuck.	The remote TAWS alert acknowledge (ALRT ACK) key/switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the ALRT ACK key/switch is not stuck. Contact dealer for service if this message persists.
REMOTE KEY STUCK - RP Mode key is stuck.	The remote RP MODE key/switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the RP MODE key/switch is not stuck. Contact dealer for service if this message persists.

Message	Description	Action
REMOTE KEY STUCK - Pilot/Co-Pilot voice command push-to-command key is stuck.	The remote push-to-command key/switch has been in pressed position for at least 30 seconds. This input will now be ignored. This input is not available in all installations.	Verify the push-to-command key/switch is not stuck. Contact dealer for service if this message persists.
SELECT FREQUENCY - Select appropriate NAV frequency for approach.	Correct NAV frequency is not set in the active NAV frequency for the approach procedure.	Insert the correct frequency into the active navigation frequency window.
SET COURSE - Set course on CDI/HSI to [current DTK].	The selected course on the CDI/HSI does not match the current desired track.	Set the CDI/HSI selected course to the current desired track.
STEEP TURN - Aircraft may overshoot course during turn.	Flight plan contains an acute course change ahead which will require a bank in excess of normal to follow the guidance. If coupled to the autopilot, the autopilot may not be able to execute the steep turn needed to follow the course guidance.	No action is necessary; message is informational only. If desired, slow the aircraft to shallow the turn.
STORMSCOPE - StormScope is inoperative or connection to GTN is lost.	The GTN is configured for a WX-500 StormScope but is not receiving data from it.	Close the Stormscope circuit breaker and ensure Stormscope is receiving power. Contact dealer for service.

Message	Description	Action
STORMSCOPE - Invalid heading received from StormScope.	The WX-500 StormScope reports that it has an invalid heading source.	GTN StormScope data is correct and may be used. Contact dealer for service.
TAWS AUDIO INHIBITED - TAWS audio inhibit input is stuck.	The TAWS Audio Inhibit discrete input has been active for at least 30 seconds. This input is active in all installations. TAWS audio may be heard at the same time as other audio alerts.	Contact dealer for service.
TIMER - Timer has expired.	A user-configured timer has expired.	No action is necessary; message is informational only.
TRAFFIC - Traffic device is inoperative or connection to GTN is lost.	The GTN is configured for a traffic device but is not receiving data from it. Traffic will not be displayed on the GTN.	Contact dealer for service.
TRAFFIC - Traffic device has been in standby for more than 60 seconds.	The GTN is airborne and the traffic device has been in standby for more than 60 seconds.	Set the traffic device to "operate" on the traffic page if traffic alerts are desired.
TRAFFIC - Traffic device battery low. Traffic device user config settings not saved.	The TCAD system has indicated that its battery is low.	Contact dealer for service.

Message	Description	Action
TRANSPONDER - Transponder 1 and 2 Mode S addresses do not match.	The GTN is configured for two transponders and their Mode S addresses do not match. This message is intended to assist installers and will not occur in a properly configured system.	Contact dealer for service.
TRANSPONDER 1 OR 2 Transponder 1 or 2 needs service.	The transponder is reporting to the GTN that it needs service. The transponder may continue to function.	Verify squawk code and altitude with ATC. Contact dealer for service.
TRANSPONDER 1 OR 2 Transponder 1 or 2 is inoperative or connection to GTN is lost.	The GTN is configured for transponder 1 or 2 but is not able to communicate with the transponder.	Verify squawk code and altitude with ATC. Contact dealer for service.
TRANSPONDER 1 OR 2 ADS-B is not transmitting position.	The transponder has insufficient data to support ADS-B.	Ensure the aircraft has a clear view of the sky. Contact dealer for service.
TRUE NORTH APPROACH - Verify NAV Angles are referenced to True North (T).	A procedure is loaded that is referenced to true north and the active leg has a published true north reference.	Verify the Nav Angle is set to True North.

Message	Description	Action
USER WAYPOINT IMPORT - User waypoints were imported successfully.	All user waypoints were imported successfully.	No action is necessary; message is informational only.
USER WAYPOINT IMPORT - User waypoint import failed.	User Waypoint import failed due to improper file format.	Ensure the media has the correct file format. If the problem persists. Contact dealer for service.
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.

Message	Description	Action
VLOC RECEIVER - Navigation receiver needs service.	The nav radio is reporting that it needs service. The nav radio may continue to function.	Use GPS based navigation. Contact dealer for service.
VLOC RECEIVER - Navigation receiver has failed.	The nav radio is not communicating property with the system.	Use GPS based navigation. Contact dealer for service.
WAYPOINT - Arriving at [wpt name].	User has configured the arrival alarm and is within the specified distance.	No action is necessary; message is informational only.
WX ALERT - Possible severe weather ahead.	The weather radar system is indicating the presence of severe weather ahead.	Check weather radar. See Section12.4.8.2 for more information.
WX RADAR FAIL - Weather radar is inoperative.	The GTN is configured for a weather radar but is not receiving data from it. Weather Radar will not be displayed on the GTN.	Contact dealer for service.
WX RADAR SERVICE - Weather radar needs service. Return unit for repair.	Weather radar is reporting a system fault.	Contact dealer for service.

Table 17-1 Messages

Note 1: There are several reference datums that waypoints can be surveyed against. TSO-C146 normally requires that all waypoints be referenced to the WGS84 datum, but allows for navigation to waypoints that are not referenced to the WGS84 datum so long as the pilot is notified. Certain waypoints in the navigation database are not referenced to the WGS84 datum, or their reference datum is unknown. If this is the case, this message is displayed. Garmin cannot determine exactly how close the non-WGS84 referenced waypoint will be to the WGS84 datum that the GTN uses. Typically, the distance is within two nautical miles. The majority of non-WGS84 waypoints are located outside of the United States.

18 SYMBOLS

The following tables describe the symbols that are found on the Map display.

18.1 Map Page Symbols

Symbol	Description
	Unknown Airport
	Non-towered, Non-serviced Airport
	Towered, Non-serviced Airport
	Non-towered, Serviced Airport
	Towered, Serviced Airport
	Soft Surface, Serviced Airport
	Soft Surface, Non-serviced Airport
	Private Airport
	Heliport
	Intersection
	LOM (compass locator at outer marker)
	NDB (Non-directional Radio Beacon)
	VOR
	VOR/DME
	ILS/DME or DME-only
	VORTAC
	TACAN

Table 18-1 Map Page Symbols

18.2 SafeTaxi™ Symbols

Symbol	Description
	Helipad
	Airport Beacon
	Under Construction Zones
	Unpaved Parking Areas

Table 18-2 SafeTaxi Symbols

18.3 Traffic Symbols

TIS Symbol	Description
	Non-Threat Traffic
	Traffic Advisory (TA)
	Traffic Advisory Off Scale

Table 18-3 TIS Symbols

TAS Symbol	Description
	Non-Threat Traffic (intruder is beyond 5 NM and greater than 1200 ft vertical separation)
	Proximity Advisory (PA) (intruder is within 5 NM and less than 1200 ft vertical separation)
	Traffic Advisory (TA) (closing rate, distance, and vertical separation meet TA criteria)
	Traffic Advisory Off Scale

Table 18-4 TAS Symbols

Symbol		Description
Imminent Traffic (Traffic within ±500 feet AND 1.0 NM; OR no altitude AND within 1.0 NM)	Non-Imminent Traffic	
		Traffic Closing Vertically
		Traffic Diverging Vertically
		Traffic not Closing or Diverging Vertically

Table 18-5 9900B TCAD Symbols

Symbol	Description
	Traffic Advisory
	Proximity Advisory (color may be configured as cyan)
	Other Traffic (color may be configured as cyan)
	Out-of-Range Traffic Advisory

Table 18-6 9900BX (TCAS) Symbols

Symbol	Description
	Basic Non-Directional Traffic
	Basic Directional Traffic
	Basic Off-scale Selected Traffic
	Proximate Non-Directional Traffic
	Proximate Directional Traffic
	Proximate Off-scale Selected Traffic
	Non-Directional Alerted Traffic
	Off-Scale Non-Directional Alerted Traffic
	Directional Alerted Traffic
	Off-Scale Directional Alerted Traffic
	Non-Directional Surface Vehicle
	Directional Surface Vehicle

Table 18-7 ADS-B Traffic Symbols

NOTE: *Color of basic and proximate traffic is dependent on configuration (cyan or white) and airborne/on-ground status of target (target is brown when on the ground, see the surface vehicles).*

18.4 Terrain Obstacle Symbols

Unlighted Obstacle (Height is less than 1000 ft AGL)	Lighted Obstacle (Height is less than 1000 ft AGL)	Unlighted Obstacle (Height is greater than 1000 ft AGL)	Lighted Obstacle (Height is greater than 1000 ft AGL)
			

Table 18-8 Obstacle Altitude/Color Correlation

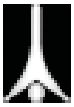
Tower	Windmill	Windmill in Group	Power Line
			

Table 18-9 Obstacle Icon Types

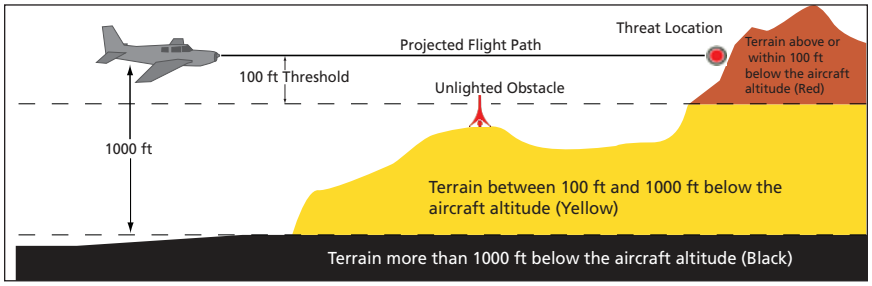


Figure 18-1 Terrain Altitude/Color Correlation

18.5 HTAWS Obstacle Symbols

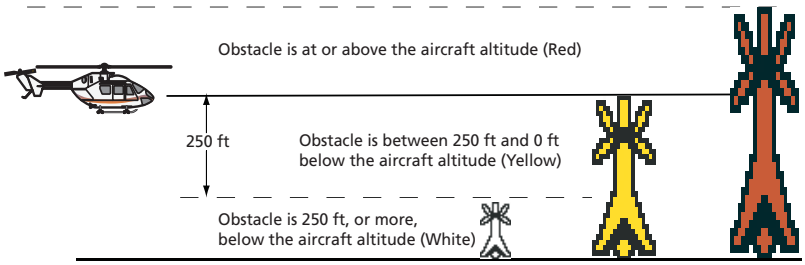


Figure 18-2 HTAWS Obstacle Altitude Correlation

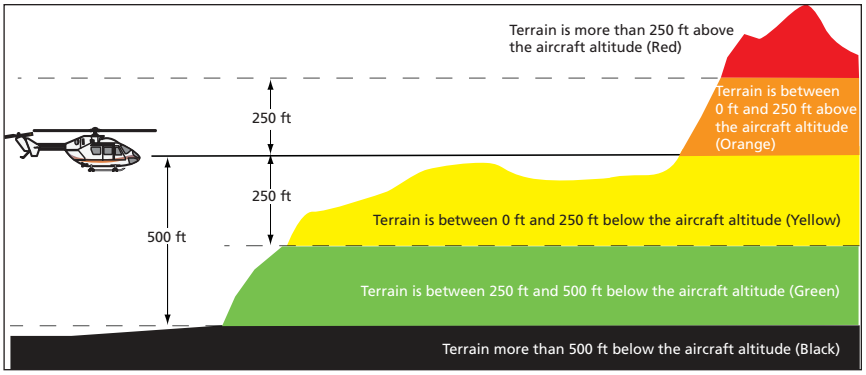


Figure 18-3 HTAWS Altitude/Color Correlation

18.6 Basemap Symbols

Symbol	Description
	Interstate Highway
	State Highway
	US Highway
	National Highway - 2-digit drawn inside
	Small City or Town
	Medium City
	Large City

Table 18-10 Basemap Symbols

18.7 Map Tool Bar Symbols

Symbol	Description
	Terrain Proximity Enabled and Available Indicator
	Terrain Proximity Enabled and Not Available Indicator
	Point Obstacle Enabled and Available Indicator (Software version 5.12 and later)
	Point Obstacle Enabled and Not Available Indicator (Software version 5.12 and later)
	Wire Obstacles Enabled and Available Indicator (Software version 5.12 and later)
	Wire Obstacles Enabled and Not Available Indicator (Software version 5.12 and later)
	StormScope
	Ownship is receiving TIS-B and ADS-R services (Software version 5.11 or earlier)
	Possible incomplete traffic picture – ownship is not receiving one (or both) of the TIS-B or ADS-R services (Software version 5.11 or earlier)
	Traffic Enabled and Available Indicator
	Traffic Enabled and Not Available Indicator

Table 18-11 Map Tool Bar Symbols

18.8 Miscellaneous Symbols

Symbol	Description
	Low-Wing Prop (Default Ownship)
	High-Wing Prop
	Kit Plane
	Turboprop

Symbol	Description
	Twin-Engine Prop
	Single-Engine Jet
	Business Jet
	2-Blade Rotorcraft
	3-Blade Rotorcraft
	4-Blade Rotorcraft
	Non-directional ownship is shown if there is no heading or ground track. This typically only occurs during start-up. In helicopters without a heading source, the non-directional ownship symbol will also appear below 15 kts.
	Parallel Track Waypoint
	Restricted/Prohibited/Warning/Alert
	TFR (Temporary Flight Restrictions)
	MOA
	Class B Airspace
	Class C Airspace
	Class D Airspace
	User Waypoint

Table 18-12 Miscellaneous Symbols

NOTE: *Ownship icons are configured by the installer and can be colored magenta for enhanced visibility (Software version 5.12 or later).*

18.9 Stormscope Symbols

Symbol	Time Since Strike (Seconds)
	6
	60
	120
	180

Table 18-13 Stormscope Symbols

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19 APPENDIX

19.1 Glossary

ACT, ACTV	active, activate
ACT	Altitude Compensated Tilt
ADC	Air Data Computer
ADF	Automatic Direction Finder
ADI	Attitude Direction Indicator
AFM	Airplane Flight Manual
AFMS	Airplane Flight Manual Supplement
AGL	Above Ground Level
AIM	Airman's Information Manual
AIRMET	Airman's Meteorological Information
ALT	altitude
AP	autopilot
APR	approach
APT	airport, aerodrome
ARINC	Aeronautical Radio Incorporated
ARSPC	airspace
ARTCC	Air Route Traffic Control Center
AS	airspeed
ASOS	Automated Surface Observing System
ATC	Air Traffic Control
ATCRBS	ATC Radar Beacon System
ATIS	Automatic Terminal Information Service
AUX	auxiliary
AWOS	Automated Weather Observing System
BARO	barometric setting
BC	backcourse
Bearing	The compass direction from the present position to a destination waypoint
BRG	bearing
C	center runway
°C	degrees Celsius
CDI	Course Deviation Indicator
CHNL	channel

CLD	cloud
CLR	clear
CNXT	Connext
CONFIG	configuration
Course	The line between two points to be followed by the aircraft
Crosstrack Error	The distance the aircraft is off a desired course in either direction, left or right
CRS	course
CRSR	cursor
CTA	Control Area
CTAF	Common Traffic Advisory Frequency
CTRL	control
CUM	The total of all legs in a flight plan
DALT	density altitude
DB, DBASE	database
DCLTR, DECLTR	declutter
deg	degree
DEP	departure
Desired Track (DTK)	The desired course between the active "from" and "to" waypoints
DEST	destination
DFLT	default
DIS	distance
Distance	The "great circle" distance from the present position to a destination waypoint
DME	Distance Measuring Equipment
DP	Departure Procedure
DPRT	departure
DSBL	disabled
DTK	Desired Track
EDR	Excessive Descent Rate
EGNOS	Provides SBAS service for most of Europe and parts of North Africa
ELEV	elevation
EMI	Electromagnetic Interference
ENR	en route

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
ERR	error
ESA	En route Safe Altitude
ETA	Estimated Time of Arrival
ETE	Estimated Time En Route
ºF	degrees Fahrenheit
FAA	Federal Aviation Administration
FCC	Federal Communication Commission
FCST	forecast
FD	flight director
FIR	Flight Information Region
FIS-B	Flight Information Services-Broadcast
FISDL	Flight Information Service Data Link
FLTA	Forward Looking Terrain Avoidance
FPL	flight plan
FREQ	frequency
FRZ	freezing
FSS	Flight Service Station
ft	foot/feet
GCS	Ground Clutter Suppression
GDC	Garmin Air Data Computer
GDL	Garmin Satellite Data Link
GEO	geographic
GLS	Global Navigation Satellite Landing System
GMA	Garmin Audio Panel System
GMT	Greenwich Mean Time
GMU	Garmin Magnetometer Unit
GPS	Global Positioning System
GPSS	GPS Roll Steering
Ground Speed	The velocity that the aircraft is travelling relative to a ground position
Ground Track	*see Track*
GRS	Garmin Reference System
GS	Ground Speed
G/S, GS	glideslope

GTX	Garmin Transponder
HDG	heading
Heading	The direction an aircraft is pointed, based upon indications from a magnetic compass or a properly set directional gyro
HFOM	Horizontal Figure of Merit
Hg	mercury
hPa	hectopascal
HPL	Horizontal Protection Level
HSDB	High-Speed Data Bus
HSI	Horizontal Situation Indicator
HTAWS	Helicopter Terrain Awareness and Warning System
Hz	Hertz
IAF	Initial Approach Fix
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
IGRF	International Geomagnetic Reference Field
ILI	Imminent Line Impact
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
IOI	Imminent Obstacle Impact
INFO	information
in HG	inches of mercury
INT	intersection(s)
INTEG	integrity (RAIM unavailable)
ITI	Imminent Terrain Impact
L	left, left runway
LAT	latitude
LCD	Liquid Crystal Display
LCL	local
LED	Light Emitting Diode
Leg	The portion of a flight plan between two waypoints
LIFR	Low Instrument Flight Rules
LNAV	Lateral Navigation
LOC	localizer

LOI	loss of integrity (GPS)
LON	longitude
LPV	Localizer Performance with Vertical guidance
LRU	Line Replacement Unit
LT	left
LTNG	lightning
MAG	Magnetic
MAG VAR	Magnetic Variation
MapMX	A proprietary data format used to forward navigation information between Garmin units
MAX	maximum
MAXSPD	maximum speed (overspeed)
MDA	barometric minimum descent altitude
METAR	Aviation Routine Weather Report
MGRS	MIlitary Grid Reference System
MIN	minimum
Minimum Safe Altitude	Uses Grid MORAs to determine a safe altitude within ten miles of the aircraft present position
MKR	marker beacon
MOA	Military Operations Area
MOT	Mark On Target
MOV	movement
mpm	meters per minute
MSA	Minimum Safe Altitude
MSAS	Provides SBAS service for Japan only
MSG	message
MSL	Mean Sea Level
MT	meter
mV	millivolt(s)
MVFR	Marginal Visual Flight Rules
NAV	navigation
NAVAID	NAVigation AID
NCR	Negative Climb Rate
NDB	Non-Directional Beacon
NEXRAD	Next Generation Radar

OAT	Outside Air Temperature
OBS	Omni Bearing Selector
PA	Proximity Advisory
PC	personal computer
PDA	Premature Descent Alert
P. POS	Present Position
PTK	parallel track
QTY	quantity
R	right, right runway
RAIM	Receiver Autonomous Integrity Monitoring
RAM	random access memory
REF	reference
REQ	required
REV	reverse, revision, revise
RLC	Reduce Required Line Clearance
RMI	Radio Magnetic Indicator
RNG	range
RNWY	runway
ROC	Reduced Required Obstacle Clearance
RT	right
RTC	Reduced Required Terrain Clearance
SAR	Search and Rescue
SBAS	Satellite-Based Augmentation System
SCIT	Storm Cell Identification and Tracking
SD	Secure Digital
SFC	surface
SIAP	Standard Instrument Approach Procedures
SID	Standard Instrument Departure
SIGMET	Significant Meteorological Information
SLP/SKD	slip/skid
SMBL	symbol
SPD	speed
SRVC, SVC	service

STAR	Standard Terminal Arrival Route
STATS	statistics
STBY	standby
STD	standard
SUA	Special Use Airspace
SUSP	suspend
SW	software
SYS	system
T	true
TA	Traffic Advisory
TACAN	Tactical Air Navigation System
TAF	Terminal Aerodrome Forecast
TAS	True Airspeed
TAS	Traffic Advisory System
TAT	Total Air Temperature
TAWS	Terrain Awareness and Warning System
TCA	Terminal Control Area
TCAS	Traffic Collision Avoidance System
TEMP	temperature
TERM	terminal
TFR	Temporary Flight Restriction
T HDG	True Heading
TIS	Traffic Information System
TMA	Terminal Maneuvering Area
Topo	topographic
Track	Direction of aircraft movement relative to a ground position; also 'Ground Track'
TRK	track
TRSA	Terminal Radar Service Area
UNAVAIL	unavailable
USR	user
UTC	Coordinated Universal Time
UTM/UPS	Universal Transverse Mercator/ Universal Polar Stereographic Grid
V, Vspeed	velocity (airspeed)
VAR	variation

VFR	Visual Flight Rules
VHF	Very High Frequency
VLOC	VOR/Localizer Receiver
VMC	Visual Meteorological Conditions
VNAV, VNV	vertical navigation
VOR	VHF Omni-directional Range
VORTAC	very high frequency omnidirectional range station and tactical air navigation
VS	Vertical speed
VSI	Vertical Speed Indicator
WAAS	Wide Area Augmentation System
WGS-84	World Geodetic System - 1984
WPT	waypoint(s)
WX	weather
XPDR	transponder
XTK	cross-track

19.2 SD Card Use and Databases

The GTN 7XX System uses Secure Digital (SD) cards to load and store various types of data. For basic flight operations, SD cards are required for database storage as well as database updates.

Database Name	Function	Where Stored	Update Cycle	Provider	Notes
Navigation	Airport, NAVAID, Waypoint, and Airspace information	Internal GTN memory	28 days (on Thursdays)	fly.garmin.com	Updates installed via SD card and copied into internal memory
SafeTaxi	Airport surface diagrams	Internal GTN memory	56 days (on Thursdays)	fly.garmin.com	Updates installed via SD card and copied into internal memory
Terrain	Topographic map, Terrain/TAWS	SD card	As required	fly.garmin.com	
Obstacle	Obstacle information for map, and TAWS	Internal GTN memory	56 days (on Thursdays)	fly.garmin.com	Updates installed via SD card and copied into internal memory
Basemap	Boundary and road information	Internal GTN memory	As required	fly.garmin.com	Updates installed via SD card and copied into internal memory
FliteCharts	FAA-published terminal procedures	SD card	28 days (on Thursdays)	fly.garmin.com	Disables 180 days after expiration date.
ChartView	Jeppesen terminal procedures	SD card	14 days (on Fridays)	Contact Jeppesen	Optional feature that requires Garmin dealer enablement. Disables 70 days after expiration date.

Table 19-1 Database List

More information about databases and updates can be found at:

https://fly.garmin.com/fly-garmin/support.

19.2.1 Jeppesen Databases

The navigation database is updated on a 28-day cycle. Navigation database updates are provided by Garmin and may be downloaded from the Garmin web site "fly.garmin.com" onto a Garmin provided Supplemental Data card. Contact Garmin at fly.garmin.com for navigation database updates and update kits. The Navigation database is stored internally and the data card is only used to transfer the database into the unit.

The optional ChartView database is updated on a 14 day cycle. The ChartView database is provided directly from Jeppesen. Contact Jeppesen (www.jeppesen.com) for ChartView subscription and update information. An enablement card that is purchased from Garmin is separate from the Jeppesen database and is required to enable ChartView.

NOTE: *Garmin requests that the flight crew report any observed discrepancies related to database information. These discrepancies could come in the form of an incorrect procedure, incorrectly identified terrain, obstacles and fixes, or any other displayed item used for navigation or communication in the air or on the ground. Go to "FlyGarmin.com" and at the bottom of the page select "Aviation Data Error Report."*

Updating the Jeppesen navigation database

1. With the GTN 7XX System OFF, insert the SD card containing the navigation database update into the card slot of the GTN 7XX to be updated (label of SD card should face to the right).
2. Turn the GTN 7XX System ON.
3. Verify the correct update cycle is loaded during power-up.

19.2.2 Garmin Databases

NOTE: *The data contained in the terrain and obstacle databases comes from government agencies. Garmin accurately processes and cross-validates the data, but cannot guarantee the accuracy and completeness of the data.*

The Supplemental Data Card should not be removed except to update the databases stored on the card. The data cards cannot be moved between units.

Figure 19-1 SD Card Database Location

The Garmin databases can be updated by following the instructions on *fly.garmin.com*. Once the updated files have been downloaded from the web site, a PC equipped with an appropriate SD card reader is used to unpack and program the new databases onto the existing Supplemental Data Cards. The following equipment is required to perform the update:

- Windows-compatible PC computer (Windows 2000, XP, Vista, or Windows 7 recommended)
- SanDisk SD Card Reader, P/Ns SDDR-93 or SDDR-99 or equivalent card reader
- Updated database obtained from the Garmin web site
- Existing Garmin Supplemental Database SD Card

It may be necessary to have the system configured by a Garmin authorized

service facility in order to use certain database features.

Common Problems/Troubleshooting Tips for Databases

- SD Cards
  - The supplied SD cards, and most commercially available SD cards, have a small sliding tab located on the top left of the card (when viewing the card label-side up).
  - When the sliding tab is in the Down position (as in farther away from the gold contacts on the back of the card), you will not be able to write data to the card, as it will be write protected.
  - The tab must be in the Up position to work correctly.
- Card Programmer
  - If a card programmer is having trouble finding or writing data to the SD cards, you may have to upgrade to a High Capacity SD card programmer.
  - SD cards with a capacity of 4GB are considered high capacity.
  - Most non-high capacity card programmers will not work with a high capacity SD card. High capacity card programmers can be easily purchased at a consumer electronics store.
  - Ensure that your card programmer is not plugged into a USB hub, your computer screen, or your keyboard.
  - Make sure it is plugged directly into your computer (the back of the computer, if using a desktop computer).
- If you accidentally place a file onto the wrong card, call Garmin's Aviation Product Support team to look at the files and delete the proper files.
  - Do not format the cards

Updating Garmin Databases

1. Download the data to the data cards from the appropriate web site.
2. Insert Navigation Database SD card in the slot of the GTN 7XX.
3. Apply power to the GTN 7XX System. View the power-up splash screen. Check that the databases are initialized and displayed on the splash screen. Some databases can take up to 15 minutes to update.
4. The database update page will prompt to either Update or Continue. Touch the **Update** key to update the database(s). Touch the **Continue** key to continue to normal operation without updating a database. This process will repeat for each database that is available on the card for updating.
5. After the database(s) have completed the update process, touch **OK** to continue the normal progression of start-up displays.
6. From the Home page, touch the **System** key. Then, touch the **System Status** key.
7. Check that all databases are current and there are no errors. If a database is highlighted in yellow, it is either expired or the GTN 7XX can not determine the date.

19.3 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.

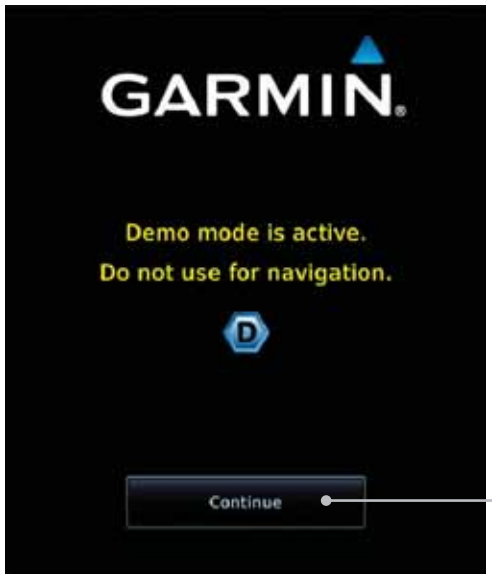

Figure 19-2 Demo Mode Start Up Display

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 19-3 Demo Mode Setup

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

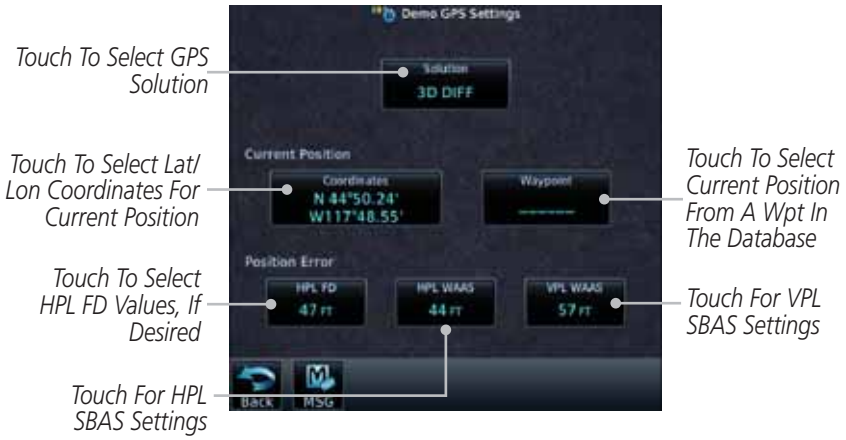

Figure 19-4 Demo Mode GPS Settings

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

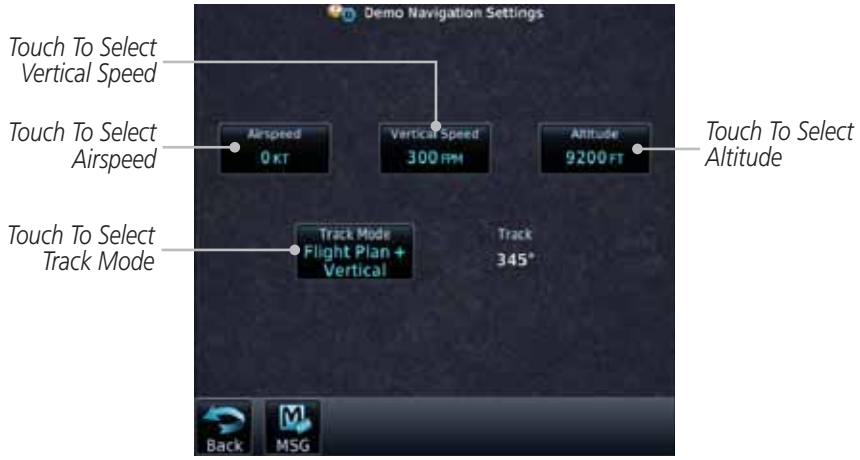

Figure 19-5 Demo Mode Navigation Settings

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

Figure 19-6 Demo Mode Date/Time Settings

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

19.4 Glove Qualification Procedure

This procedure is used to qualify a specific glove for use with the GTN system by guiding the user through a variety of tasks that use the touchscreen. Due to differences in finger size, glove size, and touchscreens between the 6XX or 7XX unit, the qualification granted by this procedure is specific to the pilot/glove and 6XX or 7XX combination. GTN 7XX and 6XX units must be evaluated separately.

The GTN touchscreen uses capacitive touch technology to sense the proximity of skin to the display. A glove increases the distance between skin and the display glass and may reduce the ability of the GTN to detect touches. Therefore, when selecting a glove for use with the GTN, thinner gloves tend to work better than thicker gloves. Leather gloves and gloves designed to work specifically with capacitive touchscreen devices are often found to be acceptable. Additionally, altering your touch technique to use the pad of your finger to touch the unit rather than the tip will increase the touchscreen sensitivity while using gloves.

This qualification must be completed on the ground. Performing this procedure in flight is not authorized. Table 19-1 contains tasks that are required to qualify a glove. Table 19-2 contains tasks that are not required to qualify a glove, but may limit the manner in which some functions are accessed while a glove is worn.

1. Sit in the pilot's seat.
2. Start the GTN in Demo mode by pressing and holding the **Direct To** key during power up.
3. Perform the tasks listed in Table 19-1 and Table 19-2 with an non-gloved hand. You do not need to record any results for this step.
4. Perform the tasks listed in Table 19-1 and Table 19-2 with a gloved hand. For each task, determine whether the operation is the same or worse as it was without the glove. Record the results in Table 19-1 and Table 19-2. Items that may cause the operation to be worse include, but are not limited to:
    a. Multiple attempts to select a key
    b. Unintentional selection of adjacent keys
    c. Excessive force on the touchscreen to select a key
5. If all applicable tasks in Table 19-1 respond in the same way with and without a glove then the glove used to complete these tasks may be used by the pilot

who performed this evaluation on the unit (6XX or 7XX) that was used during this procedure.

Pilot: _____

Glove Description: _____

GTN (circle one): 6XX or 7XX

Task	Operation With Glove (circle one)	
Navigate to the Home Screen.	NA	
Touch the **Demo** key.	Same	Worse
Touch the **GPS** key.	Same	Worse
Touch the **Waypoint** key.	Same	Worse
Type "KSLE" using the touchscreen, then touch **Enter.**	Same	Worse
Navigate to the Home Screen (Press **HOME**).	NA	
Touch the **Flight Plan** key.	Same	Worse
Enter the following waypoints using the **Add Waypoint** key at the bottom of the list of flight plan waypoints: KSLE KMMV KONP BTG	Same	Worse
Select BTG, then touch the **Load Airway** key to load the following airway: V23 ALFOR.	Same	Worse
While viewing the flight plan page, touch the **Up/ Down** arrow keys to scroll up and down to view the flight plan waypoints.	Same	Worse
Touch the **Back** key to return to the Home screen.	Same	Worse
Touch the COM standby frequency to activate the com frequency entry keypad (Task applicable to 635/650/750 only).	Same	Worse
Enter a valid com frequency and touch the **Enter** key (635/650/750 only).	Same	Worse

Task	Operation With Glove (circle one)	
Touch the active com frequency to flip/flop the com frequencies. (635/650/750 only).	Same	Worse
Touch the active nav frequency to flip/flop the nav frequencies (750 only).	Same	Worse
Touch the **Menu** key (650 only).	Same	Worse

Table 19-2 Tests Required for Glove Qualification

Task	Operation With Glove (circle one)	
Navigate to the flight plan page.	NA	
While viewing the flight plan page, touch the list and drag up/down to view the flight plan waypoints.	Same	Worse
While viewing the flight plan page, touch and flick the list to view the flight plan waypoints.	Same	Worse
Navigate to the map page.	NA	
Touch the Map to enter Pan mode, then touch the **Graphically Edit FPL** key.	Same	Worse
Remove KONP from the flight plan graphically by touching KONP and dragging it to an area without any waypoints (Pan and zoom in/out as necessary to accomplish the task).	Same	Worse
Insert KSPB between KMMV and BTG by dragging the leg between KMMV and BTG to KSPB.	Same	Worse

Table 19-3 Tests Not Required for Glove Qualification

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