



# **GPS 175/GNX 375**

Pilot's Guide

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**WARNING**

DO NOT USE TERRAIN AVOIDANCE DISPLAYS AS THE SOLE SOURCE OF INFORMATION FOR MAINTAINING SEPARATION FROM TERRAIN AND OBSTACLES. GARMIN OBTAINS TERRAIN AND OBSTACLE DATA FROM THIRD PARTY SOURCES AND CANNOT INDEPENDENTLY VERIFY THE ACCURACY OF THE INFORMATION.

**WARNING**

DO NOT RELY SOLELY UPON TERRAIN PROXIMITY DATA FOR TERRAIN AVOIDANCE. TERRAIN PROXIMITY IS NOT A CERTIFIED TERRAIN AWARENESS SYSTEM. IT IS AN AID TO SITUATIONAL AWARENESS ONLY. USING TERRAIN PROXIMITY DATA DOES NOT UNDER ANY CIRCUMSTANCES OR CONDITIONS RELIEVE THE PILOT'S RESPONSIBILITY TO SEE AND AVOID TERRAIN OR OBSTACLES.

**WARNING**

ALWAYS REFER TO CURRENT AERONAUTICAL CHARTS AND NOTAMS FOR VERIFICATION OF DISPLAYED AERONAUTICAL INFORMATION. DISPLAYED AERONAUTICAL DATA MAY NOT INCORPORATE THE LATEST NOTAM INFORMATION.

**WARNING**

NEVER USE GPS ALTITUDE FOR VERTICAL NAVIGATION. THE ALTITUDE CALCULATED BY GPS RECEIVERS IS GEOMETRIC HEIGHT ABOVE MEAN SEA LEVEL AND COULD VARY SIGNIFICANTLY FROM THE ALTITUDE DISPLAYED BY PRESSURE ALTIMETERS (E.G., THE OUTPUT FROM THE GDC 74A/B AIR DATA COMPUTER) OR OTHER ALTIMETERS IN THE AIRCRAFT. ALWAYS REFER TO THE PRESSURE ALTIMETERS IN THE AIRCRAFT FOR CURRENT PRESSURE ALTITUDE.

**WARNING**

NEVER USE EXPIRED DATABASES. UPDATE DATABASES REGULARLY TO ENSURE CURRENCY. USE OUT OF DATE DATABASE INFORMATION AT YOUR OWN RISK.

**WARNING**

NEVER USE BASEMAP INFORMATION (LAND AND WATER DATA) AS THE SOLE MEANS OF NAVIGATION. BASEMAP DATA IS INTENDED ONLY TO SUPPLEMENT OTHER APPROVED NAVIGATION DATA SOURCES AND SHOULD BE CONSIDERED ONLY AN AID TO ENHANCE SITUATIONAL AWARENESS.

**WARNING**

DO NOT RELY SOLELY UPON THE DISPLAY OF TRAFFIC INFORMATION TO ACCURATELY DEPICT ALL OF THE TRAFFIC WITHIN RANGE OF THE AIRCRAFT. DUE TO LACK OF EQUIPMENT, POOR SIGNAL RECEPTION, AND/OR INACCURATE INFORMATION FROM AIRCRAFT OR GROUND STATIONS, TRAFFIC MAY BE PRESENT THAT IS NOT REPRESENTED ON THE DISPLAY.



### **WARNING**

NEVER USE DATALINK WEATHER INFORMATION FOR MANEUVERING IN, NEAR, OR AROUND AREAS OF HAZARDOUS WEATHER. INFORMATION CONTAINED WITHIN DATALINK WEATHER PRODUCTS MAY NOT ACCURATELY DEPICT CURRENT WEATHER CONDITIONS.



### **WARNING**

DO NOT USE THE INDICATED DATALINK WEATHER PRODUCT AGE TO DETERMINE THE AGE OF THE WEATHER INFORMATION SHOWN BY THE DATALINK WEATHER PRODUCT. DUE TO TIME DELAYS INHERENT IN GATHERING AND PROCESSING WEATHER DATA FOR DATALINK TRANSMISSION, THE WEATHER INFORMATION SHOWN BY THE DATALINK WEATHER PRODUCT MAY BE OLDER THAN THE INDICATED WEATHER PRODUCT AGE.



### **WARNING**

ALWAYS REFER TO CURRENT AERONAUTICAL CHARTS FOR APPROPRIATE MINIMUM CLEARANCE ALTITUDES. THE DISPLAYED MSA<sub>s</sub> ARE ONLY ADVISORY IN NATURE AND SHOULD NOT BE RELIED UPON AS THE SOLE SOURCE OF OBSTACLE AND TERRAIN AVOIDANCE INFORMATION.



### **WARNING**

DO NOT USE GPS TO NAVIGATE TO ANY ACTIVE WAYPOINT IDENTIFIED AS A "NON WGS84 WPT" BY A SYSTEM MESSAGE. "NON WGS84 WPT" WAYPOINTS ARE DERIVED FROM AN UNKNOWN MAP REFERENCE DATUM THAT MAY BE INCOMPATIBLE WITH THE MAP REFERENCE DATUM USED BY GPS (KNOWN AS WGS84) AND MAY BE POSITIONED IN ERROR AS DISPLAYED.



### **WARNING**

DO NOT RELY SOLELY UPON THE DISPLAY OF TRAFFIC INFORMATION FOR COLLISION AVOIDANCE MANEUVERING. THE TRAFFIC DISPLAY DOES NOT PROVIDE COLLISION AVOIDANCE RESOLUTION ADVISORIES AND DOES NOT UNDER ANY CIRCUMSTANCES OR CONDITIONS RELIEVE THE PILOT'S RESPONSIBILITY TO SEE AND AVOID OTHER AIRCRAFT.



### **WARNING**

DO NOT RELY ON THE ACCURACY OF ATTITUDE AND HEADING INDICATIONS IN GEOGRAPHIC AREAS WHERE VARIATION IN THE EARTH'S MAGNETIC FIELD EXISTS. THIS INCLUDES: NORTH OF 72° NORTH LATITUDE AT ALL LONGITUDES; SOUTH OF 70° SOUTH LATITUDE AT ALL LONGITUDES; NORTH OF 65° NORTH LATITUDE BETWEEN LONGITUDE 75° W. AND 120° W. (NORTHERN CANADA); NORTH OF 70° NORTH LATITUDE BETWEEN LONGITUDE 70° W. AND 128° W. (NORTHERN CANADA); NORTH OF 70° NORTH LATITUDE BETWEEN LONGITUDE 85° E. AND 114° E. (NORTHERN RUSSIA); SOUTH OF 55° SOUTH LATITUDE BETWEEN LONGITUDE 120° E. AND 165° E. (REGION SOUTH OF AUSTRALIA AND NEW ZEALAND).



## **WARNING**

**DO NOT RELY SOLELY UPON DATALINK SERVICES TO PROVIDE TFR INFORMATION. ALWAYS CONFIRM TFR INFORMATION THROUGH OFFICIAL SOURCES SUCH AS FLIGHT SERVICE STATIONS OR AIR TRAFFIC CONTROL.**



## **WARNING**

**DO NOT LEARN OPERATIONAL PROCEDURES IN THE AIR. FOR SAFETY REASONS, THOROUGHLY PRACTICE BASIC OPERATION ON THE GROUND BEFORE ACTUAL USE.**



## **WARNING**

**REVIEW AND UNDERSTAND ALL ASPECTS OF THIS PILOT'S GUIDE. DOING SO REDUCES THE RISK OF UNSAFE OPERATION.**



## **WARNING**

**ALWAYS RESOLVE ANY DISCREPANCIES BETWEEN THE DISPLAY AND OTHER NAVIGATION SOURCES WHEN THEY OCCUR. DURING FLIGHT OPERATIONS, COMPARE DISPLAY INDICATIONS TO INFORMATION FROM OTHER NAVAIDS, VISUAL SIGHTINGS, CHARTS, AND OTHER AVAILABLE SOURCES BEFORE CONTINUING NAVIGATION.**



## **CAUTION**

*DO NOT CLEAN DISPLAY SURFACES WITH ABRASIVE CLOTHS OR CLEANERS CONTAINING AMMONIA. THEY WILL HARM THE ANTI-REFLECTIVE COATING.*



## **CAUTION**

*ENSURE THAT ANY UNIT REPAIRS ARE MADE BY AN AUTHORIZED GARMIN SERVICE CENTER. UNAUTHORIZED REPAIRS OR MODIFICATIONS COULD VOID BOTH THE WARRANTY AND AFFECT THE AIRWORTHINESS OF THE AIRCRAFT.*



## **NOTE**

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



## **NOTE**

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



### NOTE

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



### NOTE

Interference from GPS repeaters operating inside nearby hangars can cause an intermittent loss of attitude and heading displays while the aircraft is on the ground. Moving the aircraft more than 100 yards away from the source of the interference should alleviate the condition.



### NOTE

Use of polarized eye wear may cause the flight displays to appear dim or blank.



### NOTE

This product, its packaging, and its components contain chemicals known to the State of California to cause cancer, birth defects, or reproductive harm. This notice is being provided in accordance with California's Proposition 65. If you have any questions or would like additional information, please refer to our website at [www.garmin.com/prop65](http://www.garmin.com/prop65).



### NOTE

Operating the system in the vicinity of metal buildings, metal structures, or electromagnetic fields can cause sensor differences that may result in nuisance miscompare annunciations during start up, shut down, or while taxiing. If one or more of the sensed values are unavailable, the annunciation indicates no comparison is possible.



### NOTE

The system responds to a terminal procedure based on data coded within that procedure in the Navigation Database. Differences in system operation may be observed among similar types of procedures due to differences in the Navigation Database coding specific to each procedure.



### NOTE

Do not use SafeTaxi functions as the basis for ground maneuvering. SafeTaxi functions do not comply with the requirements of AC 120-76C and are not qualified for use as an airport moving map display. SafeTaxi is to be used for orientation purposes only.

**NOTE**

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

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

**NOTE**

The pilot/operator must review and be familiar with Garmin's database exclusion list as discussed in SAIB CE-14-04 to determine what data may be incomplete. The database exclusion list can be viewed at [flyGarmin.com](http://flyGarmin.com) by selecting "Database Exclusions List."

**NOTE**

The pilot/operator must have access to Garmin and Jeppesen database alerts and consider their impact on the intended aircraft operation. The database alerts can be viewed at [flyGarmin.com](http://flyGarmin.com) by selecting "Aviation Database Alerts."

**NOTE**

If the pilot/operator wants or needs to adjust the database, contact Garmin Product Support.

**NOTE**

Garmin requests 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. Visit [flyGarmin.com](http://flyGarmin.com) and select "Aviation Data Error Report."



### **NOTE**

The navigation databases used in Garmin navigation systems contain Special Procedures. Prior to flying these procedures, pilots must have specific FAA authorization, training, and possession of the corresponding current, and legitimately-sourced chart (approach plate, etc.). Inclusion of the Special Procedure in the navigation database DOES NOT imply specific FAA authorization to fly the procedure.

### **AC 90-100A Statement of Compliance**

The Garmin navigational unit meets the performance and functional requirements of FAA Advisory Circular (AC) 90-100A, *U.S. Terminal and En Route Area Navigation (RNAV) Operations*.

## Record of Revision

REVISION	DATE	CHANGE DESCRIPTION
1	02/07/19	Experimental Release.

## Layout

SECTION	TITLE
1	System at a Glance
2	Get Started
3	Navigation
4	Planning
5	Hazard Awareness
6	Messages
7	Qualification
8	Glossary

The design and layout of this guide is intended to provide clear, concise sections written in the logical order of a pilot's flight instrument and systems scan.

## Electronic Document Features

Versions of this guide are saved in Adobe Acrobat and are available for download at: [garmin.com/manuals](http://garmin.com/manuals)

### Reference Manuals

DOCUMENT	P/N
N/A	N/A

### Reference Websites

WEBSITE	ADDRESS
Aviation Limited Warranty	<a href="https://www.garmin.com/en-US/legal/aviation-limited-warranty">https://www.garmin.com/en-US/legal/aviation-limited-warranty</a>
Database Concierge	Go to <a href="http://www.flygarmin.com/support">http://www.flygarmin.com/support</a> and select Database Management.
ADS-B Academy	<a href="https://www.garmin.com/us/intheair/ads-b">https://www.garmin.com/us/intheair/ads-b</a>
Connex	<a href="http://www.garmin.com/connex">http://www.garmin.com/connex</a>



# 1 System at a Glance

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# Overview

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The GPS 175 and GNX 375 are the first 2" by 6.25" panel mount navigators to employ full color capacitive touchscreen technology.

The GPS 175 is a TSO-C146e compliant GPS/WAAS navigator with en route, terminal, and precision/non-precision approach capabilities. The GNX 375 combines the functionality of the GPS 175 with a TSO-C112e (Level 2els, Class 1) compliant mode S transponder.

Each unit is Bluetooth compatible, providing flight plan, traffic, weather, and position data to an available portable electronic device.

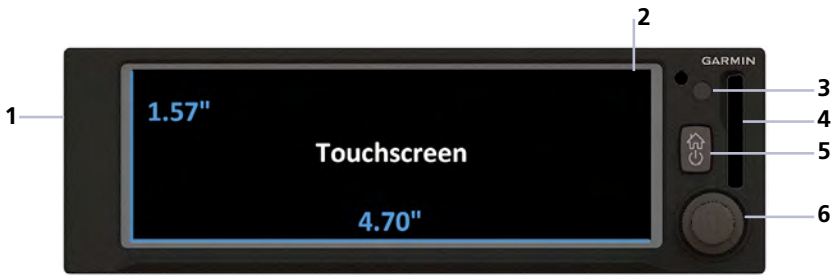
## **GPS 175 NAVIGATOR**

- TSO-C146e compliant GPS/WAAS navigator and internal GPS source
- TSO-C195b (Class B1, B3, B5, B7) compliant with an active ADS-B In source
- Certified compatible with ADS-B Out 2020 mandate

## **GNX 375 NAVIGATOR WITH TRANSPONDER**

- TSO-C88b compliant automatic pressure altitude reporting equipment
- TSO-C146e compliant GPS/WAAS navigator
- TSO-C112e (Level 2els, Class 1) compliant mode S transponder
- TSO-C154c (Class A1S) compliant 1090/UAT receiver
- TSO-C157b (Class 1) compliant FIS-B equipment uplink
- TSO-C166b compliant ADS-B Out 1090 MHz extended squitter
- TSO-C195b (Class B1, B3, B5, B7, C1, C2, C3, C5, C7) compliant with an active ADS-B In source

# 1.1 Display Layout



1	<p><b>Bezel</b></p> <p>Includes the power key, mechanical knobs, photocell, and SD card slot. Ledges provide hand stability when performing data entry and making selections.</p>
2	<p><b>Touchscreen</b></p> <p>Multi-touch color display provides controls for unit operation.</p>
3	<p><b>Photocell</b></p> <p>Measures cockpit ambient light level to automatically adjust display brightness for day and night.</p>
4	<p><b>SD Card Slot</b></p> <p>Interface for loading database, exporting log files, and updating software. Compatibility with Flight Stream 510 allows wireless database transfer from the Garmin Pilot app via Database Concierge.</p>
5	<p><b>Power/Home Key</b></p> <p>Powers the unit on or off and provides direct access to the Home page.</p>
6	<p><b>Inner &amp; Outer Knobs</b></p> <p>Multipurpose dual concentric knob allows data entry, list scrolling, map range control, and page navigation.</p>

## 1.2 Unit Functions

GPS 175 NAVIGATOR	GNX 375 NAVIGATOR W/TRANSPONDER
<ul style="list-style-type: none"> <li>• Moving Map</li> <li>• Traffic [1]</li> <li>• Terrain</li> <li>• Flight Plan</li> <li>• Graphical Flight Planning</li> <li>• FIS-B Weather Display [1] [2]</li> <li>• Waypoint Information</li> <li>• Terrain Avoidance</li> <li>• System Advisories</li> <li>• Scheduled Messages</li> <li>• Clock</li> <li>• CDI</li> <li>• Internal GPS Receiver</li> <li>• Built-in Bluetooth</li> <li>• ADS-B In Traffic Display [1] [2]</li> <li>• Database Concierge Access [3]</li> </ul>	<ul style="list-style-type: none"> <li>• Moving Map</li> <li>• Traffic</li> <li>• Terrain</li> <li>• Flight Plan</li> <li>• Graphical Flight Planning</li> <li>• FIS-B Weather Receiver &amp; Display[2]</li> <li>• Waypoint Information</li> <li>• Terrain Avoidance</li> <li>• System Advisories</li> <li>• Scheduled Messages</li> <li>• Clock</li> <li>• CDI</li> <li>• Internal GPS Receiver</li> <li>• Built-in Bluetooth</li> <li>• ADS-B In Traffic Receiver &amp; Display [2]</li> <li>• ADS-B Out on 1090 MHz Extended Squitter</li> <li>• Mode S Transponder</li> <li>• Database Concierge Access [3]</li> </ul>

[1] Function availability dependent upon aircraft interfaces or enablement.

[2] ADS-B In via 1090 MHz (traffic) and 978 MHz UAT (traffic and weather).

[3] Requires Wi-Fi connection via Flight Stream 510.

# Pilot Interface

## 1.3 Unit Power

The unit receives power directly from the aircraft's electrical system. Upon power-up, the bezel key backlight momentarily illuminates. System failure annunciations typically disappear within the first 30 seconds after power-up.

The start-up screen presents the unit software versions, the name and status of all installed databases, and the Database Updates page access key. These features are available only at power up.

Tapping **Continue** advances to the Instrument Test page.

If an instrument remains flagged after one minute, check the status of the associated LRU, then contact a Garmin dealer for support.

### 1.3.1 Instrument Test

To ensure safe operation, continuous built-in test features exercise the unit's processor, memory, external inputs, and outputs. The Instrument Test page displays the results of all external equipment checks performed by the unit.

LCDI	Half Left	TO/FROM	To
LFLG	Out of View	OBS	0
VCDI	Half Up	DTK	150°
VFLG	Out of View		

All map and terrain data provided is only to be used as a general reference to your surroundings and as an aid to situational awareness.

Review this list to ensure that all CDI outputs and other displayed data are correct for the connected equipment.

### 1.3.2 Power Off



#### WARNING


**NEVER ATTEMPT TO POWER OFF THE UNIT WHILE AIRBORNE UNLESS OPERATIONAL PROCEDURES DICTATE.**

Unit powering off in:

**3**

Pushing and holding the **Power** key for 0.5 seconds initiates the power off sequence. Shutdown occurs once the timer reaches zero.

Power off annunciation temporarily replaces the knob function indicator.

**Hold  to power off**

## 1.4 SD Card Slot

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### **NOTE**

Do not remove or insert an SD card while in flight. Always verify the system is powered off before inserting or removing an SD card.

The navigator requires an SD card for the following tasks.

- Exporting data logs
- Capturing screen images
- Upgrading software
- Saving system configurations
- Enabling Flight Stream connectivity
- Updating databases

### **INSERT AN SD CARD**






When inserting an SD card:

1. Verify the slot is empty.
2. Hold card such that label faces left edge of display screen.
3. Ensure back edge of card is flush with display bezel after insertion.

### **EJECT AN SD CARD**

Release the spring latch by pressing lightly on the back edge of card.

# 1.5 Touchscreen

<b>GESTURES</b>	
<p><b>TAP</b></p> 	<p>Touching the screen briefly with a single finger.</p> <p>Use this gesture for:</p> <ul style="list-style-type: none"> <li>• Opening a page or menu</li> <li>• Activating a command key or data entry field</li> <li>• Displaying map feature information</li> <li>• Selecting an option within an application</li> </ul>
<p><b>TAP AND HOLD</b></p> 	<p>Certain momentary controls (e.g., directional arrow keys) provide a secondary tap and hold function. Tap the key and hold your finger in place until the desired action occurs.</p> <p>Use this gesture for:</p> <ul style="list-style-type: none"> <li>• Scrolling with arrow keys</li> <li>• Increasing/decreasing values continuously</li> </ul>
<p><b>SWIPE</b></p> 	<p>A smooth motion that involves touching an object, then sliding your finger across the screen and then lifting up.</p> <p>Use this gesture for:</p> <ul style="list-style-type: none"> <li>• Accessing multiple panes (right or left swipes)</li> <li>• Viewing and scrolling lists</li> <li>• Panning across a map display</li> </ul>
<p><b>FLICK</b></p> 	<p>Swiping the screen in a quick upward or downward motion. Information moves at a fast speed, then slows to a stop.</p> <p>Use this gesture for:</p> <ul style="list-style-type: none"> <li>• Scrolling an item list</li> </ul>
<p><b>PINCH &amp; STRETCH</b></p> 	<p>Touch any map with two fingers at the same time, then bring the fingers close together (pinch) or spread them apart (stretch). Just remember: stretch to zoom in and pinch to zoom out.</p> <p>Use this gesture for:</p> <ul style="list-style-type: none"> <li>• Magnifying map features</li> </ul>

## 1.5.1 Keys

### COMMON COMMANDS



Open the system messages list. A flashing icon indicates unread messages.



Cancel an active function without inputting data.



Open a context menu.



Input a specified value.

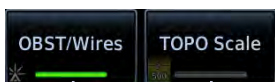


Return to the previous page.



Select the corresponding item (e.g., database update). A checkmark confirms selection.

### FUNCTION KEYS



On

Off

Toggle keys turn a specific function on or off. The current state of the function is indicated below the key label.

### PAGE ICONS

Tapping one of these icons opens the corresponding page. Menu pages provide additional icons for accessing functions on subpages.





## 1.5.2 Menu

Menus group related controls into an expandable pane, allowing access to multiple functions on a single page. Depending on the number of available functions, a menu may comprise more than one pane.



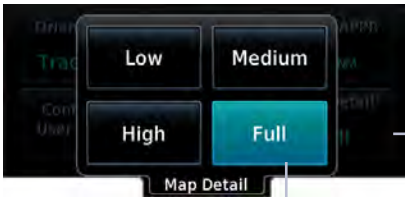
Multiple panes are accessible by way of swipe or inner knob turn.

Active Pane



An indicator at the bottom of the menu shows which pane is active.

### POP-UP MENU



Pop-up menu open to the default or previously selected value.

Underlying Page Hidden

Default or Current Setting

### LISTS

Scrollable lists group control keys related to a single function (e.g., FIS-B Weather). When scrolling, all keys in the list are inactive.



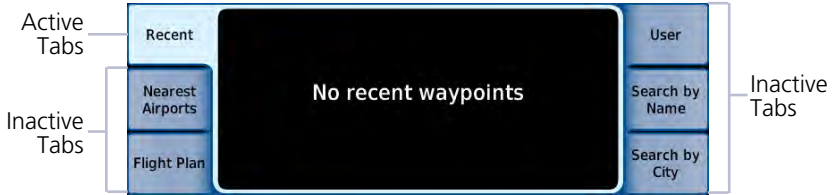
Toggle keys either enable or disable list items. In some cases, **Settings** or **Range** keys provide access to selectable setting options.

Scroll Bar

### 1.5.3 Tabs

Tabs group information into individual panes. Content includes scrolling lists, data fields, function keys, or a combination of controls.

Tabs are located along the left and right sides of a pane.



### 1.5.4 Keypads

The navigator employs multiple keypad types to serve specific settings and functions.

#### NUMERIC



Numeric keypads open on a single pane.

#### ALPHANUMERIC

Alphanumeric keypads comprise multiple keysets that are accessible by way of swipe or key selection.



Selectable Keysets



Active Keyset

An indicator shows which keyset is active. Keys **a** through **m** are active by default.

## 1.6 Control Knobs



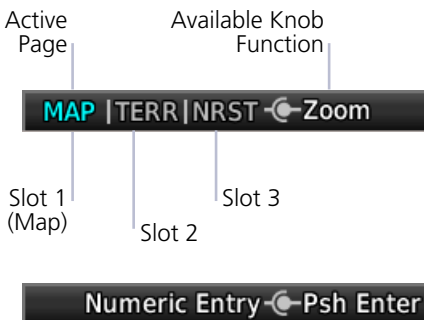
Outer Inner

Inner and outer control knobs offer an alternative method for selecting and modifying data without the use of touch keys.

KNOB FUNCTIONS	
<b>Outer Knob</b>	<ul style="list-style-type: none"> <li>• Selecting reference controls</li> <li>• Selecting a page shortcut</li> <li>• Cursor placement and initial field/page selections</li> <li>• Moving cursor forward or backward within data field</li> </ul>
<b>Inner Knob (Turn)</b>	<ul style="list-style-type: none"> <li>• Zooming</li> <li>• Selecting reference values</li> <li>• Inputting data</li> <li>• Modifying individual characters in data entry field</li> </ul>
<b>Inner Knob (Push)</b>	<ul style="list-style-type: none"> <li>• Entering current or specified numerical value</li> <li>• Toggling Map page user fields on or off</li> <li>• Accessing the Direct To function from the Home page</li> </ul>

### 1.6.1 Knob Function Indicators

A locator bar works in conjunction with the outer knob providing quick access to the indicated page. Turning the outer knob clockwise or counter-clockwise moves the locator through displayed menu options.



Slot 1 is a dedicated Map page shortcut. Slots 2 and 3 are customizable. Selectable page options are dependent upon configuration.

The active page name displays in cyan.

Additional icons located to the right of the bar indicate available knob functions for the associated page (e.g., zoom, numeric entry).

### 1.6.2 Screen Captures

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Save images to an SD card at any time using a screen capture. Images automatically save to the “print” folder in the SD card root directory.



1. Insert an SD card into the card slot.
2. Push and hold the control knob.
3. With knob depressed, push and release the **Home/Power** key.

A camera icon momentarily shows in the annunciator bar indicating a successful screen capture. To view saved images, remove the SD card and open the “print” folder on a computer.

## 1.7 Color Conventions

	<p><b>Red</b></p> <ul style="list-style-type: none"> <li>• Warning conditions</li> <li>• Operating limits</li> </ul>
	<p><b>Yellow</b></p> <ul style="list-style-type: none"> <li>• Cautionary conditions</li> <li>• Conditional operating ranges</li> </ul>
	<p><b>Green</b></p> <ul style="list-style-type: none"> <li>• Safe operating conditions</li> <li>• Normal operating ranges</li> <li>• Engaged modes</li> </ul>
	<p><b>White</b></p> <ul style="list-style-type: none"> <li>• Scales and markings</li> <li>• Current data and values</li> </ul>
	<p><b>Magenta</b></p> <ul style="list-style-type: none"> <li>• GPS data</li> <li>• Active flight plan legs</li> </ul>
	<p><b>Cyan</b></p> <ul style="list-style-type: none"> <li>• Pilot-selectable references</li> </ul>
	<p><b>Gray</b></p> <ul style="list-style-type: none"> <li>• Missing or expired data</li> <li>• Product unavailable</li> </ul>
	<p><b>Blue</b></p> <ul style="list-style-type: none"> <li>• Sky</li> <li>• Water</li> </ul>
	<p><b>Brown</b></p> <ul style="list-style-type: none"> <li>• Ground</li> </ul>

# Compatible Equipment

## 1.8 Line Replaceable Units

<b>SYSTEM REQUIRED LRUS</b>
GPS antenna
<b>SYSTEM OPTIONAL LRUS</b>
ADAHRS or ADC with AHRS
GAD 29 adapter
GAE 12 altitude encoder
G3X Touch
G500/G600
G500/G600 TXi
GMX 200
MX 20
<b>OPTIONAL INTERFACES</b>
GDL 88/GTX 345 ADS-B transceiver (applicable to GPS 175 only)

The system consists of multiple LRUs, which are installed behind the instrument panel or in a separate avionics bay. Their modular design aids system maintenance and unit replacement.

Optional LRUs may include compatible equipment from either Garmin or a third party manufacturer.

Some LRUs provide features that require registration and/or enablement prior to activation.

## 1.8.1 ADC & AHRS

The ADC and AHRS sense air data and aircraft attitude for display and use by other systems. AHRS units have a magnetometer interface for determining magnetic heading. ADC units have an OAT probe interface for measuring outside air temperature.

LRU	DISPLAY	FUNCTION
GDC 74 ADC	GNX	<ul style="list-style-type: none"> <li>• Air temperature</li> <li>• Airspeed</li> <li>• Altitude</li> <li>• Vertical speed</li> </ul>
G3X G500/G600	GPS GNX	<b>ADC</b> <ul style="list-style-type: none"> <li>• Air temperature</li> <li>• Airspeed</li> <li>• Altitude</li> <li>• Vertical speed</li> </ul>
GSU 25/73 Integrated ADAHRS	GNX	<b>AHRS</b> <ul style="list-style-type: none"> <li>• Attitude</li> <li>• Heading</li> <li>• Rate of turn</li> <li>• Slip/skid/yaw</li> </ul>
GRS 77 AHRS	GNX	<ul style="list-style-type: none"> <li>• Attitude</li> <li>• Heading</li> <li>• Rate of turn</li> <li>• Slip/skid</li> </ul>

## 1.8.2 Altitude Encoder

LRU	DISPLAY	FUNCTION
GAE 12 Provides pressure altitude information to the transponder.	GNX	Aircraft static pressure

### 1.8.3 Connex Services

LRU	DISPLAY	FUNCTION
GDL 88 Provides datalink traffic and weather.	GPS	<b>Traffic Services</b> <ul style="list-style-type: none"> <li>• ADS-B</li> <li>• TIS-B</li> </ul> <b>Weather Services</b> <ul style="list-style-type: none"> <li>• FIS-B</li> </ul> <b>Weather Products</b> Map & WX page: <ul style="list-style-type: none"> <li>• Precip</li> <li>• METARs</li> </ul> Weather Page: <ul style="list-style-type: none"> <li>• Precip</li> <li>• Winds Aloft</li> <li>• METARs/TAFs</li> <li>• AIRMETs</li> <li>• SIGMETs</li> <li>• TFRs</li> <li>• PIREPs</li> </ul>
GTX 345 Overlays Connex weather products on moving map and weather pages.		

### 1.8.4 Traffic

LRU	DISPLAY	FUNCTION
GDL 88	GPS	ADS-B
GTX 345		



# 2 Get Started

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# Databases



## NOTE

The navigator supports SD cards in the FAT32 format only, with capacities ranging between 8 GB and 32 GB.

Databases are stored in the unit's internal memory. To view update cycles, or to purchase individual databases or database packages, go to [flyGarmin.com](http://flyGarmin.com).

There are two methods for loading and updating databases:

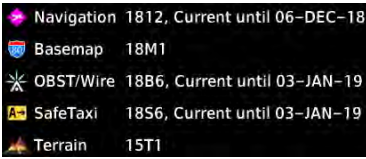
1. Load databases via SD card. The card may be removed after loading.
2. Transfer databases from a Flight Stream 510 wireless datacard. Requires Garmin Pilot application on a portable electronic device.

SUPPORTED DATABASES	
<b>Basemap</b>	Bodies of water, geopolitical boundary, and road information
<b>Navigation</b>	Airport, NAVAID, waypoint, and airspace information (Garmin or Jeppesen)
<b>Obstacles</b>	Obstacle and wire data
<b>SafeTaxi</b>	Airport surface diagrams
<b>Terrain</b>	Terrain elevation data

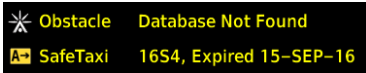
For information regarding third party navigation databases, go to [jeppesen.com](http://jeppesen.com).

# 2.1 Database Effective Cycles

Most databases expire at regular intervals. Exceptions include Basemap and Terrain, which neither expire nor update on a regular schedule.



The start-up page lists all currently installed databases. Review this list for current database types, cycle numbers, and expiration dates.



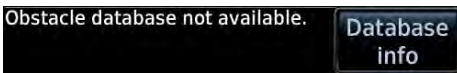
Yellow text denotes when a database is:

- Not available
- Installed before its effective date
- Missing date information
- Past its expiration date

DATABASE EFFECTIVE STATUS	
<b>Databases with no effective date</b>	<ul style="list-style-type: none"> <li>• Effective upon release</li> <li>• Transfer occurs prior to database verification at system start-up</li> <li>• No automatic transfer if Flight Stream 510 is present</li> <li>• Includes Basemap and Terrain</li> <li>• No pilot confirmation or restart required</li> </ul>
<b>Databases with specified effective dates</b>	<ul style="list-style-type: none"> <li>• Effective during a specific period</li> <li>• Unit determines database status using the current date and time from GPS</li> <li>• Automatic activation occurs on the effective date</li> </ul>

## DATABASE NOT FOUND

Notifications for databases not present or available also display in the form of system messages.



Tapping **Database Info** opens the Active Database Information page.



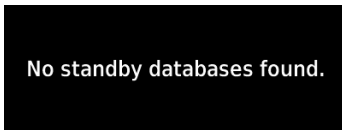
Review this list to determine the status of the indicated database.

## 2.2 Active and Standby Databases

The navigator uses two types of databases: active and standby. Active databases are in use by the system. Standby databases have not reached the effective date. During normal operation, information about all active and standby databases are viewable on the associated info page.

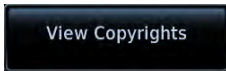
From the Home page, tap **System** > **System Status** > Select **Active** or **Standby**.

DB INFO PAGE	DISPLAYS
<b>Active</b>	<ul style="list-style-type: none"> <li>Information about databases currently in use</li> <li><b>View Copyrights</b> key</li> </ul>
<b>Standby</b>	<ul style="list-style-type: none"> <li>Information about databases that are not yet effective</li> </ul>



The Standby DB Info page notifies when no standby databases are available.

### VIEW COPYRIGHTS



Tapping this key displays copyright information for all installed databases.

## 2.3 Manual Updates

### FUNCTIONAL LIMITATIONS

The Database Updates page is available only when:

- The aircraft is on ground
- The start-up page is active (i.e., during power up)

### 2.3.1 Database Updates Page

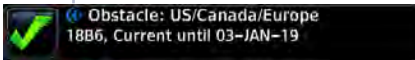
Databases

This page presents a list of all available databases. To open, tap the **Databases** key on the start-up page.



### DATABASE SOURCE INDICATION

Connex icon



A Connex icon indicates when a database is from Garmin Pilot via wireless transfer.

No indication means the database is either from an SD card or the unit's internal standby queue.

## SELECT ALL DATABASES



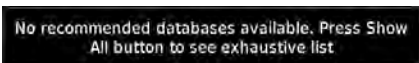
Select individual databases for transfer, or choose **Select All** if all listed databases require updating.



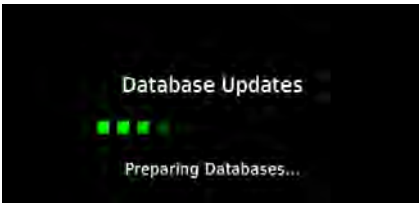
Basemap and Terrain update automatically and require no action.

After all selections are made, initiate the update process by tapping **Start**.

By default, this page displays only the databases recommended for update.



A message notifies when no such databases are available.

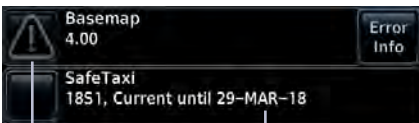


The unit automatically restarts once all updates are complete.

## SHOW ALL DATABASES



Tapping **Show All** displays a complete list of all databases.



Error  
Icon

Older  
Timestamp

This list may include databases that are:

- Not yet effective
- Older than the currently active database(s)
- Unable to update due to an error

## ERROR INFORMATION



To determine the cause of a database error, tap **Error Info**.



An information window provides details regarding the state of the database.

## SELECT REGION



This key appears when two databases are of the same type and cycle, but pertain to different regions.

To specify a database region, tap **Select Region**, then select the appropriate menu option.



## 2.4 Automatic Updates

### AUTOMATIC UPDATES OCCUR WHEN...

- A newer database is detected on the SD card or in the internal standby queue
- A newer database is within its effective dates
- The aircraft is on ground

When a newer database is available, follow the on-screen prompts to complete the update process.

A status page displays a progress bar and the name of each database as it uploads to the unit. Terrain databases may require up to 5 minutes for transfer. Total transfer time depends on the SD card type.

The unit automatically restarts once the update is complete. The update is indicated in the list of currently installed databases.

### INSTALL OR UPDATE A DATABASE USING AN SD CARD

1. Download a database onto an SD card.
2. Insert the SD card with the most recent database(s) into the card slot.
3. Power on the unit.



Selecting **Update** opens the DB Updates page. A list displays the newest databases.

All newer databases (effective and expired) transfer from the SD card to the internal standby queue.

### BASEMAP AND TERRAIN UPDATES

These databases automatically transfer from an SD card without any prompting or progress indications. They do not require pilot confirmation or a unit restart.

## 2.5 Database Concierge

### FEATURE REQUIREMENTS

- Flight Stream 510 wireless datacard
- Garmin Pilot app on a mobile device



Database Concierge allows wireless transfer of databases from a mobile device.

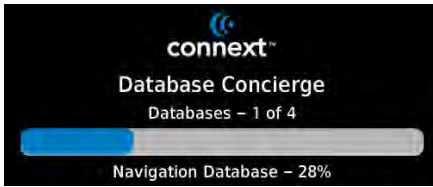
A pilot selects and downloads databases inside the Garmin Pilot app. Transfers occur once Flight Stream 510 establishes a wireless connection inside the aircraft.

### DATABASE CONCIERGE TRANSFER FUNCTIONS

- Automatic updates for databases with effective dates
- Preloads databases that are not yet effective by placing them in the internal standby queue
- Displays database type, cycle, effective date, and transfer progress
- **Start** key for manual operation
- Pilot confirmation required

### TRANSFER A DATABASE USING DATABASE CONCIERGE

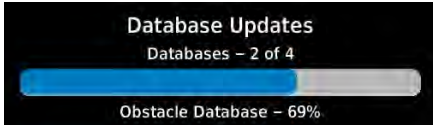
1. Purchase database(s) from [flyGarmin.com](http://flyGarmin.com).
2. Open Garmin Pilot and follow the download instructions.
3. Install Flight Stream 510 and then power on unit.
4. Connect to Wi-Fi.
5. Follow the on screen prompts.



### Database Transfer Status

Database Concierge transfers databases from the app to Flight Stream 510.

A progress bar shows when this process is complete.



### Database Update Status

The unit either updates or preloads databases based on their effective date. A second progress bar indicates upload status. The unit automatically restarts upon database activation.



Tapping **Skip** cancels any unfinished wireless transfers and initiates the update process.

The unit activates any databases that completed transfer before the interruption. Previously selected databases on an SD card or in the internal standby update as well. The message "Transfers interrupted" displays if no databases are available.

# Connectivity

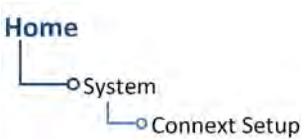


Data logs transfer over Bluetooth.

## FEATURE LIMITATIONS

- Unit allows pairing of up to 13 Bluetooth devices, with two simultaneous device connections
- Auto reconnect function is not available for Android devices

## 2.6 Connex Setup



Connex works via the Bluetooth data link to provide up-to-date, wireless information throughout the cockpit.

The Connex interface allows communication with applications (i.e., Garmin Pilot and ForeFlight Mobile) while running on a portable electronic device.

### Connex Features

The following features are available on your portable electronic device.

- GPS position and velocity information [1] [2]
- ADS-B In traffic data [1]
- FIS-B weather and flight information [2]
- Uncorrected barometric pressure altitude used by transponder and ADS-B [1]
- AHRS data via Connex and a built-in sensor [2] [3]

[1] GNX 375 only.

[2] External ADS-B In device required for GPS 175.

[3] Occurs when GNX 375 is installed as a standalone device. Attitude data does not output to other installed avionics.

[4] The internal AHRS sensor is only for use with a portable electronic device. All internal AHRS functions are automatic and do not require pilot action.

## 2.7 Bluetooth Setup

### BLUETOOTH FEATURES

- FIS-B weather [1]
- ADS-B traffic [1]
- GPS/WAAS position, velocity, and time
- Pressure altitude
- AHRS
- Magnetic heading
- Flight plan transfer

The unit supports Bluetooth pairing with up to 13 portable electronic devices via the Garmin Pilot app.

Bluetooth management options reside on the Devices page. Opening this page automatically initiates device pairing.

Device information and pairing mode status display on the Connex page.

[1] GNX 375, or GPS 175 with external ADS-B In source.

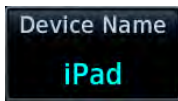
### 2.7.1 Enabling Bluetooth



Tapping **Bluetooth Enabled** toggles Bluetooth functionality on or off.

All associated setting controls and features are unavailable when this function is inactive.

### DEVICE NAME



Allows entry of the Bluetooth device name. Use the keypad or control knobs to enter the Bluetooth name.

## 2.7.2 Managing Paired Devices



To view a list of all paired devices and their connection status, tap **Paired Devices**.

### AUTO RECONNECT

Enables automatic connection between the unit and the paired device when the two are within range.

### REMOVE

Removing a device from the list means it is no longer paired with the unit. This action requires pilot confirmation.

Be sure to remove pairing on both devices before attempting to pair them again.

### PAIRING STATUS



The device is configured and communicating properly.



The device is not available and is not configured or it is not communicating properly.

## 2.7.3 Importing a Flight Plan



This feature allows automatic import of flight plans via Bluetooth.

It may be necessary to turn this function off if a portable device application makes repeated erroneous attempts to send flight plans to the unit.

## 2.8 Wi-Fi Setup



Tapping **WiFi Info** opens an information page. This page is accessible from the Database Update and start-up pages.



Information includes:

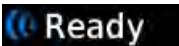
- Database Concierge connection status
- Connected device name
- Database update availability and instructions
- Wi-Fi SSID and password

### WI-FI INFO STATUS

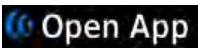
Wi-Fi connection status annunciates on the key label when the information page is not active.



Flight Stream 510 requires power up.



Wi-Fi is active, but the unit is waiting to connect with a connected device.



Connection complete. Flight Stream 510 requires Garmin Pilot to be opened in order for database transfer to commence.



Garmin Pilot opened and streaming to unit.

### 2.8.1 Connecting to Wi-Fi

Follow the onscreen prompts when connecting to the Wi-Fi network.

1. Install Flight Stream 510 and then power on unit. Observe Wi-Fi status changes from "Offline" to "Ready."
2. Tap **WiFi Info**.
3. Enter the required SSID and password using the provided keypads.
4. Enable Wi-Fi setting on the portable device. Wi-Fi status changes to "Open App" once pairing is complete.

# XPDR

## FEATURE LIMITATIONS

- GNX 375 only.



Transponder controls are accessible via the IDENT key.



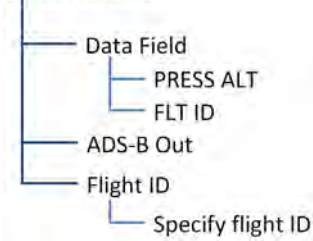
**XPDR Control Panel**

<b>1</b>	Squawk Code Entry Field	<b>4</b>	Squawk Code Entry Keys
<b>2</b>	VFR Key	<b>5</b>	Data Field
<b>3</b>	XPDR Mode Key		



## 2.9 XPDR Setup

### XPDR Menu



Tap **Menu** to access the transponder setup options. From here you can:

- Change the display of data
- Enable 1090 ES ADS-B Out functionality
- Assign a unique flight ID

### 2.9.1 Displaying Data



Toggles the data field between pressure altitude and flight ID.

#### Pressure Altitude

Pressure ALT: **2297 FT**

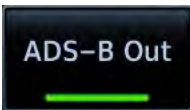
Displays the current pressure altitude.

#### Flight ID

Flight ID: **FLY4GA**

Displays the active Flight ID. Unless configured, the Flight ID is not editable.

### 2.9.2 Enabling Extended Squitter Transmissions



Tapping ADS-B Out allows the transmission of ADS-B Out messages and position information.

## 2.9.3 Assigning a Flight ID

---

### FEATURE LIMITATIONS

- Availability dependent on configuration



If the flight ID is editable, tap **Flight ID** and assign a unique identifier.

Flight IDs are alphanumeric (upper-case only) and have an eight character limit.

The active flight ID displays by default.

## 2.10 XPDR Modes



Tapping **Mode** opens a menu of the available transponder modes. Options include Standby, On, and Altitude Reporting.

MODE	FUNCTION
<b>Standby</b>	<ul style="list-style-type: none"> <li>• Transponder does not reply to interrogations or transmit ADS-B Out</li> <li>• Bluetooth functions remain operational</li> <li>• Unit continues to receive ADS-B In information, but is not a TIS-B participant</li> </ul>
<b>On</b>	<ul style="list-style-type: none"> <li>• Transponder replies to interrogations. Replies do not include pressure altitude</li> <li>• Reply (R) symbol on the display indicates the transponder is responding</li> </ul>
<b>Altitude Reporting</b>	<ul style="list-style-type: none"> <li>• Transponder replies to identification and altitude interrogations</li> <li>• Reply (R) symbol indicates the transponder is responding</li> <li>• GNX 375 transmissions include pressure altitude</li> </ul>

During Altitude Reporting mode, all aircraft air/ground state transmissions are handled via the transponder and require no pilot action. Always use this mode while in the air and on the ground, unless otherwise requested by ATC.

## 2.11 Squawk Code Keys

SPECIAL SQUAWK CODES	
1200	Default VFR code (USA)
7500	Hijacking
7600	Loss of communications
7700	Emergency

Eight squawk code entry keys (0 – 7) provide access to all ATCRBS codes. Pressing one of these keys begins the code selection sequence.

Use the **Backspace** key or outer control knob to move the cursor.



Digits that are not yet entered appear as underscores.



Entering the fourth digit activates the new code.

To cancel the code entry and exit the page, tap **Cancel**.



Active squawk codes remain in use until a new code is entered.

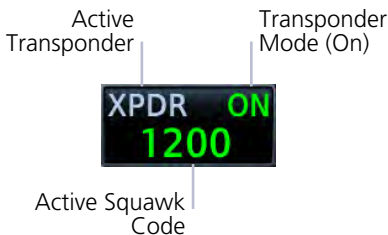
### 2.11.1 VFR



Tapping this key once sets the squawk code to the preprogrammed VFR code.

This code is factory set to 1200, but may be changed during configuration.

### 2.11.2 IDENT



Tapping this key activates the IDENT function for 18 seconds. This signal distinguishes the transponder from others on the air traffic controller's screen.

## TRANSPONDER STATUS INDICATIONS

### IDENT



- Reply active
- Identify function active
- No change to transponder code

### Standby Mode



- Standby mode
- Current squawk code (inactive)

### IDENT with New Squawk Code



- Reply active
- Transponder code modified

### Altitude Reporting Mode



- Altitude reporting mode
- Reply active
- Identify function active
- VFR squawk code (active)

SYMBOL	MEANING
<b>R</b>	Reply active
<b>ID</b>	Identify function active
<b>ON</b>	Transponder in operation
<b>ALT</b>	Altitude Reporting
<b>STBY</b>	Standby
<b>IDENT</b>	Press to initiate the IDENT function (code unmodified)
<b>ENT+ID</b>	Press to accept modified code and initiate IDENT function

## 2.12 Remote Control

Transponder functions are controllable from a connected G3X Touch display.

Control features include:

- Squawk code
- IDENT
- Flight ID
- Transponder mode
- ADS-B transmission

For transponder control operation, consult the G3X Touch Pilot’s Guide.

## 2.13 XPDR Alert



If the transponder fails:

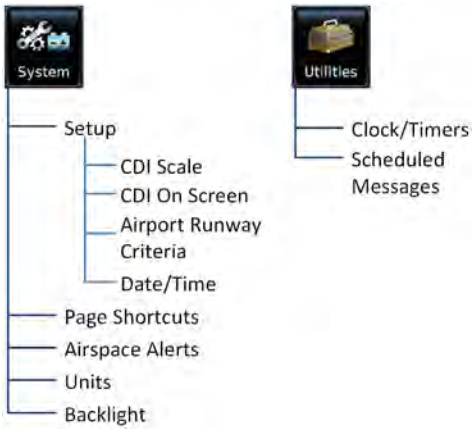
- Red “X” displays over the IDENT key
- Advisory message alerts
- XPDR control page is not available

Transponder fail annunciations are designed to be immediately recognizable. If a failure occurs while the control page is active, the display automatically returns to the previous page.

UNIT	CONDITION
GPS 175	GDL 88 failure.
GNX 375	ADS-B interboard communication failure.

For information regarding pilot response to a transponder failure, consult the AFMS.

# Pilot Settings

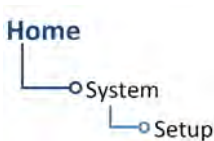


System customization options allow you to:

- Set and display the CDI
- Specify runway criteria
- Set the date and time
- Create shortcuts
- Set the display units
- Adjust display brightness

Other setup options allow you to monitor time in flight and create custom reminder messages. These reside in the system Utilities.

## 2.14 CDI Scale



Set the scale for the course deviation indicator. Scale values represent full scale deflection for the CDI to either side.

Options: • 0.30 nm • 1.00 nm • 2.00 nm • Auto

By default, the scale is set to “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 unit uses this for en route and terminal phases and ramps down further during an approach.

## 2.14.1 Horizontal Alarm Limits

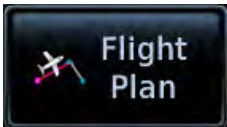
Horizontal alarm limits (HAL) follow the selected CDI scale, unless the corresponding flight phase requires a lower alarm limit. For example, the selected scale setting is 1.0 nm, but full-scale deflection during approach still follows the approach scale setting (0.30 nm).

FLIGHT PHASE	CDI SCALE	HORIZONTAL ALARM LIMIT
Approach	0.30 nm or Auto	0.30 nm
Terminal	1.00 nm or Auto	1.00 nm
En Route	2.00 nm or Auto	2.00 nm
Oceanic	Auto	2.00 nm

## 2.14.2 CDI On Screen

Toggleing this setting displays the CDI scale on screen. When active, a CDI with lateral deviation indicator displays below the GPS NAV Status Indicator key.

### CDI OFF



Only the Flight Plan page access key is available.

### CDI ON



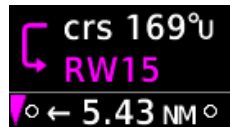
The CDI provides no indications without an active flight plan.

### Lateral Deviation Indicator



Lateral deviation indications display when there is an active flight plan.

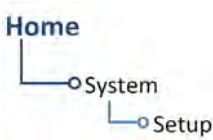
### Visual Approach Guidance



Advisory horizontal and vertical guidance annunciations appear when a visual approach procedure is active.



## 2.15 Airport Runway Criteria



Specify runway criteria from the System Setup page. Selections determine which airports are suitable when using the nearest airport search feature.

During an approach, the terrain alerting algorithm uses airport runway settings to avoid nuisance alerts.

### 2.15.1 Runway Surface

#### RUNWAY SURFACE OPTIONS

- Any
- Hard Only
- Hard/Soft
- Water

Tap **Runway Surface** and then select the runway surface type.

Selecting “Any” allows all surface types to display on the map.

### 2.15.2 Minimum Runway Length

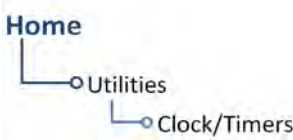
Specify a minimum runway length to prevent the display of airports with shorter runways. Typing “0” allows runways of any length to display.

## 2.16 Clocks & Timers

### 2.16.1 Timers

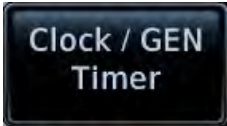


Monitor time in flight using three available timer types.



Timer settings are accessible via the Utilities menu page. Toggle between timer types using the provided display key.

#### Clock/Generic Timer



Stopwatch style counter. Count up or count down. Specify countdown time using the preset function.

Controls:

- **Direction** (Up, Down)
- **Start • Stop • Timer Preset**

#### Trip/Departure Timers

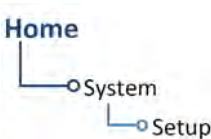


Measure elapsed airborne time since the last ground-to-air transition. Set timer to start at unit power up or once the aircraft is in air.

Controls:

- **Criteria** (Power On, In Air)
- **Reset Timer**

### 2.16.2 Clock



Specify the time format and local offset. Settings reside in the System Setup page.

Format options include 12 hour, 24 hour, and UTC.

If a 12 hour or 24 hour clock is selected:

Tap **Local Offset** > Specify the appropriate offset value from UTC.

## 2.17 Page Shortcuts



A knob shortcut option allows you to customize slots 2 and 3 of the locator bar. Slot one is reserved for the Map page.

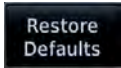
Tap a slot key and assign a page to that slot.

### PAGE SHORTCUT OPTIONS

- |           |               |
|-----------|---------------|
| • Traffic | • Nearest     |
| • Terrain | • Airport     |
| • Weather | • Flight Plan |

Depending on configuration, Traffic and Weather shortcuts may not be available.

Verify shortcut operation once complete.



Tapping **Restore Defaults** returns both slots to their default settings (Terrain for Slot 2, Nearest Airport for Slot 3).

## 2.18 Alerts Settings



Airspace alerts generate a message and filtering of the Nearest Airspace list. They rely on three-dimensional data (altitude, latitude, and longitude) to avoid nuisance alerts.

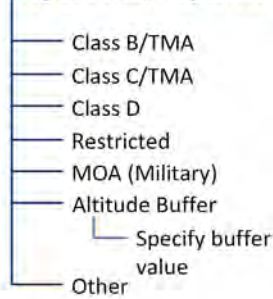
### FEATURE LIMITATIONS

- Alert altitudes are dependent on aircraft and airspace altitudes and the pilot-specified altitude buffer value



Control keys allow you to select which airspace boundaries generate an alert annunciation upon entry.

### Airspace Alert Options



Airspace alerts for Prohibited airspace cannot be disabled.

Alert boundaries for controlled airspace are sectorized to provide complete information on any nearby airspace.

Alert settings do not alter the depiction of airspace, nor do they change Smart Airspace settings on the Map page.

With the exception of Altitude Buffer, airspace alert options are on/off only.

## 2.19 Unit Selections



Customize the display unit settings. Tapping a parameter key opens a menu of the available unit types.

PARAMETER	SETTINGS
<b>Distance/Speed</b>	<ul style="list-style-type: none"> <li>Nautical Miles (nm/kt)</li> <li>Statute Miles (sm/mph)</li> </ul>
<b>Temperature</b>	<ul style="list-style-type: none"> <li>Celsius (°C)</li> <li>Fahrenheit (°F)</li> </ul>
<b>NAV Angle</b>	<ul style="list-style-type: none"> <li>Magnetic (°)</li> <li>True (°T)</li> <li>User (°U)</li> </ul>
<b>Magnetic Variation</b>	<ul style="list-style-type: none"> <li>Specify number of degrees for east or west (°E, °W)</li> <li>Available only when "User (°U)" is the active NAV angle</li> </ul>

### SPECIFY UNIT TYPE

1. Review the current unit selections.
2. Tap the applicable parameter key.
3. Select a unit type.

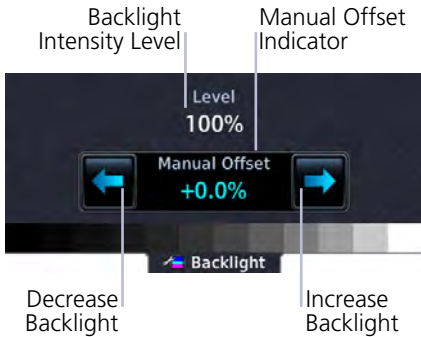
## 2.20 Display Brightness Control



Depending on configuration, display brightness is controlled using inputs from the built in photocell, aircraft dimmer bus, or both.

### 2.20.1 Automatic Brightness Control

Dimming is limited to prevent on screen indications from becoming unreadable. The built in photocell automatically controls display brightness based on ambient light levels.



During automatic control, the pilot may still adjust brightness using the manual offset controls in the Backlight page.

The unit retains manual offset settings over power cycles.

### 2.20.2 Manual Brightness Control

Optionally, the unit is configurable to use an aircraft dimming bus for display brightness control. Upon reaching minimum input level, display brightness reverts to the photocell. This prevents the display from going black in the event of a dimmer input failure.

Installer configured curves determine the amount of change in brightness that occurs in response to a control adjustment.

If brightness control is not satisfactory, contact a Garmin dealer to adjust the lighting curves.

## 2.21 Scheduled Messages



Create custom reminder messages and set when they will display. Allows one time, periodic, and event-based message types.



Active reminders appear at the top of the scheduled message list. This list is accessible via the Utilities menu page.

Examples: • "Call FBO" • "Close flight plan" • "Switch fuel tanks"

### CREATE A REMINDER MESSAGE

1. Tap **Create Scheduled Message**.
2. Specify the message type, content, and countdown timer value.

#### 2.21.1 Message Types

TYPE	DISPLAY
One time	Displays when the timer expires, or following each power cycle until message deletion.
Periodic	Displays after a specified duration of time. Countdown repeats once the message displays.
Event	Based a specified date and time. Message timer not applicable.

#### 2.21.2 Modifying Scheduled Messages

Once created, these messages may be modified at any time. Selecting a scheduled message opens an options menu.

##### EDIT MESSAGE

This function is accessible from either the Scheduled Messages page or the system message list.

##### RESET TIMER

Restarts the countdown timer.

##### DELETE MESSAGE

Confirming this request removes the selected message from the list.

# Status Indications

## 2.22 Alert Types

The unit generates annunciations in response to various conditions that may occur. These abbreviated messages are grouped according to the level of urgency and required response. They display in order of priority, from highest to lowest.

1. Warnings
2. Cautions
3. Mode & function advisories

### WARNINGS & CAUTIONS

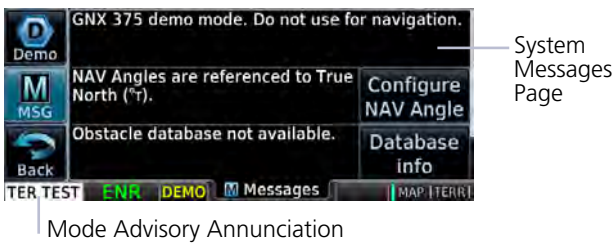
Warnings require immediate attention. Cautions indicate the presence of an abnormal condition that may require pilot action. A warning may follow a caution if no attempt is made to correct the condition (e.g., altering the aircraft’s path toward the alerted terrain or obstacle).

### MODE & FUNCTION ADVISORIES

Advisories provide status and operating information.

System advisories display on a dedicated page or slide over window. Depending on the number of advisories, this list may be scrollable.

Function or mode specific advisories appear as unobstructed annunciations on the associated display.





## 2.22.1 Alert Annunciations

Alert annunciations are abbreviated messages that indicate an alerted function or mode. The color of the annunciation depends on the alert type.

ALERT COLORS
<b>WARNING</b>
<b>CAUTION</b>
<b>ADVISORY</b>

- Warnings display in white text on red background
- Cautions display in black text on amber background
- Function or mode specific advisories display in black text on white background

When an alert is triggered, the annunciation flashes by alternating text and background colors. It turns solid after five seconds. All annunciations remain active (solid) until the condition is resolved or no longer a threat.

### ANNUNCIATION LOCATION

Alerts and informational advisories annunciate in the annunciator bar along the bottom of the screen.



## 2.22.2 Pop-up Alerts

If a warning or caution relating to terrain or traffic occurs, a pop-up window may display. These pop-ups only appear if the alerted function's associated page is not active.

### POP-UP ALERT PRIORITY

In the event of simultaneous alerts, pop-up windows display in the following order:

1. Terrain alerts
2. Traffic alerts

Each pop-up alert provides:

- Threat indication
- Alert annunciation
- Option to inhibit or mute the alert
- Control for closing the pop-up window
- Direct access to the associated page



Pop-up Alert Layout

1	Threat Indication	4	Alert Inhibit Key
2	Alert Annunciation	5	Go to <Page> Key
3	Close Pop-up Window Key		

To open the indicated page, tap **Go to <Page>**.

To acknowledge the alert and return to previous page view, tap **Close**.

## 2.22.3 Aural Alerts

### FEATURE LIMITATIONS

- GNX 375 only (traffic alerts)

Traffic alerts are accompanied by an aural voice message. Voice gender is configured during installation.

## 2.23 System Status Page



View information specific to the unit and its software. Refer here when contacting customer service.

### DATA FIELDS

- Serial number
- System ID
- Main software version
- GPS/WAAS software version
- Transponder software version (GNX 375 only)

### CONTROLS

Database Info access keys:

- **Active**
- **Standby**

## 2.24 GPS Status Page



Monitor GPS receiver performance, establish a baseline for normal system operation, and troubleshoot weak or missing signal issues.

This page provides a visual reference of GPS receiver functions, including:

- Current satellite coverage
- Phase of flight
- Present position (latitude and longitude)
- GPS solution and receiver status
- Position accuracy

### SKY VIEW DISPLAY



- Depicts satellites currently in view as well as their respective positions.
- Outer circle represents the horizon (with north at the top of the circle)
- Inner circle represents 45° above the horizon
- Center point shows the position directly overhead

## SIGNAL STRENGTH INDICATIONS

### SATELLITE SVIDS

Each bar is labeled with the SVID of the corresponding satellite.

Numbers vary according to satellite type.

- GPS: 1 to 31
- SBAS: 120 to 138

A graph shows GPS signal strength for up to 15 satellites. As the GPS receiver locks onto satellites, a signal strength bar appears for each satellite in view.

Graph symbols depict the progress of satellite acquisition. Some data may not display until the unit has acquired enough satellites for a fix.



SYMBOL	CONDITION
Not present	Receiver is searching for the indicated satellites.
Gray bar, empty	Satellite located.
Gray bar, solid	Satellite located, receiver is collecting data.
Yellow bar, solid	Data collected, but satellite is excluded from position solution (i.e., it is not in use).
Cyan bar, cross-hatch	Satellite located, but FDE excludes it for being a faulty satellite.
Cyan bar, solid	Data collected, but receiver is not using satellite in the position solution.
Green bar, solid	Data collected, satellite in use in the current position solution.
D (inside bar)	Differential corrections are in use (e.g., WAAS).

## POSITION ACCURACY FIELDS

LABEL	POSITION DATA
EPU	Estimated Position Uncertainty
HDOP	Horizontal Dilution of Precision
HFOM	Horizontal Figure of Merit
VFOM	Vertical Figure of Merit

EPU is the horizontal position error estimated by the fault detection and exclusion algorithm, in feet or meters.

Information fields indicate the accuracy of the position fix.

HFOM and VFOM values represent 95% confidence levels in horizontal and vertical accuracy.

Lower values mean higher accuracy. Higher values are the least accurate.

## FDE PREDICTION



### NOTE

Under FAR parts 91, 121, 125, and 135, FDE must be used prior to all oceanic or remote area flights using the GPS 175/GNX 375 as a primary means of navigation.

This program uses an algorithm to predict FDE availability. If the unit has not been in operation for more than six months, acquiring satellite data to establish almanac and satellite orbit information may take 5 to 10 minutes.

## 2.24.1 Circle of Uncertainty

### FEATURE LIMITATIONS

- Available only when the aircraft is on ground
- Displays only on the Map page
  - Depicts area surrounding the ownship when GPS cannot accurately determine aircraft location
  - Expands as GPS horizontal accuracy degrades
  - Shrinks as accuracy improves
  - Transparent so as not to obstruct other features

## 2.24.2 SBAS Providers



### NOTE

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



SBAS supports wide area or regional augmentation through the use of additional satellite broadcast messages.

Tap this key and select from the list of providers.

PROVIDER	SERVICE AREAS
EGNOS	Most of Europe and parts of North Africa.
GAGAN	India
MSAS	Japan only.
WAAS	Alaska, Canada, the 48 contiguous states, and most of Central America.

## 2.24.3 GPS Status Annunciations

Once the GPS receiver determines the aircraft’s position, the unit displays position, altitude, track, and ground speed data. GPS status annunciates under the following conditions.

ANNUNCIATION	CONDITION
Acquiring	GPS receiver uses last known position and satellite orbital data (collected continuously from satellites) to determine which satellites should be in view.
3D Nav	3-D navigation mode. GPS receiver computes altitude using satellite data.
3D Diff Nav	3-D navigation mode. Differential corrections from SBAS provider are in use.
LOI	Satellite coverage is insufficient to pass built-in integrity monitoring tests.

## 2.24.4 GPS Alerts

The following alert conditions can affect GPS accuracy.

INDICATIONS	FAULT TYPE	CONDITION
Yellow "LOI" annunciation.	Loss of Integrity	Integrity of the GPS position does not meet the requirements for the current phase of flight. Occurs before the final approach fix (if an approach is active).
Unit invalidates active course guidance. Annunciation is specific to cause.	Loss of Navigation	Aircraft is after the final approach fix and GPS integrity does not meet the active approach requirements.
		Insufficient number of satellites supporting aircraft position (i.e., more than 5 seconds pass without adequate satellites to compute a position).
		GPS sensor detects an excessive position error or failure that cannot be excluded within the time to alert.
		On-board hardware failure.
Yellow "No GPS Position" annunciation. Ownship icon not present	Loss of Position	Unit cannot determine a GPS position solution.

## 2.25 ADS-B Status Page



View last uplink time and GPS source information.

### FEATURE REQUIREMENTS

- GDL 88 or GTX 345 ADS-B transceiver (GPS 175 only)

### UPLINK TIME

TEXT COLOR	MINUTES SINCE LAST UPLINK
Green	< 5
Yellow	5 to 15
	> 15

Dashes indicate when valid uplink data is unavailable (e.g., the device is offline).

### FIS-B WX STATUS



Tapping this key opens the FIS-B Weather Status page. This page is also accessible from the FIS-B Weather setup menu.

### TRAFFIC APPLICATION STATUS



Tap this key to view the status of the three traffic applications: • AIRB • SURF • TSAA (airborne alerts)

ANNUNCIATION	DESCRIPTION
On	Application is running. Required ownship data is available and meets the performance criteria.
Available to Run	Application is configured. Required input data is available and meets the performance criteria. ASA application is off.
Unavailable to Run	Required input data is not available due to a failure (e.g., ASA application process failed).
Unavailable - Fault	Required input data is available, but does not meet the performance criteria or is not available due to non-computed data conditions.



# Logs

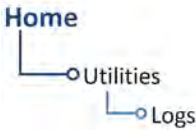
## 2.26 Exporting to SD Card



A logging function stores WAAS diagnostic data in the unit's internal memory. This information is available for export to an SD card for later analysis.

### FEATURE REQUIREMENTS

- SD card



The export function resides in the Logs page.  
This function is not available if no log files are present.

### WAAS Diagnostic Log Functions

- Generates log files automatically upon unit power-up
- Provides WAAS engine data in the form of serial text messages
- Overwrites oldest file when the internal log reaches capacity
- Exports to the “log\_files” folder on the SD card

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# 3 Navigation

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## DIRECT TO

### WAYPOINTS

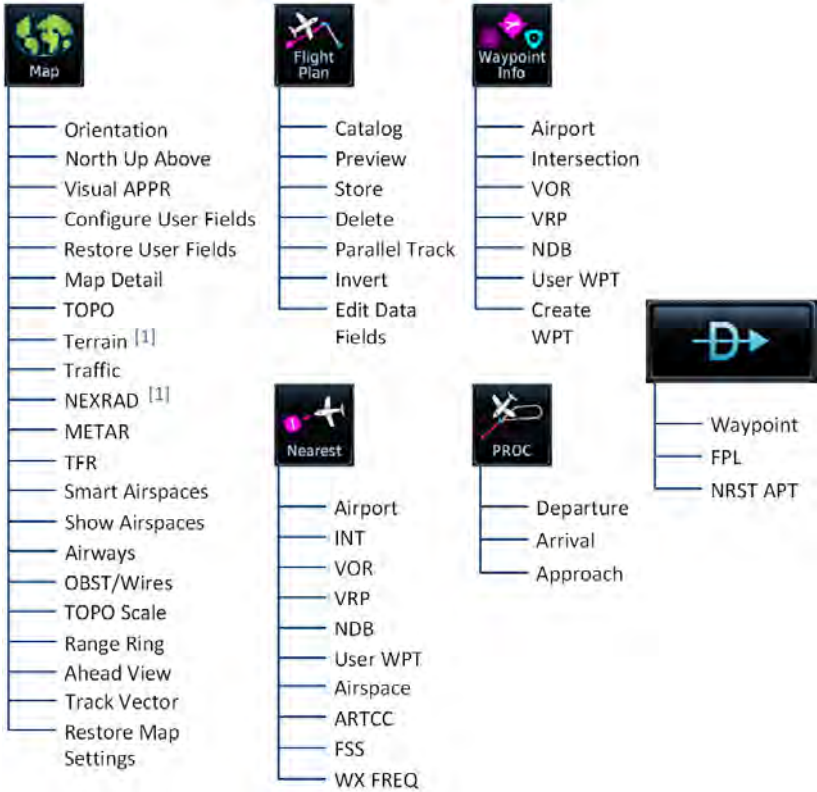
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## NAVIGATION APPS & FUNCTIONS

Menu selections vary based on features and optional equipment installed with Garmin avionics.



[1] NEXRAD and Terrain overlays are mutually exclusive.

# Map



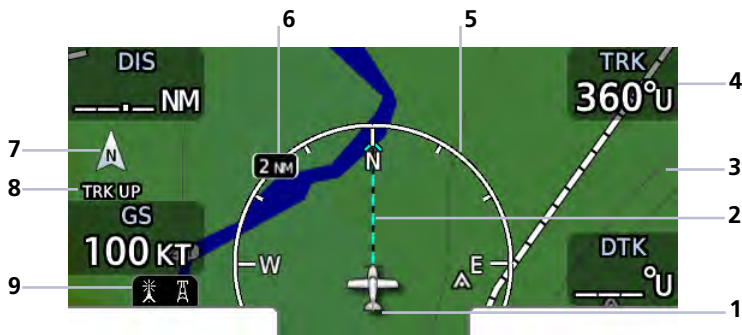
To increase situational awareness, the Map page depicts the aircraft's current position relative to land, aeronautical, weather, and traffic information.

## FEATURE REQUIREMENTS

- Active GPS source (aircraft position symbol)
- UAT receiver (FIS-B weather)

## FEATURE LIMITATIONS

NEXRAD and terrain overlay functions are mutually exclusive. Enabling one automatically disables the other.



Map Page

1	<p><b>Aircraft Symbol</b> Depicts current aircraft position and orientation.</p> <ul style="list-style-type: none"> <li>• Tip represents actual aircraft location</li> <li>• Symbol type is dependent upon configuration</li> <li>• Absent if a GPS source is not available</li> </ul>
2	<p><b>Track Vector</b> Current ground track indication.</p>
3	<p><b>Basemap</b> Presents a graphical depiction of land and water data.</p>
4	<p><b>User Field</b> Customizable data field appearing in each corner of the map. By default, these display: distance, track, ground speed, and desired track</p>
5	<p><b>NAV Range Ring</b> Displays current direction of travel on a rotating compass. Orientation: Magnetic north</p>

<b>6</b>	<p><b>Map Range Indicator</b></p> <p>Displays current map range in the upper left quadrant of the range ring (i.e., the distance from the aircraft to the range ring).</p>
<b>7</b>	<p><b>North Indicator</b></p> <p>Indicates True north.</p>
<b>8</b>	<p><b>Page Orientation Label</b></p> <p>Options:</p> <ul style="list-style-type: none"> <li>• <b>North Up</b> orients map to True north.</li> <li>• <b>Heading Up</b> orients map to current aircraft heading (requires heading data source interface).</li> <li>• <b>Track Up</b> orients map to current aircraft GPS track.</li> </ul>
<b>9</b>	<p><b>Map Overlay Icons</b></p> <p>Indicates status of overlays at the current map range. Includes: obstacles, power lines, precipitation, terrain, and traffic</p>

### AUTOMATIC ZOOM

AIRCRAFT STATE	DEFAULT ZOOM
Ground	0.50 nm
Air	10.0 nm

Map remembers the last zoom range for each aircraft state, and automatically resumes this view when the aircraft transitions between air and ground states.

### FEATURE LABELS

To maintain readability, map feature labels remain uniform at all zoom levels.

### TRAFFIC UNITS

System Units page selections do not affect the display of traffic on the Map page.

## LAND AND WATER DEPICTIONS

Land and water data are for general reference only. Data accuracy is not suitable for use as a primary navigation source. The information is intended to supplement and not replace official government charts and notices.

## DATA DRAWING ORDER

The electronic map draws data in order of priority, from highest (1) to lowest (39), with higher priority features drawn atop those of lower priority.

LEVEL	FEATURE
1	Traffic
2	Ownship
3	Flight Plan
4	Terrain-FLTA
5	Point Obstacles
6	Line Obstacles
7	TFR
8	METAR
9	Winds Aloft
10	SIGMET
11	AIRMET
12	PIREP
13	AIREP

LEVEL	FEATURE
14	Surface Conditions
15	Airspace
16	Waypoints
17	Airways
18	Reference Grid
19	Radar Coverage
20	NEXRAD
21	SafeTaxi
22	Runways
23	Terrain
24	Basemap
25	Topo

# 3.1 Map Interactions

## 3.1.1 Basic Interactions

Typical map interactions include zoom, pan, and object selection.

### PAN & ZOOM

Panning allows movement of the map in any direction without change to the current zoom setting. Zooming adjusts the current magnification level between pre-defined range parameters.



Maximum Scale Value



Minimum Scale Value

Before flight, consider which map scales are best for achieving the desired level of detail and map information. Generally, use smaller map scales in and around terminal areas and whenever precise navigation is required (e.g., airway or radial intercepts). During cruise flight, increase the map scale to better balance navigation, situational awareness, and decision making.

### OBJECT SELECTION

Tapping any object or location on the map displays a map pointer and an information banner.

### MAP POINTER



This symbol indicates point of contact on the map. A gray circle highlights any selected waypoint or obstacle.



## MAP INFO

Selected Airport



Available information and controls are dependent upon object or location type and proximity to other objects.



Selecting an airport icon displays the airport's highest field elevation.

An information page access key displays when you select a waypoint, airspace, airport, airport surface hot spot, or TFR.

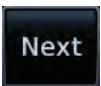
### DATA FIELDS

- Pan mode annunciation
- Bearing and distance from current aircraft position to map pointer
- Location elevation
- Maximum altitude AGL and MSL for obstacles

### CONTROLS

- **Map Pointer/Create Waypoint**
- **Graphical Edit**
- **Next** (for stacked objects)
- Associated information page access key, if applicable

## STACKED OBJECTS



To move the selector through each object in proximity of the map pointer, select an object and tap **Next**.



Overlapping objects may be difficult to identify at a given zoom level.

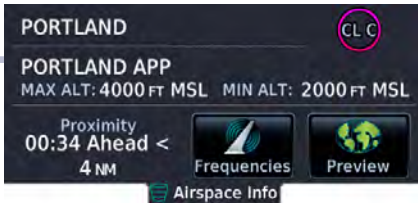
## AIRSPACE INFO

Selected Airspace



When selected, active airspace boundaries change color.

Tapping **Airspace Info** opens the associated information page.



Data fields display information specific to the selected airspace.

Available controls reside along the bottom of the page.

### DATA FIELDS

- Airspace name and type icon
- ATC entity responsible for the airspace, if applicable
- Floor and ceiling altitudes
- Proximity to airspace

### CONTROLS

- **Frequencies:** View a list of all related radio frequencies
- **Preview:** View the airspace boundary and a 2-D map of the surrounding area

## 3.1.2 Graphical Flight Plan Editing

### FEATURE LIMITATIONS

- Parallel track offsets do not apply to the temporary flight plan



Graphical editing allows quick changes to the active flight plan from the map display.



Map provides identifier keys for selecting waypoints that are stacked or in close proximity. If the displayed options are not preferred, tap away or select **Cancel**.

## TEMPORARY FLIGHT PLAN BANNER

An information banner displays waypoint selections made during graphical edit mode. All selections become active once you tap **Done**.



Lists up to four waypoint identifiers

Ellipse indicates additional waypoints

Initial waypoint in flight plan always appears first



Tapping **Undo** reverses the last edit. You may undo up to nine of the most recent actions.

On the map, dragging and releasing the leg away from any waypoints removes it from the temporary flight plan.

To exit edit mode without saving changes, tap **Cancel**.

## ADD WAYPOINT TO AN EXISTING LEG

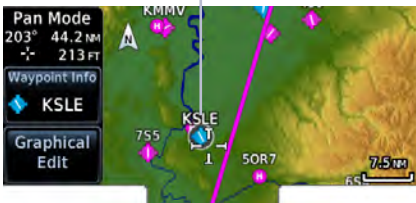


You can edit, add, or omit flight plan legs by tapping or dragging your finger directly on the map.



Existing Leg

Selected Waypoint



1. Tap any location on the map.
2. Tap **Graphical Edit**.

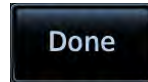


3. Tap and drag the leg to a new waypoint or airway, then release.



The temporary flight plan adjusts to show the new route.

If no other edits are necessary, tap **Done**.



	DTK	DIS	CUM
<b>KPDX</b> Portland Intl			
<b>KSLE</b> Mcrary	203°	44.2 NM	44.2 NM
<b>KEUG</b> Mahlon Sweet	191°	47.9 NM	92.2 NM

Active FPL

The new waypoint now appears in the active flight plan.



Delete any existing flight plan before attempting to graphically edit a direct-to waypoint. Map does not allow the addition of an intermediate waypoint between the current position and a direct-to waypoint unless the waypoint is in the flight plan.

## REMOVE WAYPOINT FROM FLIGHT PLAN



You can tap and drag any leg to another waypoint or airway, or release it away from any waypoint if an alternate destination is not preferred.



## CREATE LEGS WITHOUT AN EXISTING FLIGHT PLAN

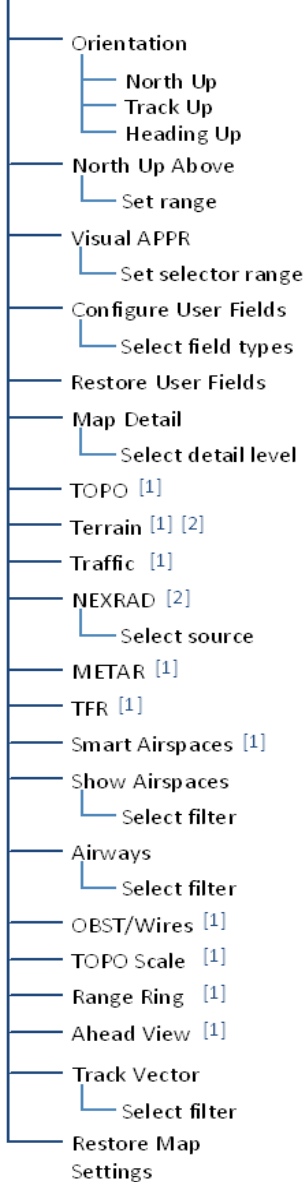


If an active flight plan does not exist, you can graphically create one without ever leaving the Map page.

1. Tap any location on the map > **Graphical Edit**.
2. Begin tapping waypoints to add them to the temporary flight plan.
3. Tap **Done**.

## 3.2 Map Setup

### Map Menu



Map setup options allow you to customize the display of aeronautical information.

Tap **Menu** when you need to:

- Change map orientation settings
- Configure user fields
- Adjust the map detail level
- Enable map overlays
- Select a NEXRAD source
- Filter airspace data according to altitude
- Specify airway types and range values
- Expand the forward-looking view for improved situational awareness

### RESTORE MAP SETTINGS

With the exception of user fields, this key restores all original factory map settings.

[1] On/off functionality only.

[2] NEXRAD and Terrain overlays are mutually exclusive.

## 3.2.1 Configure User Fields

### DEFAULT USER FIELDS

- DIS - Distance
- TRK - Track
- GS - Ground Speed
- DTK - Desired Track

Displays the Map page in configuration mode, allowing you to customize the display of data in each corner of the Map page.

User fields are useful during time sensitive and work load intense phases of flight.

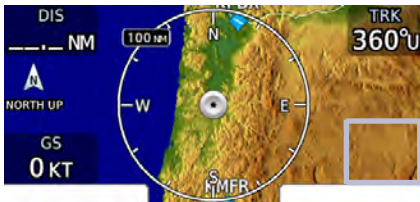


In configuration mode:

- All four data fields change to selectable keys
- All other map elements are inactive



Tap any key and select from the list of available data types. Displayed units change based on selection.



Selecting "OFF" removes the corresponding user field from the map page.

User Field Absent

Tapping **Restore User Fields** returns all fields to their default settings.

LABEL	FIELD TYPE	LABEL	FIELD TYPE
BRG	Bearing to waypoint	MSA	Minimum safe altitude
DIS/BRG APT	Distance/bearing from destination airport (i.e., the straight line distance)	OAT (static)	Outside static air temperature
DIS	Distance to waypoint	OAT (total)	Outside total air temperature
DIS to Dest	Distance to destination (i.e., the distance along the flight plan)	Time	Current time
DTK	Desired track	Time to TOD	Time to top of descent
ESA	En route safe altitude	TKE	Track angle error
ETA	Estimated time of arrival	Trip Timer	Timer display
ETA at Dest	ETA at destination	TRK	Track
ETE	Estimated time en route	VSR	Vertical speed required
ETE to Dest	ETE to destination	Wind	Wind speed and direction
Generic Timer	Timer display	XTK	Cross track error
GS	GPS ground speed	OFF	Do not display data field
GSL	GPS altitude		

“Destination” refers to the missed approach point (if an approach is loaded) or the final airport in the flight plan.

### 3.2.2 Map Orientation



Sets the orientation of the map display. Options include North Up, Track Up, or Heading Up. Label below the North indicator shows the current orientation.



This label is absent when the info banner is active.

North Up is useful when zoomed out to view the entire route or a frontal system on a NEXRAD display.



### 3.2.3 North Up Above

Sets the range at which map orientation changes to North Up.

Using the North Up Above feature causes the screen to switch at certain zoom levels. This is useful as a shortcut to quickly increase situational awareness.

### 3.2.4 Visual Approach



Visual Approach  
Key

Sets the distance from the destination airport at which the **Visual Approach** selector key becomes active.



To reduce page clutter, the key moves to the upper left corner of the display when the info banner is active.

### 3.2.5 TOPO Scale



Displays a topographical elevation scale.

### 3.2.6 Range Ring



Provides a more precise indication of distance between the aircraft and map objects.

### 3.2.7 Track Vector

#### FEATURE LIMITATIONS

- Indication absent when aircraft velocity is < 30 kt



Indicates the current ground track.

Arrow tip represents aircraft position at the specified time interval (if the aircraft maintains current ground track during that time).

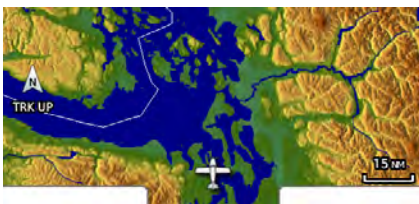
Track vector length options display as a dashed line and arrow extending from the aircraft icon, showing current track and distance the aircraft will travel in the selected time.

If the track vector is placed over a point on the map, and no data is entered into the system, the unit indicates a wind-corrected GPS track to that point. This is useful for intercepting airways and radials, making small but positive lateral corrections during approaches, and in setting up for arrivals in the terminal area.

### 3.2.8 Ahead View

#### FEATURE LIMITATIONS

- Not available when page orientation is North Up



Repositions ownship near the bottom of the page to expand the view ahead.

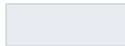
### 3.2.9 Map Detail

Changes to the map detail level take effect immediately. Options include:

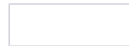
- Full
- High
- Medium
- Low

FEATURE	FULL	HIGH	MEDIUM	LOW
Small Cities				
Medium Cities				
Large Cities				
Freeways				
Highways				
Roads				
Railroads				
Basemap Labels				
VORs				
NDBs				
Line Obstacles				
Point Obstacles				
Airspaces that are not prohibited or restricted				
Waypoints				
SafeTaxi				
Restricted Airspaces				
Prohibited Airspaces				











**Present**



**Removed**








### AVIATION DATA SYMBOLS






SYMBOL	DESCRIPTION
	Non-towered, non-serviced airport [1]
	Towered, non-serviced airport [1]
	Soft surface, non-serviced airport
	Restricted (private) airport
	Heliport
	Intersection
	NDB
	VOR
	VORTAC
	Runway extension

SYMBOL	DESCRIPTION
	Non-towered, serviced airport [1]
	Towered, serviced airport [1]
	Soft surface, serviced airport
	Unknown airport
	ILS/DME or DME only
	LOM
	TACAN
	VOR/DME
	VRP

[1]Symbol depicts orientation of longest runway.

### LAND DATA SYMBOLS

SYMBOL	DESCRIPTION
	Railroad
	River/Lake
	State/Province Border
	Local Road
	Local Highway

SYMBOL	DESCRIPTION
	National Highway
	Freeway
	Small City
	Medium City
	Large City

## 3.3 Map Overlays

### OVERLAY SELECTIONS

- |           |               |
|-----------|---------------|
| • TOPO    | • TFR         |
| • Terrain | • Airspaces   |
| • Traffic | • Airways     |
| • NEXRAD  | • Obstacles & |
| • METAR   | Wires         |

Overlay data controls reside in the Map menu. Changes to an overlay setting take effect immediately.

NEXRAD and Terrain overlays are mutually exclusive. Enabling one automatically disables the other.

NEXRAD and Traffic overlays are optional.

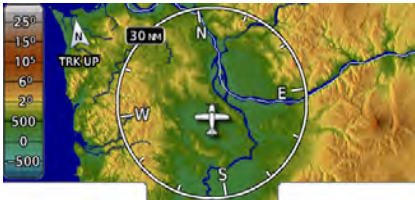
### 3.3.1 Overlay Controls



Control keys enable the specified overlay function only and do not activate interfaced equipment. Control keys remain active even in the absence of required data.

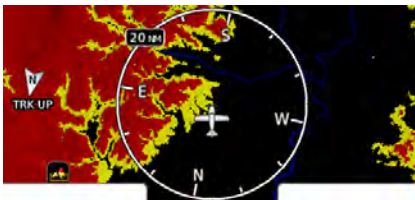
Overlay controls reside in the Map menu.

#### TOPO



- Overlays topographical data and ground elevation scale
- Depictions are similar to a VFR sectional
- Pilot-selectable topographical elevation scale available

#### TERRAIN



- Overlays terrain map data
- Color shading depicts terrain elevation relative to the aircraft's altitude

## TRAFFIC



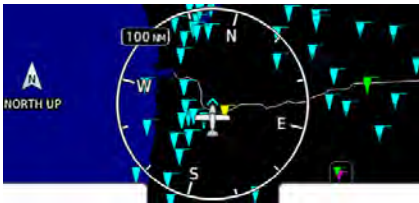
- Overlays traffic information
- Filter selection on the Traffic page determines altitude range
- Feature optional for GPS 175

## NEXRAD



- Overlays datalink precipitation weather information
- Options include: CONUS, Regional, or off (none)
- Feature optional for GPS 175

## METAR



- Overlays graphical METARs
- Tapping flag icon displays information on current and forecast conditions
- Available only in areas covered by the active navigation database
- Feature optional for GPS 175

## TFR



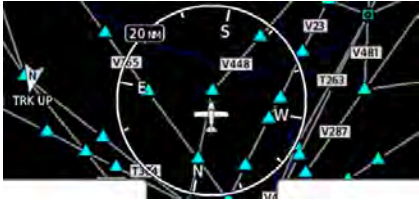
- Overlays graphical TFRs
- Tapping this airspace symbol displays details regarding the restricted area
- Feature optional for GPS 175

## AIRSPACES



- Overlays airspace boundaries with altitude labels
- Filter selection determines altitude range

## AIRWAYS



- Overlays the selected airway type(s) with identifier labels
- Options include: low, high, all, or off (none)
- High altitude airways are green, low altitude airways are gray

## OBSTACLES & WIRES










- Overlays obstacle and wire data
- Color shading depicts an object's elevation relative to the aircraft's altitude

### 3.3.2 Overlay Status Icons

Icons indicate which overlays are present at the current map range. A crossed out icon means the overlay is active, but data is unavailable due to a failure, test, or standby condition (where relevant).

The absence of an overlay icon means one of two possible conditions:

1. Overlay not present at the current detail level or zoom setting.
2. Overlay control is off.

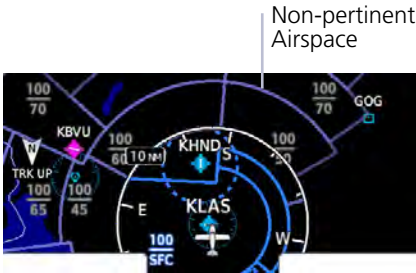
	METAR		NEXRAD
	Obstacle		Power Line
	TFR		Traffic
	Terrain		Data not available



### 3.3.3 Smart Airspace



Smart Airspace Off



Smart Airspace On

Garmin’s Smart Airspace feature automatically de-emphasizes non-pertinent airspace away from the aircraft’s current altitude.

When an airspace’s vertical proximity to the aircraft is >1,000 ft:

- Its boundary becomes transparent
- All associated altitude labels turn gray

This range increases linearly to 2,000 ft as the aircraft ascends to 10,000 ft.

SMART AIRSPACE CRITERIA	
AIRCRAFT ALTITUDE	AIRSPACE PROXIMITY TO AIRCRAFT <sup>[1]</sup>
Sea level	>1,000 ft
>10,000 ft	2,000 ft

[1]Vertical distance above and below aircraft altitude.

#### AIRSPACE DATA SYMBOLS

SYMBOL	DESCRIPTION
	Class B Altitude Label (ceiling/floor)
	Class C Altitude Label (ceiling/floor)
	Class D Altitude Label (ceiling only)
	TFR
	Class B/TMA

SYMBOL	DESCRIPTION
	Class C/TCA
	Class D
	Restricted/Prohibited
	MIL
	Other/ADIZ

### 3.3.4 SafeTaxi

#### SAFETAXI FEATURES

- Airport diagram overlay that includes hot spot information
- Aircraft position relative to taxiways, runways, and airport landmarks
- Pilot selectable range options








SafeTaxi provides greater map detail and higher image resolution at lower zoom levels.

Feature labels denote:

- Runways
- Taxiways
- Airport landmarks

#### SAFETAXI DATA SYMBOLS

SYMBOL	DESCRIPTION
	Runway
	Helipad
	Airport Beacon

SYMBOL	DESCRIPTION
	Taxiway
	Construction Area
	Unpaved Parking

## HOT SPOTS



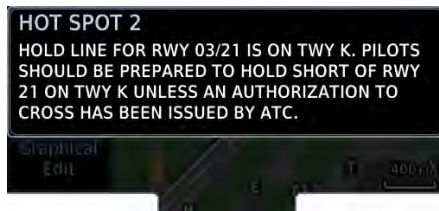
SafeTaxi hot spots identify locations on an airport surface where positional confusion or runway incursions are likely to occur. These known problem areas require heightened attention by pilots.



Selecting the border of a hot spot displays a brief summary of the indicated hazard and an information key.



Tapping this key provides additional location information. Numbering corresponds to a list on the airport diagram.



The following airport features may be deemed hot spots by aviation authorities.

- Intersecting taxiways and runways
- Complex ramp areas
- Directional limitations
- Limited wing-tip clearance
- Overflight risk

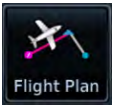
## CONSTRUCTION SPOTS



There are no expanded detail keys or notes associated with construction areas.

Construction Area Border

# Active Flight Plan



Current flight plan information displays as a scrolling list on the Active Flight Plan page.

### FEATURE REQUIREMENTS

- Active flight plan

### FEATURE LIMITATIONS

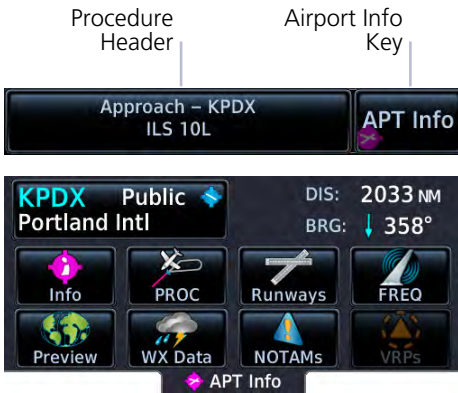
- Displays up to 100 waypoints for an active flight plan



**Active Flight Plan Page**

1	Waypoint Identifier Column	5	Selectable Data Field Columns
2	Active Leg Indicator	6	Fix Type Indicator
3	Current Waypoint	7	Leg Data
4	Waypoint Type Icon	8	Add Waypoint Key

## AIRPORT INFO



For convenience, airport information is directly accessible from the procedure header. This includes airports specified in active approaches, arrivals, and departures.

Tap **Airport Info** to open the corresponding information page.

## FIX TYPE INDICATIONS

LABEL	FIX TYPE
iaf	Initial Approach Fix
faf	Final Approach Fix
map	Missed Approach Point
mahp	Missed Approach Hold Point
-p	Parallel Track (no fix)

When applicable, labels indicate the fix type associated with an identifier.

## ACTIVE LEG STATUS INDICATIONS

SYMBOL	DESCRIPTION
	IAF
	FAF
	MAP
	MAHP
	Parallel Track
	Arc Right

SYMBOL	DESCRIPTION
	Arc Left
	Holding Pattern (Right Turns)
	Holding Pattern (Left Turns)
	Right Arrow
	Direct To

## 3.4 Edit Data Fields



To select a flight plan data column, tap **Edit Data Fields**. Columns are arranged in numerical order (1 - 3).

To restore columns to default display settings, tap **Restore Defaults**.

DATA FIELD SELECTIONS	
CUM	Cumulative Distance
DIS	Distance
DTK	Desired Track
ESA	En Route Safe Altitude
ETA	Est. Time of Arrival
ETE	Est. Time En Route

Selections are identical for each column. By default, flight plan information fields display:

Column 1: DTK

Column 2: DIS

Column 3: CUM

## 3.5 Collapse All Airways

Airways automatically display as flight plan legs. A single airway may contain numerous legs. Airways without an active leg collapse for simplification. This does not affect airway legs shown on the external navigator(s).

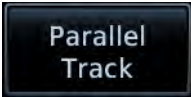


All airways begin with an indicator field and end with an exit identifier.



To hide all waypoints along an airway, but not the airway's exit waypoint, tap **Collapse All Airways**.

## 3.6 Parallel Track



A parallel track is a route that is offset a distance from and parallel to the original route. Parallel Track feature sets the offset distance of 1 to 99 nm to the left or right of the current flight plan.

### FEATURE REQUIREMENTS

- Active flight plan

### FEATURE LIMITATIONS

- Function not available when Direct-to is active.
- Graphically editing a flight plan cancels the parallel track function
- Large offset values combined with certain leg types (e.g., approach) or leg geometries (i.e., changes in track  $>120^\circ$ ) do not support parallel track

Creating a parallel course offset shows a magenta parallel track line to the left or right from the original course and shows the original course line in gray.

The aircraft navigates to the parallel track course line and external CDI/HSI guidance drives from the parallel track. At the end of the flight plan when reaching the offset distance from the end of the parallel track, a parallel terminating message appears, giving time to intercept the original course.

From the Active Flight Plan page:

1. Tap **Menu > Parallel Track**.
2. Specify the track direction and offset distance relative to the active flight plan.
3. Tap **Activate**.

“-P” indicates when the active leg is on a parallel track.

## 3.7 Flight Plan Catalog

Create, activate, edit, copy, and delete flight plans with the Flight Plan Catalog function. The catalog holds up to 99 flight plans with up to 100 waypoint locations each. Flight plans are named by the departure and destination location.

1. In the Flight Plan page, tap **Menu > Catalog >** and tap a flight plan.
2. Tap a Route Option.

FLIGHT PLAN ROUTE OPTION	DESCRIPTION
<b>ACTIVATE</b>	<p>This option creates a copy of the flight plan (automatically transfers to Active Flight Plan page) and overwrites the active flight plan.</p> <ol style="list-style-type: none"> <li>1. Select the flight plan.</li> <li>2. Tap <b>Activate &gt; OK</b> to replace the existing flight plan with the new one.</li> </ol>
<b>INVERT &amp; ACTIVATE</b>	<p>This option reverses and activates the previous flight plan. Select the flight plan.</p> <ol style="list-style-type: none"> <li>3. Tap <b>Invert &amp; Activate &gt; OK</b> to invert and activate the flight plan.</li> </ol>
<b>PREVIEW</b>	<p>Previews the selected flight plan. Tap the flight plan &gt; <b>Preview</b>.</p>
<b>EDIT</b>	<p>Edits the selected flight plan.</p> <ol style="list-style-type: none"> <li>1. Tap the flight plan &gt; <b>Edit</b>.</li> <li>2. Make changes to the waypoint and use the Waypoint Options.</li> </ol>
<b>COPY</b>	<p>Copies the selected flight plan. Tap the flight plan &gt; <b>Copy</b> to copy the selected flight plan. If any changes are required for the copy, it can be used as a starting point for a similar flight plan. Use the Edit Route option to make the desired changes.</p>
<b>DELETE</b>	<p>Deletes the selected flight plan. Select the flight plan &gt; <b>Delete &gt; OK</b>.</p>



## 3.7.1 Delete a Flight Plan

---

There are three ways to delete a flight plan.

- Remove a selected flight plan from the catalog
- Remove all flight plans from the catalog
- Remove all waypoints locations from the active flight plan

Deleting the existing active flight plan does not delete the stored flight plan in the catalog.

### **From the Active Flight Plan page:**

1. Tap **Menu > Delete**.
2. Confirm the request.

### **From the catalog:**

1. Select a flight plan.
2. Tap **Delete**.
3. Confirm the request to delete all waypoints.

### **To delete all flight plans from the catalog:**

1. Select a flight plan.
2. Tap **Delete All**.
3. Confirm the request.

## 3.8 Creating a Flight Plan



### NOTE

The unit cannot verify the accuracy of cataloged flight plans with modified procedures.

You can create a flight plan one of three ways.

- Creating a new flight plan from the active flight plan
- Creating a flight plan from the Map page
- Creating a new flight plan in the catalog

Flight plans are listed by the departure and destination waypoint identifiers. The destination waypoint is the last airport in the flight plan.

### CREATE A NEW FLIGHT PLAN

1. From the Home page, tap **Flight Plan** > **Menu** > **Delete** > **OK** to delete the existing active flight plan. If there is no active flight plan, continue to the next step.
2. Tap **Add Waypoint** > select a waypoint identifier > **Enter**, repeat as required.

### CREATE A FLIGHT PLAN FROM THE MAP PAGE

1. Tap the Map page display > **Graphical Edit**.
2. Tap the first flight plan location waypoint on the map. If there are nearby waypoints, select the location waypoint.
3. Tap the next location waypoint or airway on the map and continue adding locations as required and tap **Done** when finished.

### CREATE A NEW FLIGHT PLAN IN THE CATALOG

It is not recommended to save flight plans with modified procedures in the flight plan catalog.

1. Tap **Flight Plan** > **Menu** > **Catalog**.
2. At the end of the flight plan list in the Catalog, tap **Create New Catalog Route**.
3. Tap **Add Waypoint** > select a waypoint identifier
4. Tap **Menu** > **Direct-To** (or **Preview** > **Activate**).

## 3.9 Waypoint Options

### Options Menu



Selecting a waypoint identifier opens a menu. Changes to the active flight plan take effect immediately.

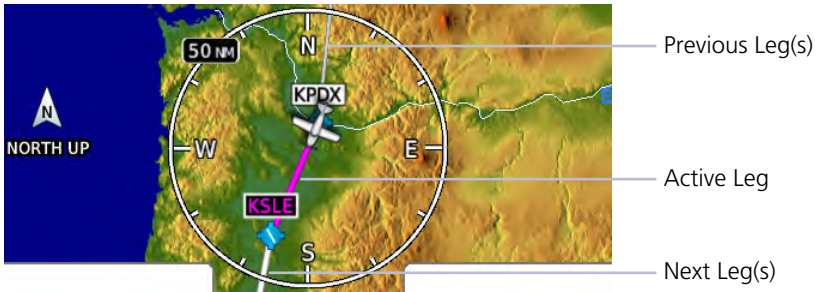
- Insert a new waypoint into a flight plan
- Add an airway or procedure
- Change the active leg
- Remove a selected waypoint
- Add a holding pattern to an existing waypoint
- View information about a waypoint

SELECTION	FUNCTION
<b>Insert Before</b>	<ul style="list-style-type: none"> <li>• Insert a new waypoint before the selected waypoint</li> </ul>
<b>Insert After</b>	<ul style="list-style-type: none"> <li>• Insert a new waypoint after the selected waypoint</li> </ul>
<b>Load PROC</b>	<ul style="list-style-type: none"> <li>• Load and activate an approach, arrival, departure, missed approach, and vectors to final</li> </ul>
<b>Load Airway</b>	<ul style="list-style-type: none"> <li>• Assign an airway and exit waypoint to the selected entry waypoint (e.g., intersection, VOR)</li> </ul>
<b>Activate Leg</b>	<ul style="list-style-type: none"> <li>• Designate any TO waypoint as the active leg</li> </ul>
<b>Hold at WPT</b>	<ul style="list-style-type: none"> <li>• Create a user-defined hold at the selected waypoint</li> <li>• Specify hold parameters and preview holding patterns from a dedicated menu page</li> </ul>
<b>WPT Info</b>	<ul style="list-style-type: none"> <li>• Open the dedicated information page for the selected waypoint</li> </ul>
<b>Remove</b>	<ul style="list-style-type: none"> <li>• Remove the selected waypoint or hold from the active flight plan</li> </ul>

# 3.10 Active Flight Plan Map Overlay

LEG STATUS	COLOR
Active	Magenta
Next & Future	White
Past or Inactive	Gray

Active, next, and previous flight plan legs overlay on the Map page and are display only.



**Leg Status Indications**

## 3.11 GPS NAV Status Indicator Key

This key displays from-to-next route information when an active flight plan exists. It resides in the lower right corner of the display.

Indications change based on active leg status.

### No Flight Plan Exists



Tap for direct access to the Active Flight Plan page.

Page icon means an active flight plan does not exist.

### Route Indicator Only



Once the page is open, the indicator is display only.

Underscores denote the absence of an active leg.

### Active Route Display



Label changes to show active route identifiers (from-to-next) and leg types.

### CDI Scale Active



Only from-to waypoints display when the CDI scale is active.

# Direct To

## FEATURE LIMITATIONS

Not all flight plan entries are note selectable using the Direct-To function (e.g., holds and course reversals).



## NAVIGATION KEYS

DIRECT-TO KEY	KEY DESCRIPTION
<b>DIRECT-TO</b>	Sets a course to a specified waypoint
<b>DIRECT-TO ACTIVATE</b>	Activates the loaded course
<b>HOLD</b>	Allows you to set holding patterns with inbound or outbound course guidance, left or right turns, and specify leg length in time or distance
<b>LOAD HOLD</b>	Loads holding patterns into the unit with a user-defined location inserted into a flight plan or using direct-to navigation
<b>HOLD ACTIVATE</b>	Activates the loaded hold pattern, keeping the aircraft in a hold pattern until it is removed
<b>REMOVE</b>	Removes a hold on a waypoint
<b>ENTER</b>	Enters a value using the keypad
<b>LOAD APPROACH</b>	Loads the approach course into the GPS/GNX unit

DIRECT-TO KEY	KEY DESCRIPTION
<b>ACTIVATE APPROACH</b>	Activates the loaded approach

## DIRECT-TO NAVIGATION

DESTINATION WAYPOINT	RESULT
<b>LOCATION IS IN THE FLIGHT PLAN</b>	After reaching the location the next location in the flight plan sequence resumes.
<b>LOCATION IS NOT IN THE FLIGHT PLAN</b>	The flight plan is not active but remains available.

Approach guidance is not active if a direct course is activated at a location between the FAF and the MAP and then tapping the Direct-To function.

NAVIGATION OPTION	INFORMATION AND INSTRUCTIONS
<b>DIRECT-TO COURSE</b>	<ol style="list-style-type: none"> <li>1. Tap <b>Direct-To &gt; Waypoint, FPL, or NRST APT</b> tab.</li> <li>2. Tap the waypoint identifier or <b>Select Waypoint &gt; Activate</b>.</li> </ol>
<b>REMOVING A DIRECT-TO COURSE</b>	<p>When canceling a Direct-To course, the previously active flight plan reactivates and the nearest leg to the aircraft position is the active leg. If there was no active flight plan, the aircraft continues with the current heading.</p> <p>To remove the Direct-To course, tap <b>Direct-To &gt; Remove</b>.</p>
<b>FLIGHT PLAN LOCATION</b>	If flight plans, holds, or course reversals, are not available using the Direct-To function, select the location. Tap <b>Direct-To &gt; FPL &gt; the flight plan waypoint &gt; Activate</b> .
<b>NEAREST AIRPORT</b>	The airport at the top of the list is the closest airport. Tap <b>Direct-To &gt; NRST APT &gt; waypoint identifier &gt; Activate</b> .
<b>MAP LOCATION</b>	Set a Direct-To course to any location on the Map page by touching an airport, VOR, NDB or any other location. Tapping the map page anywhere without an existing location name creates a waypoint with the name MAPWPT. On the Map page, tap a location > <b>Direct-To &gt; Activate</b> .

NAVIGATION OPTION	INFORMATION AND INSTRUCTIONS
<p><b>OFF-ROUTE COURSE</b></p>	<p>There are three options for creating an off-route and direct course; Waypoint or NRST APT tab, or selecting a location on the map. Activating an off-route Direct-To course automatically deactivates the current (or existing) flight plan. Removing the Direct-To course reactivates the original active flight plan and waypoint sequencing.</p>
<p><b>USER-DEFINED HOLD</b></p>	<p>Create user-defined holds as part of a direct-to function to a location. Modify course holds using these hold options.</p> <ul style="list-style-type: none"> <li>• Course - Course Angle</li> <li>• Direction - Inbound or Outbound</li> <li>• Turn - Left or Right</li> <li>• Leg Type - Time or Distance</li> <li>• Leg Time/Distance - Enter Time or Distance</li> <li>• EFC - Expect Further Clearance Reminder</li> </ul> <p>Create a user-defined hold. When a user hold is changed with the Direct-To key, navigation guidance returns to the holding fix and the new hold initiates. Automatic waypoint sequencing suspends during the hold.</p> <ol style="list-style-type: none"> <li>1. Tap <b>Direct-To &gt; Hold</b> &gt; modify the course options.</li> <li>2. Then tap <b>Load Hold &gt; Hold Activate</b>.</li> </ol>



# Waypoints

There are two types of waypoints: database and user

Database waypoints (i.e., waypoints contained in the navigation database) are organized into five groups:



## Database Waypoints

The Airport page is a great place to start when performing an approach brief, checking weather, or considering a diversion.



You also have the ability to define any point in space and store it. Unlike database waypoints, these “user” waypoints are editable.

## 3.12 Waypoint Information



Dedicated information pages provide waypoint search functions and details not available on the Map page.

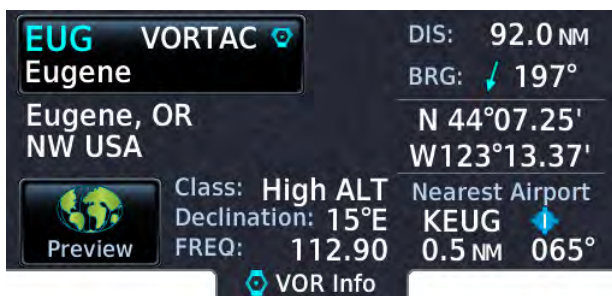
### FEATURE REQUIREMENTS

- FIS-B (viewing NOTAMs)
- Navigation database containing VRP waypoint data

### FEATURE LIMITATIONS

- 2-D maps provide zoom functionality only
- FIS-B transmits distant and FDC NOTAMs within 100 nm of radio station position

Intersection, VOR, VRP, and NDB information pages have a uniform layout.



**VOR Information Page**

<b>1</b>	Waypoint Identifier key	<b>5</b>	Nearest NAVAID information
<b>2</b>	Location Information	<b>6</b>	Waypoint coordinates
<b>3</b>	Preview key	<b>7</b>	Waypoint distance and bearing
<b>4</b>	Waypoint specific information (e.g., class, station declination, frequency)		

## COMMON PAGE FEATURES






All waypoint information pages share the following features.


DATA FIELDS	CONTROLS
<ul style="list-style-type: none"> <li>Distance and bearing from current aircraft position</li> <li>Latitude and longitude</li> <li>Applicable city, state, country and/or region (e.g., "NW USA")</li> <li>Identifier and type icon</li> </ul>	<ul style="list-style-type: none"> <li><b>WP Identifier</b> key with access to multiple search tabs</li> <li><b>Preview</b> key for displaying a 2-D map of the surrounding area (includes SafeTaxi airport depictions)</li> </ul>

As you approach an airport, use the Preview function to orient yourself for such things as pattern entry or runway alignment.

## WAYPOINT SPECIFIC PAGE FEATURES

Page features listed here are unique to the corresponding waypoint.

WAYPOINT	PAGE FEATURES
<p><b>Airport</b></p> 	<p><b>Info:</b> Airport location, elevation, time zone, and fuel availability.</p> <p><b>Procedures:</b> Available approach procedures.</p> <p><b>Runways:</b> Identifiers, size, surface type, and traffic pattern direction.</p> <div data-bbox="314 412 474 488" style="border: 1px solid black; padding: 2px; display: inline-block; margin: 5px;"> <p style="margin: 0;">Runway <b>13 /31</b></p> </div> <p style="margin-left: 20px;">To open a list of available runways, tap <b>Runway</b>.</p> <p><b>Frequencies:</b> Available communication and localizer frequencies. The “c” symbol denotes frequencies that function as the CTAF. If available, for additional frequency information, tap “<b>More Information</b>.”</p> <p><b>WX Data:</b> Applicable METARs, city forecasts, and TAF weather information.</p> <p><b>NOTAMS:</b> Applicable distant and FDC NOTAMs.</p> <p><b>VRPs:</b> Nearest VRPs.</p>
<p><b>Intersection</b></p> 	<p><b>Data Fields:</b></p> <p>Nearest VOR (identifier, type icon, bearing, and distance)</p>
<p><b>VOR</b></p> 	<p><b>Data Fields:</b></p> <ul style="list-style-type: none"> <li>• Frequency</li> <li>• Nearest airport (identifier, type icon, bearing, and distance)</li> <li>• Station declination</li> <li>• VOR class</li> </ul>
<p><b>VRP</b></p> 	<p><b>Data Fields:</b></p> <p>Nearest VRP (identifier, type icon, bearing, and distance)</p>
<p><b>NDB</b></p> 	<p><b>Data Fields:</b></p> <ul style="list-style-type: none"> <li>• Frequency</li> <li>• Nearest airport (identifier, type icon, bearing, and distance)</li> <li>• Marker description</li> </ul>

WAYPOINT	PAGE FEATURES
<p><b>User WPT</b></p> 	<p><b>Edit:</b> Opens the Create User Waypoint page for editing purposes.</p> <p><b>View List:</b> Displays a list of all user waypoint identifiers.</p> <p><b>Delete:</b> Removes the selected user waypoint from the list.</p> <p><b>Delete All:</b> Removes all user waypoints from the list.</p> <p>All deletions require user confirmation. User waypoints in the active flight plan cannot be edited or deleted.</p> <p><b>Data Fields:</b></p> <ul style="list-style-type: none"> <li>• Reference position or nearest waypoint (identifier, type icon, radial, and distance), whichever is applicable</li> <li>• Number of waypoints used out of 1,000</li> </ul>

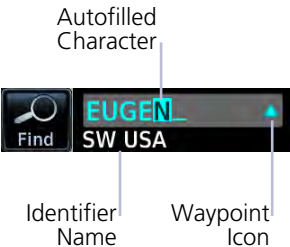
The User WPT page is the only page that allows you to view an entire list of all user waypoints created and saved in the database.

## 3.13 Waypoint Selection



The **WP Identifier** key provides access to different waypoint search options. Enter a specific identifier or select one from the available search tabs.

### 3.13.1 Waypoint Autofill



Alphanumeric characters autofill based on the first alphabetical match in the navigation database.

Autofill characters are cyan and display from the cursor position to the right of the field.



**WP Info Key**

Matching waypoint entries typically change with the addition of each typed character. An information key reflects each matching entry.

“No matches found” and “Duplicate found” announce when applicable.

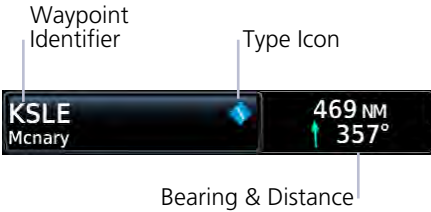
### 3.13.2 Search Tabs



The **Find** key provides access to multiple search tabs. Each tab displays a list of selectable identifiers based on specific criteria.



**Waypoint Search Tabs**



Each entry includes general information about the associated waypoint.

#### RECENT

Lists up to 20 of the most recently viewed waypoints.

#### NEAREST

Lists up to 25 waypoints within a 200 nm radius.



Tap **Filter** and select from the available filter options. Only waypoints belonging to the selected class appear in the list.



To list all classes, select **All**.

#### FLIGHT PLAN

Lists all waypoints contained in the active flight plan.

#### USER

Lists up to 1,000 user-defined waypoints.

### SEARCH BY NAME



Lists all airports, NDBs, and VORs associated with the specified facility name.

Tap **Search Facility Name** to begin search.

### SEARCH BY CITY



Lists all airports, NDBs, and VORs found in proximity of the city.

Tap **Search City Name** to begin search.

## 3.14 Create User Waypoints



Create and store up to 1,000 user defined waypoints.

### FEATURE LIMITATIONS

- Overwriting an existing waypoint identifier of the same name is not allowed.
- Names may be up to six characters in length
- Comment may be up to 25 characters
- Maximum waypoint limit: 1,000



Access this page from one of two places:

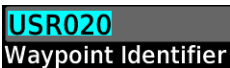
- Waypoint Info page
- Map page

### MAP POINTER KEY



Tapping any location on the map that is not a existing waypoint displays the Create Waypoint access key.

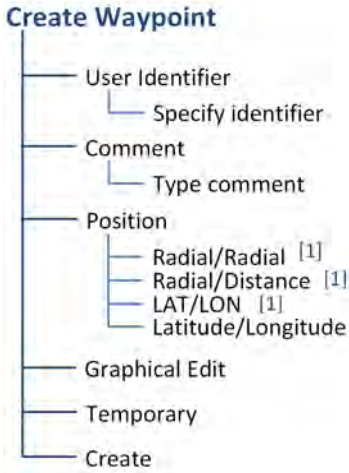
### USER WAYPOINT IDENTIFIER



Assign a unique identifier or keep the unit generated identifier. By default, the identifier format is "USR" followed by a sequential three digit number.

User waypoints are helpful when ATC requests that you fly one radial to intercept another. While the point is often defined by an intersection in the navigation database, this is not always the case. The Create User Waypoint function allows you to define the new intersection and insert it into the flight plan in advance, as opposed to using the NAV radio to tune each VOR and specify the radials to fly inbound and outbound.

### 3.14.1 Define Waypoint Criteria



Active user waypoints already existing in a flight plan are not editable.

When creating a user waypoint, you have the option to:

- Create a user waypoint
- Assign a unique identifier
- Set the waypoint as temporary
- Enter a comment
- Set the waypoint position
- Edit the waypoint graphically

SELECTION	FUNCTION
<b>User Identifier</b>	Assign a unique identifier.
<b>Comment</b>	Type a comment regarding the new waypoint.
<b>Position</b>	Set the waypoint position.
<b>Graphical Edit</b>	Open a preview map for graphical editing purposes. User waypoint icon remains stationary as you move the surrounding map to the new location.
<b>Temporary</b>	Assign the waypoint a temporary status. Identifier remains available until the next unit power cycle.
<b>Create</b>	Add the new identifier to the used waypoints list. The associated information page opens automatically for viewing and editing purposes.



## COMMENT FORMAT

Default comments display in a specific format for each reference type.

Radial/Radial

<Waypoint 1><Radial 1> / <Waypoint 2><Radial 2>

UBG177 / CVO031

Radial/Distance

<Waypoint><Radial> / <Distance>

UBG177 / 31

LAT/LON

<LAT> <LON>

N45 W123

## POSITION OPTIONS

Set the Waypoint Position using one of the following options.

### **Radial/Radial:**

Specify a waypoint and radial for each of the two reference points.

### **Radial/Distance:**

Specify the reference waypoint, radial, and distance.

### **LAT/LON:**

Specify the point's latitude and longitude.

## 3.14.2 Edit an Existing User Waypoint

---

### FEATURE LIMITATIONS

User waypoints that are part of a flight plan are not editable.

You can access the edit function multiple ways.

#### From the dedicated information page:

Home > **Waypoint Info** > **User WPT** > Specify an identifier, or tap **View List** and select an identifier from the used waypoints list > **Edit**

#### From the Nearest page:

Home > **Nearest** > **User WPT** > Select an identifier from the list (e.g., USR001) > **Edit**

#### From the Active Flight Plan page:

Home > **Flight Plan** > Select the identifier from the flight plan > **WPT Info** > **Edit**

### MODIFY POSITION VALUES

From the Edit WPT page, you can modify a user waypoint's position one of two ways:

1. Tap **Position** > **Latitude/Longitude** > Specify the waypoint's coordinates > **Save**.

OR

1. Tap **Graphical Edit**.
2. Hold and drag the basemap until the user waypoint icon appears over the desired location.
3. Tap **Enter** > **Save**.

## 3.14.3 Import User Waypoints

---



### NOTE

The import function overwrites any existing user waypoint of the same name.

The **Import Waypoints** key appears when the unit detects a user waypoint on the datacard.

1. Insert datacard containing user waypoints.
2. From the Home page, tap **Waypoint Info** > **Import Waypoints**.
3. Acknowledge the pop-up message.

## 3.15 Nearest






View a list of the nearest waypoints, frequencies, or facilities within 200 nm of the aircraft's position.

From the Home page:

1. Tap **Nearest** > select a waypoint or frequency icon.
2. Scroll through the list of entries.

Information varies according to the selected waypoint or frequency type. Nearest waypoints provide an identifier key for accessing the associated information page.

ICON	DISPLAYS
 Airport	<b>Nearest Airport</b> <ul style="list-style-type: none"> <li>• Identifier • symbol • distance • bearing • approach type</li> <li>• length of longest runway</li> </ul>
 INT	<b>Nearest Intersection</b> <ul style="list-style-type: none"> <li>• Identifier • symbol • distance • bearing</li> </ul>
 VOR	<b>Nearest VOR</b> <ul style="list-style-type: none"> <li>• Identifier • symbol • distance • bearing • frequency</li> </ul>
 VRP	<b>Nearest VRP</b> <ul style="list-style-type: none"> <li>• Identifier • symbol • distance • bearing</li> </ul>
 NDB	<b>Nearest NDB</b> <ul style="list-style-type: none"> <li>• Identifier • symbol • distance • bearing • frequency</li> </ul>
 User WPT	<b>Nearest User Waypoint</b> <ul style="list-style-type: none"> <li>• Identifier • symbol • distance • bearing</li> </ul>
 Airspace	<b>Nearest Airspace</b> <ul style="list-style-type: none"> <li>• Identifier • symbol • distance</li> </ul>

ICON	DISPLAYS
	<p><b>Nearest ARTCC</b></p> <ul style="list-style-type: none"> <li>• Facility name • distance • bearing • frequency</li> </ul>
	<p><b>Nearest FSS</b></p> <ul style="list-style-type: none"> <li>• Facility name • distance • bearing • frequency ("RX" denotes receive-only frequencies)</li> </ul>
	<p><b>Nearest WX FREQ</b></p> <ul style="list-style-type: none"> <li>• Facility name • distance • bearing</li> <li>• frequency of nearest ATIS, ASOS, and AWOS</li> </ul>

**ENTRY LIMITS**

NEAREST LIST	ENTRY LIMIT
ARTCC, FSS	05
Airspace	20
Airport, Intersection, VOR, VRP, NDB, User, Weather FREQ	25

The number of entries displayed varies according to item type.

Entries are ordered from closest to farthest.

**UPDATE INTERVALS**

With the exception of nearest airspace, all lists update every 30 seconds. The nearest airspace list updates once per second.

**MULTIPLE FREQUENCIES**



This key displays when more than one frequency is available at the indicated range.

Applicable to functions displaying information only (ARTCC, FSS, and WX FREQ).

# Procedures



Lateral and vertical guidance is available for visual and GPS/RNAV approaches. The published instrument approach procedures allows precision and non-precision approaches to airports and are directly accessible from the Procedures (PROC) icon.

## FEATURE REQUIREMENTS

- Baro-corrected altitude source (automatic sequencing of altitude leg types)

In the absence of baro-corrected altitude data, altitude leg types require manual sequencing.

## FEATURE LIMITATIONS

- The flight plan allows only one procedure to be loaded at a time. Adding a new procedure overwrites any existing procedure

## LOAD A PROCEDURE



Select the procedure type (departure, arrival, or approach) and then define the criteria for that procedure on the corresponding page.

## 3.16 Basic Operations

The GPS/GNX guides each leg of the approach, sequencing through each leg, up to the Missed Approach Point (MAP). You can fly published approaches with the full transition using any published feeder route or initial approach fix (IAF), or with a Vectors-to-Final transition. For ILS, VOR, and NDB approaches (and non-precision localizer-based approaches), the moving map shows the surrounding conditions. Phase-of-flight annunciations displays the current mode of flight on the bottom of the screen.

- For non-GPS approaches, use the appropriate radio navigational aid for primary approach course guidance.
- Many non-precision approaches have GPS overlays, improving accuracy so approaches do not require overflying a VOR or NDB.

Baro-corrected altitude is not required by the GPS/GNX to meet the requirements of TSO-C146e. An optional baro-corrected altitude source is recommended for automatic sequencing of altitude leg types.

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

- Departure waypoints insert before the En Route waypoints in the flight plan
- Arrival waypoints insert between the En Route waypoints and the approach waypoints

### 3.16.1 GPS Flight Phase Annunciations

Phase of flight annunciations are a direct indication of the current CDI behavior for the selected navigation source. Not all annunciations are available for every navigator.

Phase of flight annunciations appear in the annunciation bar.

Under normal conditions, these annunciations are green. They turn yellow when cautionary conditions exist.

ANNUNCIATION	FLIGHT PHASE
0.30 NM	0.3 nm CDI scale
1.00 NM	1.0 nm CDI scale

ANNUNCIATION	FLIGHT PHASE
DPRT	Terminal level with departure procedure as the active navigation
DR	Dead reckoning (CDI not available)
ENR	En route
HDG LEG	Navigator provides heading information only (CDI not available)
LNAV	Lateral Navigation Approach
LNAV+V	Lateral Navigation Approach with advisory vertical guidance provided. LNAV+V uses published LNAV minimums.
LVNAV	Lateral and Vertical Navigation Approach
LP	Localizer Performance Approach
LP +V	Localizer Performance Approach with advisory vertical guidance provided. LP +V uses published LP minimums.
LPV	Localizer Performance with Vertical guidance approach.
MAPR	Missed Approach
OCN	Oceanic
TERM	Terminal
VISUAL	Visual Approach

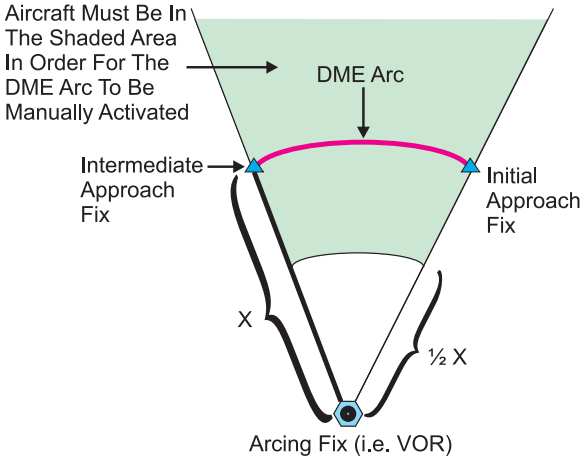
**APPROACH PROCEDURES**

APPROACH	DESCRIPTION AND INSTRUCTIONS
<b>DEPARTURE</b>	A Departure Procedure (DP) is loaded at the departure airport in the flight plan.
<b>SELECTING A DEPARTURE</b>	<p>If the selected runway is RW10B, for example, it includes runways 10L and 10R.</p> <ol style="list-style-type: none"> <li>1. Tap <b>PROC &gt; Departure</b>.</li> <li>2. Confirm the airport is shown or tap <b>Airport</b> to select an airport.</li> <li>3. Tap <b>Transition &gt; select an arrival transition &gt; Runway &gt; select the runway type &gt; Load Departure</b>.</li> </ol> <p>To change a departure, tap <b>Departure &gt; a new departure</b>.            To remove a departure, tap <b>Remove Departure</b>.</p>
<b>ARRIVAL</b>	Published arrival procedures include Standard Terminal Arrival (STAR).
<b>SELECTING AN ARRIVAL</b>	<p>If using Descent VNAV, verify that the altitudes for the selected procedure match the charted altitudes and are appropriate for the airframe type.</p> <ol style="list-style-type: none"> <li>1. Tap <b>PROC &gt; Tap Arrival</b>.</li> <li>2. Confirm the airport is shown or tap <b>Airport</b> to select an airport.</li> <li>3. Tap <b>Arrival &gt; select an arrival type &gt; Transition &gt; select an arrival transition</b>.</li> </ol> <p>Tap <b>Runway &gt; select the runway type &gt; Load Arrival</b>.</p>
<b>APPROACH</b>	<p>Loading alternate approaches during a missed approach procedure is available. The GPS/GNX retains missed approaches in the flight plan.</p> <p>The SBAS approach uses the Channel ID key to select the channel ID for the current destination. The channel ID for the SBAS approach is available from an approved approach chart. If there are duplicate numbers for a channel, a list is available to select the precise approach.</p>



APPROACH	DESCRIPTION AND INSTRUCTIONS
<p><b>SELECTING AN APPROACH</b></p>	<ol style="list-style-type: none"> <li>1. Tap <b>PROC &gt; Approach</b>.</li> <li>2. Confirm the airport is shown or tap <b>Airport</b> to select an airport.</li> <li>3. On the Approach page, tap <b>Approach &gt;</b> select an approach <b>&gt; Transition &gt;</b> select an approach transition.</li> <li>4. Tap <b>Channel/ID &gt;</b> add the channel number <b>&gt; Enter</b>.</li> <li>5. Tap <b>Load Approach &gt; Activate Approach</b>.</li> </ol> <p>Tapping <b>Activate Approach</b> makes the active leg Direct-To the selected transition waypoint. For Vector approaches it activates a leg that is an extended final approach course. If the approach is not activated on this page, select <b>Activate</b> on the Procedures page.</p> <p>To insert or remove a hold from the procedure, re-load the procedure or activate it from the PROC-Approach page.</p>
<p><b>APPROACHES WITH PROCEDURE TURNS</b></p>	<p>The GPS/GNX stores procedure turns as one of the legs of the approach. Roll steering is provided to aircraft with compatible autopilots.</p> <p>The steering provided for the procedure turn does not guarantee that the aircraft will stay within the charted procedure turn boundaries. Make sure the approach is flown within the confines of the charted procedure.</p>
<p><b>MISSED APPROACH</b></p>	<p>After reaching the Missed Approach Point (MAP), the unit continues to guide along an extension of the final course segment (FAF to MAP) until the missed approach procedure is manually initiated (as mentioned previously in reference to the SUSP advisory).</p> <p>If the unit is not configured for a CDI key, then the Activate GPS Missed Approach feature only resumes automatic waypoint sequencing. Switch to GPS navigation by using the external source selection method (typically an EFIS system).</p>

APPROACH	DESCRIPTION AND INSTRUCTIONS
<p><b>PERFORMING A MISSED APPROACH</b></p>	<p><b>Before Reaching a MAP</b></p> <ul style="list-style-type: none"> <li>• <b>Activating a Missed Approach</b> - Is accomplished on the Flight Plan or Procedures pages. In the Flight Plan page, touching the approach banner displays the Approach Options and Activate Missed Approach feature.</li> <li>• <b>Performing a Missed Approach</b> - The GPS/GNX continues to guide along the final approach course after selecting an approach option and automatically sequences the first leg of the missed approach.</li> </ul> <p>When the Missed Approach Waypoint Reached pop-up appears, tap <b>Remain Suspended</b> or <b>Activate GPS Missed Approach</b>.</p>
<p><b>APPROACH WITH A HOLD</b></p>	<p>When activating an RNAV GPS approach, the option to skip non-required holding patterns during the initial transitions of the approach is available.</p> <p>The Flight Plan Page shows a timer or distance, to fly the outbound portion of a holding pattern. The holding pattern displays on the Map Page and indicate the active leg on the Active Flight Plan pages.</p> <p>As you cross the MAP, a SUSP annunciation appears, indicating the automatic sequencing of approach waypoints is suspended at the MAP. A From indication shows on the CDI and Default NAV Page and course guidance along the final approach course continues.</p> <p>To lose extra altitude or speed by going around the holding pattern again, before crossing the holding waypoint the second time, tap <b>SUSP</b> to manually suspend waypoint sequencing. If already passed the waypoint, re-activate the holding pattern.</p>

APPROACH	DESCRIPTION AND INSTRUCTIONS
<p><b>DME ARC APPROACH</b></p>	<p>The GPS/GNX guides approaches containing DME arcs (left or right relative to the arc). To activate the DME arc leg manually, the aircraft must be near the arc, as shown in the shaded area below.</p>  <p>Aircraft Must Be In The Shaded Area In Order For The DME Arc To Be Manually Activated</p> <p>Intermediate Approach Fix</p> <p>Initial Approach Fix</p> <p>DME Arc</p> <p>X</p> <p><math>\frac{1}{2} X</math></p> <p>Arcing Fix (i.e. VOR)</p>
<p><b>RADIUS-TO-FIX (RF) APPROACH</b></p>	<p>The GPS/GNX supports RF legs associated with RNAV RNP 1.0 non-AR (Approval Required) approaches.</p> <p>AC 90-101A defines RF leg as “A constant radius circular path, around a defined turn center, that starts and terminates at a fix. An RF leg may be published as part of a procedure.” Refer to the aircraft AFMS for specific details regarding RF legs for a specific aircraft.</p> <ul style="list-style-type: none"> <li>• Annunciations and indications are identical for DME arcs and RF legs.</li> <li>• Unlike DME arcs, RF legs are not based on a VOR.</li> <li>• RF legs may have a larger or smaller radius than DME arcs.</li> </ul>
<p><b>VECTORS-TO-FINAL</b></p>	<p>Selecting Vectors-To-Final (VTF) keeps the CDI needle off-center until the final approach course starts.</p> <p>When the approach activates, the Map Page shows an extension of the final approach course in magenta. As a reminder that the approach was activated with Vectors-to-Final, VTF appears as part of the active leg on the Map page.</p> <p>The flight plan and the final approach course includes all destination waypoints along the final approach course, including locations before the FAF.</p>

APPROACH	DESCRIPTION AND INSTRUCTIONS
<p style="text-align: center;"><b>ILS APPROACH</b></p>	<div style="display: flex; align-items: flex-start;"> <div style="flex: 1;"> </div> <div style="flex: 2; padding-left: 20px;"> <p>ILS approaches have built-in VLOC (VOR/localizer/glideslope) receivers. Prior to reaching the final approach, use the GPS as a guide by selecting the VLOC window and setting the CDI output to VLOC.</p> <p>Automatically set the GPS/GNX to switch the external CDI output from GPS to VLOC when intercepting the final approach course.</p> <p><b>NOTE:</b> When using the KAP140/KFC225 autopilot, manually enable the outputs, see instructions in Enabling Autopilot Outputs for the King KAP140/KFC225).</p> <p>The GPS/GNX switches to VLOC within 1.2 nm, left or right of the final approach course, after activating the ILS approach and when the correct ILS frequency is in the active VLOC window.</p> <p>The switch ranges from 2 to 15 nm from the FAF. The illustration shows multiple locations along the approach path and the CDI selection (GPS or VLOC) to expect. In the shaded area, the automatic switch occurs from GPS to VLOC.</p> </div> </div>

APPROACH	DESCRIPTION AND INSTRUCTIONS
<b>RNAV APPROACH</b>	<p>According to the published chart, the GPS/GNX allows for flying LNAV/VNAV, LNAV, LNAV +V, LPV, LP, and LP +V approaches.</p> <ul style="list-style-type: none"> <li>• <b>L/VNAV</b> - Lateral Navigation/Vertical Navigation. RNAV non-precision approach with vertical guidance. Published LNAV/VNAV minimums.</li> <li>• <b>LNAV</b> - Lateral Navigation. RNAV non-precision approach. Published LNAV minimums.</li> <li>• <b>LNAV + V</b> - Lateral Navigation with Advisory Vertical Guidance. RNAV non-precision LNAV approach with advisory vertical guidance. The glidepath is a light dashed line on the vertical profile (Jeppesen only) with an associated glidepath angle (usually in the 3.00 degree range) to assist in maintaining a constant vertical glidepath, similar to an ILS glideslope. Published LNAV minimums.</li> <li>• <b>LPV</b> - Localizer Performance with Vertical guidance (LPV) approach. RNAV precision approach. Published LPV minimums. Published LPV minimums.</li> <li>• <b>LP</b> - Localizer Performance with no vertical guidance. Published LP minimums.</li> <li>• <b>LP + V</b> - Localizer Performance with advisory vertical guidance. This advisory guidance follows the same nature as set by the LNAV +V as shown above. Published LP minimums.</li> </ul>
<b>LPV APPROACH</b>	<p>The LPV approach has localizer performance and advisory vertical guidance. Flying the LPV approach is similar to the standard ILS approach.</p>

APPROACH	DESCRIPTION AND INSTRUCTIONS
<p><b>PERFORMING A LPV APPROACH</b></p>	<ol style="list-style-type: none"> <li>1. Within 31 nm of the destination, the GPS/GNX switches from En Route mode to Terminal mode and the CDI scale transitions from 2 to 1 nm, full-scale deflection.</li> <li>2. Approaching the IAF, a waypoint message appears on the bottom of the screen.</li> <li>3. As the IAF distance approaches zero, an Time to Turn advisory message appears and counts down 10 seconds prior to the turn.</li> <li>4. Approaching the FAF, the GPS/GNX rescales the angle. At 2.0 nm from the FAF, CDI scaling tightens from 1 nm to the approach-defined angular full-scale deflection.</li> <li>5. Sixty seconds prior to reaching the FAF, the GPS/GNX checks the required Horizontal Alarm Limit (HAL) and Vertical Alarm Limit (VAL) ensuring the GPS position integrity is within approach limits. <ul style="list-style-type: none"> <li>• If the HAL or VAL exceed the limits, the approach downgrades to a non-precision approach indicated by LNAV on the moving map. A downgraded message appears and the glideslope indicator flags, until the message is viewed. Continue the approach using LNAV non-precision minimums (if applicable).</li> <li>• If GPS integrity does not meet the non-precision HAL limits, the GPS/GNX messages to abort the approach. After acknowledging the message, the unit reverts to terminal limits of 1 nm to support navigation to the missed approach. After the aircraft has passed the FAF, a loss of WAAS integrity causes the approach to abort instead of downgrade.</li> </ul> </li> <li>6. Capture the glideslope (the same as for an ILS glideslope).</li> <li>7. When crossing the FAF, the waypoint sequences to the MAP (e.g., RW31, the runway threshold). With the needle on the external CDI (or HSI) centered, fly toward the MAP, observing the altitude minimums published on the approach plate.</li> <li>8. In the Map Page, the final course segment shows in magenta as the active leg of the flight plan.</li> <li>9. Approaching the MAP, an Arriving at Waypoint message appears on the bottom of the screen.</li> <li>10. As the GPS/GNX crosses the MAP and sequencing suspends, prepare the aircraft for a missed approach operation. Tap <b>Unsuspend</b> to sequence to the missed approach procedure.</li> <li>11. Using the GPS/GNX guidance, fly to the MAHP and hold.</li> </ol>

APPROACH	DESCRIPTION AND INSTRUCTIONS
<b>LP APPROACH</b>	<p>An LP approach uses SBAS accuracy, similar to an LNAV approach with more precision, and has lateral accuracy like an LPV approach. Angular scaling is similar to a localizer approach. Most LP approaches have step down altitudes associated with them. The approach still results in an MDA and missed approach point.</p> <p>The LP+V approach has advisory vertical guidance and at each step down the pilot must descend to the correct altitude. The approach results in an MDA and missed approach point.</p>

APPROACH	DESCRIPTION AND INSTRUCTIONS
<p><b>PERFORMING A LP APPROACH</b></p>	<ol style="list-style-type: none"> <li>1. Within 30 nm of the destination, the GPS/GNX switches from En Route to Terminal mode and the CDI scale transitions from 2.0 to 1.0 nm, full-scale deflection.</li> <li>2. Approaching the IAF, a turn direction message appears on the bottom of the screen.</li> <li>3. As the distance (DIST) to the IAF approaches zero, a time to turn advisory message appears that counts down 10 seconds prior to the turn.</li> <li>4. Approaching the FAF, the GPS/GNX rescales the angle. At 2 nm from the FAF, CDI scaling tightens from either 2° or 0.3 nm, full-scale deflection, whichever is smaller.</li> <li>5. Sixty seconds before reaching the FAF, the GPS/GNX checks the required Horizontal Alarm Limit (HAL) and the GPS position integrity is within approach limits. <ul style="list-style-type: none"> <li>• If the HAL or VAL exceed the limits, the approach downgrades to a non-precision approach indicated by LNAV on the moving map, or the approach aborts. A downgraded message appears and the NAV indicator flags. Continue the approach using LNAV non-precision minimums, (if applicable). If GPS limits does not meet non-precision HAL limits, the GPS/GNX messages to abort the approach. The unit reverts to terminal limits of 1 nm to support navigation to the missed approach.</li> <li>• If the approach is indicating an LP +V, and vertical guidance not within tolerances, the advisory vertical guidance could be removed without annunciation. This is not a downgrade, and the approach can fly to LP minimums.</li> </ul> </li> <li>6. When crossing the FAF, the destination sequences to the MAP. With the needle on the external CDI (or HSI) centered, fly toward the MAP, observing the altitude minimums published on the approach plate.</li> <li>7. When crossing the FAF, the waypoint sequences to the MAP (e.g., RW31, the runway threshold). With the needle on the external CDI (or HSI) centered, fly toward the MAP, observing the altitude minimums published on the approach plate.</li> <li>8. In the Map Page, the final course segment shows in magenta as the active leg of the flight plan.</li> <li>9. Approaching the MAP, an Arriving at Waypoint message appears on the bottom of the screen.</li> <li>10. As the GPS/GNX crosses the MAP and sequencing suspends, prepare the aircraft for a missed approach operation. Tap <b>Unsuspend</b> to sequence to the missed approach procedure. For missed approaches with heading legs, fly manually until the first active course leg is reached.</li> <li>11. Using the guidance provided by the unit, fly to the MAHP and hold.</li> </ol>



APPROACH	DESCRIPTION AND INSTRUCTIONS
<b>VISUAL APPROACH</b>	<p>Not all airports in the database support visual approaches.</p> <p>The GPS/GNX generates visual approaches, provides advisory horizontal and optional vertical guidance for the runway, and helps stabilize the runway approach. Published data is used to determine the visual approach GPA and TCH for the selected runway. If no published data is available, the default is 3° GPA and 50 FT TCH. Lateral guidance is always provided for visual approaches.</p> <p>There are three different methods for loading and activating visual approaches. For methods 1 and 2, tapping Visual opens a list of available visual approaches. Once selected, the visual approach immediately loads and becomes active.</p> <p><b>Method 1</b> - On the map, tap <b>Visual</b>. When the aircraft is within 10 nm of the destination airport the Visual key appears on the display.</p> <p><b>Method 2</b> - On the bottom edge of the screen, tap <b>Visual</b>. This key is visible when a visual approach supported airport is selected on the map during Pan mode.</p> <p><b>Method 3</b> - Visual approaches load from the PROC - Approach page or the Airport Info - Procedures tab (similar to published instrument approaches). For information on how to use this page, refer to Selecting an Approach.</p> <p>After a visual approach loads, a confirmation pop-up shows, detailing the glidepath angle (GPA) and threshold crossing height (TCH) when vertical guidance is available.</p> <p>Terrain and obstacle obstructions along the approach path determine the availability of vertical guidance advisories for visual approaches. A valid terrain database is required.</p> <ul style="list-style-type: none"> <li>• If no known obstructions are within the approach path, vertical guidance is provided to a maximum distance of 28 nm from the runway.</li> <li>• If there are known obstructions further than 3 nm, but within the 28 nm maximum distance from the runway along the approach, vertical guidance is limited to the approach path after crossing the known obstructions. After loading the approach, a shortened magenta line shows on the map. If obstructions are within 3 nm to the runway, along the approach path, advisory vertical guidance is not provided.</li> </ul> <p>Only external CDI/VDI displays provide vertical deviation indications.</p>

### POINTS TO REMEMBER FOR ALL PROCEDURES

- For all procedures, make sure to check the runway, transition, and all waypoints.
- Only one departure, arrival, or approach is loaded in a flight plan at a time.
- Selecting a new departure, arrival, or approach in the active flight plan replaces the existing.
- Selecting the departure, arrival, approach, transition waypoint, and runway defines a route.
- Vector-only departures are not available in the Procedures database.
- Advisory climb altitudes for SIDs may not match charted altitudes. Do not rely solely on advisory altitudes.
- The GPS/GNX Map page is designed to complement approach plates and improve situational awareness throughout the approach. Always fly an approach as it appears on the approach plate.
- **SUSP** - While flying the approach, the unit automatically sequences through each leg of the approach unless SUSP appears at the annunciation bar at the bottom of the display. SUSP indicates the automatic sequencing of approach waypoints is suspended on the current leg. SUSP typically appears at holding patterns, upon crossing the missed approach point (MAP), for Climb to Altitude legs, and for Hold to Altitude legs.
- For roll steering autopilots: Roll steering terminates when Approach mode is selected on the autopilot and is available once the missed approach initiates.
- If **Vectors-to-Final** is activated while on the FROM side of the FAF, automatic waypoint sequencing suspends and the **SUSP** annunciation appears. Automatic waypoint sequencing resumes once the aircraft is on the TO side of the FAF and within full-scale deflection.
- Most legs are TO legs, the TO/FROM flag on the CDI indicates TO and the Distance field on the flight plan decreases as you navigate along the leg. Some procedures include legs which are FROM legs. On these legs, the TO/FROM flag on the CDI indicates FROM and the Distance field on the flight plan increases as you navigate the leg. FROM legs are typically found on procedure turns and on some missed approach procedures.

**CAUTION**

*NOT ALL AUTOPILOTS FOLLOW GUIDANCE WHEN ON A HEADING LEG USING NAV, GPSS, OR APR MODE ON THE AUTOPILOT. SOME AUTOPILOTS REVERT TO A ROLL ONLY OR WINGS LEVEL MODE ON THESE LEG TYPES. THE PILOT MUST ENGAGE THE HEADING MODE OF THE AUTOPILOT AND SET THE HEADING BUG APPROPRIATELY IN ORDER TO USE THE AUTOPILOT ON THESE LEGS.*

**CAUTION**

*IDENTIFY HEADING LEGS FOR PROCEDURES BY HDG XXX° IN WHITE ON THE FLIGHT PLAN PAGE.*

**ENABLING AUTOPILOT OUTPUTS FOR THE KING KAP140/KFC225**

After being prompted during the approach procedure, the pilot must manually activate the autopilot outputs for the King KAP140/KFC225 autopilot units. After enabling the autopilot outputs, the GPS provides guidance information consistent with what the autopilot expects (i.e., angular CDI scaling and glideslope capture for an LPV or other vertically guided GPS approach).

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# 4 Planning

## VERTICAL CALCULATOR

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## DALT/TAS/WIND CALCULATOR

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## PLANNING APPS & FUNCTIONS



This section describes features that make flight planning easier and more efficient.

Planning apps and setup functions reside in the system Utilities.



- Target ALT
- Altitude Type
- VS Profile
- Offset
- Target Waypoint
- Restore Defaults
- Display Messages



- P. POS [1]
- From/To [1][3]
- Flight Plan [2]
- Leg [2]
- Mode
- Fuel on Board
- Fuel Flow
- Use Sensor Data
- Ground Speed [4]
- Compute



- Indicated ALT [4][5]
- BARO [4]
- CAS [4]
- TAT
- HDG
- TRK [4]
- Use Sensor Data
- Ground Speed [4]
- Compute



- Waypoint
- Arrival Date/Time
- Compute RAIM

- [1] Point-to-Point mode only.
- [2] Flight Plan mode only.
- [3] From key not selectable when Present Position (P.POS) function is active.
- [4] Function not selectable when sensor data in use.
- [5] Indicates pressure altitude when sensor data in use.

# Vertical Calculator



Calculate time to TOD and vertical speed required to reach target altitude at the specified location.



## WARNING

*DO NOT RELY ON 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.*

## FEATURE LIMITATIONS

This feature is inhibited when:

- Groundspeed is < 35 knots
- No active flight plan or direct-to destination is available
- One of the following modes is active: SUSP, Vectors-to-Final, OBS
- Navigating to a waypoint after the FAF

## 4.1 VCALC Page



The Vertical Calculator (VCALC) feature is helpful when you want to descend to a certain altitude near an airport.

Create a 3-D profile to guide you from your present position and altitude to a final (target) altitude at a specified location. Once defined, you may configure message alerts and additional data on the Map page to stay informed of your progress.



SELECTION	DESCRIPTION
<b>Target ALT</b>	<ul style="list-style-type: none"> <li>Specify the final (target) altitude for the course</li> </ul>
<b>Altitude Type</b>	<ul style="list-style-type: none"> <li>Altitude reference used for VCALC calculations</li> <li>Toggles between MSL and Above WPT</li> <li>Above WPT is available for airports only</li> </ul>
<b>VS Profile</b>	<ul style="list-style-type: none"> <li>Specify the vertical speed value</li> </ul>
<b>Offset</b>	<ul style="list-style-type: none"> <li>Distance value representing the geographical location at the target altitude</li> <li>Distance is measured from the target waypoint</li> </ul>
<b>Before/After</b>	<ul style="list-style-type: none"> <li>Indicates whether the offset distance defines a point before or after reaching the target waypoint</li> <li>“After” indication not available for the last destination in flight plan</li> </ul>
<b>Target Waypoint</b>	<ul style="list-style-type: none"> <li>Reference location specified in the flight plan or active direct-to that will be used for planning a descent</li> <li>When using a flight plan, the target waypoint is a reference that can be specified from the waypoints in the flight plan</li> <li>Last waypoint in the flight plan is the default target setting</li> </ul>

## STATUS

VCALC status messages display here.

## VS REQUIRED

Displays the vertical speed required to reach the target altitude at the specified offset.

# 4.2 VCALC Setup



Tap **Menu** to access controls for:

- Restoring default page settings
- Displaying VCALC related advisory messages

## RESTORE DEFAULTS

Resets VCALC page settings to their default values. Excludes Target Waypoint.

## DISPLAY MESSAGES

Allows VCALC related advisory messages to display on the Messages page.



# Fuel Planning



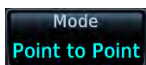
View fuel conditions along any flight plan (active or programmed) or between two waypoints (including the active direct-to).

## 4.3 Fuel Planning Page



The fuel planning feature computes fuel conditions based on route, ground speed, fuel on board, and fuel flow.

### 4.3.1 Fuel Planning Modes



Tapping **Mode** toggles the active fuel planning mode between Point to Point and Flight Plan. Point to Point is the default mode setting.

#### POINT-TO-POINT MODE

Calculate fuel between two waypoints in the database, or between the aircraft's present position and a selected waypoint.

#### FLIGHT PLAN MODE

Calculate fuel for a specific flight plan leg, or for the cumulative flight plan.

Use the mode specific controls to define the flight path (leg or route). Required input values are dependent upon mode selection.

Fuel on board, fuel flow, and ground speed data are required independent of mode selection.

MODE SELECTIONS		
MODE	SELECTION	DESCRIPTION
Point-to-Point	P. Position	<ul style="list-style-type: none"> <li>Enters the current aircraft coordinates as the departure location (or From waypoint)</li> <li>Aircraft latitude and longitude fields replace the From waypoint key</li> </ul>
	From	<ul style="list-style-type: none"> <li>Specify a waypoint from the database as the departure location (or From waypoint)</li> <li>Not available when P. Position is active</li> </ul>
	To	<ul style="list-style-type: none"> <li>Specify a waypoint from the database as the destination (or To waypoint)</li> </ul>
Flight Plan	Flight Plan	<ul style="list-style-type: none"> <li>Opens a list of available flight plans</li> <li>Options include the active flight plan or one from the catalog</li> <li>Defaults to the active flight plan if no selection is made</li> </ul>
	Leg	<ul style="list-style-type: none"> <li>Options dependent on flight plan selection</li> <li>Defaults to cumulative leg option if no selection is made</li> </ul>
Both	Fuel on Board	<ul style="list-style-type: none"> <li>Specify the amount of fuel on board (gallons)</li> <li>This amount decreases once per second based on specified fuel flow value</li> </ul>
	Fuel Flow	<ul style="list-style-type: none"> <li>Specify the current fuel flow rate (gallons per hour)</li> </ul>
	Use Sensor Data	<ul style="list-style-type: none"> <li>Display current GPS ground speed data</li> </ul>
	Ground Speed	<ul style="list-style-type: none"> <li>Specify ground speed</li> <li>This function is display only when sensor data is in use</li> </ul>

Adjust fuel on board and fuel flow values as necessary to account for changes in performance.

## 4.3.2 Computing Fuel Statistics

**Compute**

Compute and display fuel data based on the selected fuel planning mode and specified input values.

FOR PLANNING PURPOSES ONLY			
Prev	From	To (CUM)	Next
	<b>OG64</b>	<b>KEUG</b>	
Fuel Req for Leg	Fuel after Leg	RSV after Leg	
<b>7.1 GAL</b>	<b>92.8 GAL</b>	<b>09:16:59</b>	
Range	Efficiency	Endurance	
<b>1299 NM</b>	<b>13.0 NM/GAL</b>	<b>09:59:19</b>	
<b>Computed Fuel</b>			

Statistics for the selected leg or route display on a dedicated data page. This information is for planning purposes only.

Tap **Next** or **Prev** to view statistics for other legs in the flight plan (if applicable).

Statistics include:

- Fuel required for leg
- Reserve after leg
- Efficiency
- Fuel after leg
- Range
- Endurance

### COMPUTE FUEL STATISTICS

1. Select a fuel planning mode.
2. Define a leg or route.
  - If “Flight Plan” is set, select the flight plan and leg.
  - If “Point to Point” is set, select From and To waypoints, or use the aircraft’s current position as the From waypoint.
3. Specify the amount of fuel on board and average fuel flow rate.
4. Specify ground speed or elect to use sensor data.
5. Tap **Compute**.

# DALT/TAS/Wind Calculator

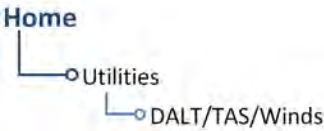


Calculate density altitude, true airspeed, and winds.

## FEATURE REQUIREMENTS

- Fuel/air data computer (pressure altitude)
- Valid sensor data

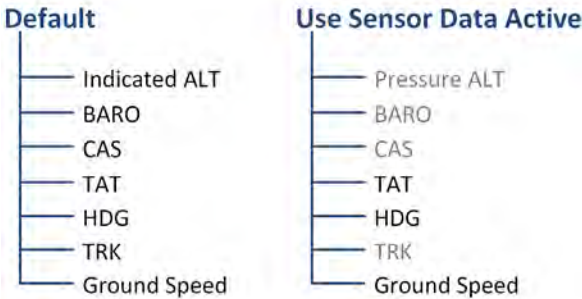
## 4.4 DALT/TAS/Wind Page



This feature indicates the theoretical altitude at which the aircraft performs based on several input variables.

### 4.4.1 Editing Input Data

Available selections are dependent on sensor data use.



Not Selectable

SELECTION	FUNCTION
<b>Indicated ALT</b>	<ul style="list-style-type: none"> <li>• Specify indicated altitude value [1] [2]</li> <li>• Use +/- keys to indicate above or below sea level</li> <li>• Mutually exclusive with Pressure ALT</li> </ul>
<b>BARO</b>	<ul style="list-style-type: none"> <li>• Specify barometric pressure value [2]</li> </ul>
<b>CAS</b>	<ul style="list-style-type: none"> <li>• Specify calibrated air speed value [2]</li> </ul>
<b>TAT</b>	<ul style="list-style-type: none"> <li>• Specify true air temperature</li> <li>• Use +/- keys to indicate above or below 0°</li> </ul>
<b>HDG</b>	<ul style="list-style-type: none"> <li>• Specify heading value</li> </ul>
<b>TRK</b>	<ul style="list-style-type: none"> <li>• Specify track angle value [2]</li> </ul>
<b>Use Sensor Data</b>	<ul style="list-style-type: none"> <li>• Inputs reference values received from</li> <li>• Replaces indicated altitude with pressure altitude received from fuel/air data computer</li> <li>• Excludes TAT and HDG</li> </ul>
<b>Ground Speed</b>	<ul style="list-style-type: none"> <li>• Specify ground speed [2]</li> </ul>

[1] Toggles to Pressure ALT indication when sensor data in use.  
 [2] Not selectable when sensor data in use.

## 4.4.2 Computing DALT/TAS/Wind Statistics

**Compute**

Compute and display density altitude and current wind conditions. Calculations are based on current input values.

FOR PLANNING PURPOSES ONLY	
Density ALT	TAS
----- FT	---- KT
Wind Direction	Wind Speed
----- °	---- KT
Head Wind Component	
---- KT	

**Computed Data**

Statistics display on a dedicated data page. This information is for planning purposes only.

Dashes indicate when input values are invalid.

**DENSITY ALTITUDE**

- Pressure altitude corrected for nonstandard temperature
- Units display in increments of ten

**WIND DATA**

- Wind direction and speed
- Headwind
- Tailwind
- True air speed

Density altitude and true airspeed calculations are dependent on indicated altitude, barometric pressure, and total air temperature.

Wind data calculations are dependent on true airspeed, aircraft heading, and ground speed.

Wind direction is dependent on the NAV Angle system unit setting.

If wind speed is zero, wind direction displays as dashes.

# RAIM Prediction



Determine GPS coverage availability for the current location or a specified waypoint at any time and date. RAIM performs checks to ensure the navigator has adequate satellite geometry during flight.

## FEATURE REQUIREMENTS

- Active flight plan and off-route direct-to waypoint (arrival date and time)

## FEATURE LIMITATIONS

FAA's TSO requirements for non-precision approaches specify significantly greater satellite coverage than is required during other phases of flight. As a result, RAIM may not be available for all approaches.

This feature predicts the availability of fault detection integrity. It cannot predict the availability of LPV or LRVNAV approaches.

Use a non-GPS based approach when RAIM is not available. For LPV approach availability, visit the FAA's NOTAM service.

## 4.5 RAIM Prediction Page



The RAIM feature can help you plan for a pending flight by confirming GPS operation before an approach.

### RAIM FEATURES

- Automatically monitors RAIM during approach operations and warns when RAIM is not available
- Near 100% availability in Oceanic, En route, and Terminal phases of flight
- **WP Identifier**, **Arrival Date**, and **Arrival Time** setup keys
- **Compute RAIM** key

## 4.5.1 Calculating RAIM Status



Calculate RAIM availability for the specified waypoint, date, and time. Prediction results annunciate once the calculation is complete.

### WAYPOINT SEARCH OPTIONS

A **WP Identifier** key allows you to specify a destination airport using multiple search options.

### ARRIVAL DATE & TIME

These setup controls allow you to set the expected date and time of arrival at the specified airport. Values default to the current date and time in the absence of an active flight plan and off-route direct-to waypoint.

### CHECK RAIM AVAILABILITY

1. Specify a destination waypoint.
2. Specify the expected arrival date and time.
3. Tap **Compute RAIM**.

## 4.5.2 RAIM Status Indications

Dashes indicate when the destination waypoint is invalid.

ANNUNCIATION	DESCRIPTION
Computing	Status is pending.
RAIM Available	RAIM is available at the specified waypoint.
RAIM Unavailable	RAIM is not available at the specified waypoint.



# 5 Hazard Awareness

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## AWARENESS APPS AND FUNCTIONS

Menu selections vary based on features and optional equipment installed with Garmin avionics.



- Map Orientation
- FIS-B WX Status
- Legend
- NEXRAD
- METAR
- AIRMET
- SIGMET
- PIREP
- Winds/Temps Aloft
- TFR



- ADS-B Display
- Test
- Motion Vector
- Vector Duration
- Altitude Filter
- Traffic Grouping



- Terrain Inhibit
- View
- Flight Plan
- Legend
- TAWS (Optional)

# Weather Awareness

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## WARNING

*DO NOT RELY SOLELY ON DATALINK WEATHER FOR WEATHER INFORMATION. DATALINK WEATHER PROVIDES A SNAPSHOT IN TIME. IT MAY NOT ACCURATELY REFLECT THE CURRENT WEATHER SITUATION.*



## NOTE

Datalink weather is not intended to replace weather briefings or in-flight weather reports from AFSS or ATC.

The FAA provides FIS-B as a Surveillance and Broadcast Service operating on the UAT (978 MHz) frequency band. FIS-B uses a network of FAA-operated ground-based transceivers to transmit weather datalink information to the aircraft's receiver on a scheduled continuous basis.

The Flight Information Service-Broadcast (FIS-B) Weather service is freely available for aircraft equipped with a capable datalink universal access transceiver (UAT). Ground stations provide uninterrupted services for the majority of the contiguous U.S., Hawaii, Guam, Puerto Rico, and parts of Alaska. No weather subscription service is required. For the latest FAA ground station coverage information, visit:

[www.faa.gov/nextgen/programs/adsb/](http://www.faa.gov/nextgen/programs/adsb/)

## 5.1 Data Transmission Limitations

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FIS-B broadcasts provide weather data in a repeating cycle which may take several minutes to completely transmit all available weather data. Therefore, not all weather data may be immediately present upon initial FIS-B signal acquisition.

### 5.1.1 Line of Sight Reception

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To receive FIS-B weather information, the aircraft's datalink receiver must be within range and line-of-sight of an operating ground-based transceiver. Reception may be affected by altitude, terrain, and other factors. Per the FAA, much of the United States has FIS-B In airborne coverage at and above 3,000 feet AGL. Terminal coverage is available at altitudes below 3,000 feet AGL and is available when flying near approximately 235 major U.S. airports. Surface coverage allows FIS-B ground reception at approximately 36 major U.S. airports.

### 5.1.2 Per FAA TSO-C157b

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FIS-B information may be used for pilot planning decisions focused on updating the pilot's awareness of the dynamic flight environment; including avoiding areas of inclement weather that are beyond visual range and pilot near-term decisions where poor visibility precludes visual acquisition of inclement weather. FIS-B weather and NAS status information may be used as follows:

- a. To promote pilot awareness of ownship location with respect to reported weather, including hazardous meteorological conditions; NAS status indicators to enhance pilot planning decisions; and pilot near-term decision-making.
- b. To cue the pilot to communicate with Air Traffic Control, Flight Service Station specialist, operator dispatch, or airline operations control center for general and mission critical meteorological information, NAS status conditions, or both. FIS-B information, including weather information, NOTAMs, and TFR areas, are intended for the sole purpose of assisting in long/near-term planning and decision making. The system lacks sufficient resolution and updating capability necessary for aerial maneuvering associated with immediate decisions. In extreme scenarios, the oldest weather radar data on the display can be up to 15 to 20 minutes older than the display's age indication for that weather radar data. Therefore, do not attempt to use FIS-B weather information to maneuver the aircraft at minimum safe distances from hazardous weather. FIS-B information must not be used in lieu of a standard preflight briefing.
- c. [Displaying FIS-B weather using GDL 88, or GTX 345 Class 1 transceivers]  
FIS-B uplink is a subscription-free FIS broadcast managed by FAA SBS. It provides an FAA approved source for METAR, TAF, WINDS, PIREPs, NEXRAD, AIRMET, SIGMET, and TFR information, and is subject to the broadcast range limits for these products.  
FIS-B uplink is not an FAA approved source for NOTAMs.

### 5.1.3 NOTAM 30-Day Limitation

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NOTAMs received via FIS-B may not be a complete listing. Active NOTAMs are removed from the FIS-B data stream 30 days after issuance. Before flight, review all necessary aeronautical and meteorological information from official sources. For more information, consult AC 00-63.

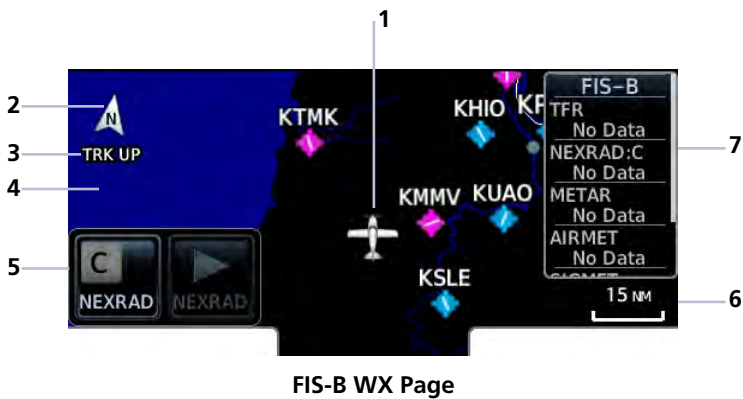
## 5.2 Weather Display



FIS-B weather data displays as overlays on the dedicated weather page and Map page. No pilot action is required to receive FIS-B weather information.

### FEATURE REQUIREMENTS

- FIS-B
- GPS 175 with UAT receiver (GDL 88, GTX 345) or
- GNX 375



1	<p><b>Aircraft Symbol</b></p> <p>Depicts current aircraft position and orientation.</p> <ul style="list-style-type: none"> <li>• Tip represents actual aircraft location</li> <li>• Symbol type is dependent upon configuration</li> <li>• Absent if a GPS source is not available</li> </ul>
2	<p><b>North Indicator</b></p> <p>Indicates True north.</p>
3	<p><b>Page Orientation Label</b></p> <p>Options include:</p> <ul style="list-style-type: none"> <li>• <b>North Up</b> orients map to True north.</li> <li>• <b>Heading Up</b> orients map to current aircraft heading (requires heading data source interface).</li> <li>• <b>Track Up</b> orients map to current aircraft GPS track.</li> </ul>
4	<p><b>Basemap</b></p> <p>Presents a graphical depiction of land and water data.</p>

5	<b>NEXRAD Controls</b> Includes source key and animation control. Source options include CONUS, Regional, or Combined.
6	<b>Zoom Scale</b> Value adjusts with changes to the current magnification.
7	<b>Product Timestamp</b> Approximate time of data collection for each active weather product.

### WX INFO BANNER

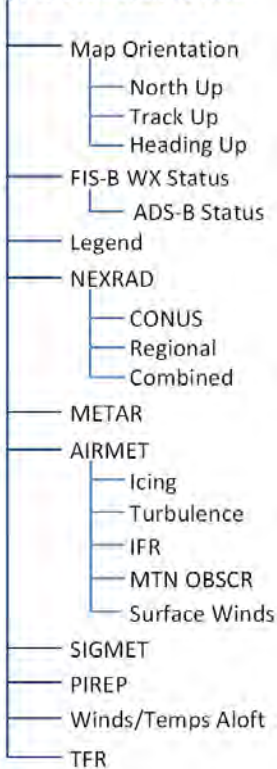
Tapping any weather icon displays an information banner. When applicable, a pop-up window displays additional data.

- Pan mode symbol
- Bearing and distance to map pointer from aircraft's current position
- Cloud Top altitudes
- Pan location
- Report data

Tapping an airport icon displays information about local weather conditions.

## 5.3 Weather Setup

### FIS-B Weather Menu



Tap **Menu** to access weather setup options. This page also provides access to the ADS-B Status page, where controls for enabling all weather products, viewing raw text reports, and checking ground reception status reside.

To enable all weather products, tap **FIS-B WX Status > FIS-B Enabled**.

# 5.4 Weather Products

FIS-B WEATHER PRODUCT	WEATHER DISPLAY			
	FIS-B WX PAGE	WX POP-UP TEXT	MAP PAGE	WAYPT INFO
AIRMET				
METAR w/Decoding				
NEXRAD				
NOTAMS				
PIREP				
AIRMET				
SIGMET				
TAF				
Temps Aloft				
TFR				
Winds Aloft				

**Graphic Product Present** 



## 5.4.1 Product Age



### NOTE

Data contained within a composite weather product may be older than its weather product age and should never be considered current.

A timestamp identifies the approximate time of data collection for each weather product. For quick reference, the age of each active weather product is calculated and shown in a color-coded side bar on the FIS-B Weather page.

### TIMESTAMP COLOR DEFINITIONS

FIS-B	
TFR	Age: 8min
NEXRAD:R	Age: ---
METAR	Age: 8min
AIRMET	03/01 16:56z
SIGMET	03/02 19:49z
PIREP	Age: 8min
Wind	No Data

- **Green** – Weather product is considered current. Its age is newer than half its expiration time. Tapping the Timestamp window displays time for all green colored weather products.
- **Amber** – Weather product is considered stale. Its age is older than half its expiration time. A weather product may be amber when its issue date and time occurs in the future by more than the complete expiration time for the requested weather product. (e.g., some TFRs)
- **Gray** – Received weather product data is expired, has not been received, or is not supported at the selected altitude. No Data or ALT UNAVBL displays next to the weather product title.

### BROADCAST RATES AND REFRESH INTERVALS

The broadcast rate represents the periodic interval at which the ADS-B ground stations transmit the weather product for reception. Weather data with the same time stamp may be received multiple times in a row. Broadcast intervals are typically higher than the weather product update intervals.

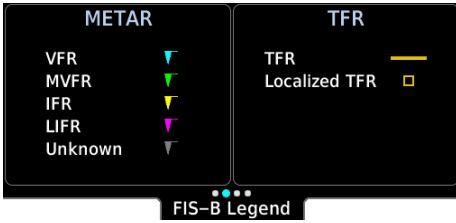
FIS-B update intervals report the frequency at which weather products refresh with new data from reporting stations, ground sensors, and weather product compilations.

FIS-B transmission intervals report the frequency at which weather products are broadcast by the ADS-B ground stations network.

Contact the appropriate weather product supplier for current broadcast rates and refresh intervals. Graphically dense weather products may take several minutes to receive completely.

## 5.4.2 Legends

A scrollable legend provides relevant product colors and symbols. Definitions are organized by product function.



Tap **Menu > Legend**, and use the inner knob to view the available product legends.

### 5.4.3 FIS-B NEXRAD



#### **WARNING**

*NEVER USE NEXRAD WEATHER FOR MANEUVERING IN, NEAR, OR AROUND AREAS OF HAZARDOUS WEATHER. NEXRAD IMAGES ARE SNAPSHOTS OF PAST WEATHER DATA. THEY ARE NOT SAFE FOR USE AS REAL TIME DEPICTIONS OF NEARBY WEATHER ACTIVITY.*

#### **CONUS NEXRAD**

#### **Regional NEXRAD**

NEXRAD weather radar displays a mosaic of precipitation data, colored according to reflectivity. Composite reflectivity images depict the highest radar energy received from multiple antenna tilt angles at various altitudes. Base reflectivity images depict radar returns from the lowest antenna tilt angle.

The precipitation intensity level reflected by each pixel represents the highest level of composite radar reflectivity data sampled in that location.

A clear understanding of ground-based Doppler weather radar capabilities will allow you to interpret the NEXRAD weather imagery in the safest way possible. The National Oceanic and Atmospheric Administration hosts a description of the technology on its website: [https://www.weather.gov/jetstream/doppler\\_intro](https://www.weather.gov/jetstream/doppler_intro)

#### **RADAR DATA ANIMATIONS**



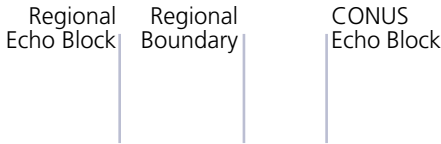
To depict trending weather movements over time, an animation function stitches the last three to six received radar images together in sequence, from oldest to newest, and replays them on a continuous loop.



Play and stop controls are active when three or more NEXRAD images are available for playback.

## CONUS & REGIONAL NEXRAD

FIS-B NEXRAD is uplinked to the aircraft as two separate weather products: CONUS and Regional NEXRAD. Both products display individually or simultaneously, separated by a white hash-marked boundary, based on source selection.



Depending on the locations of received FIS-B ground stations, Regional NEXRAD coverage can extend as far as 250 nm around an aircraft’s position. Aircraft flying at higher altitudes typically receive data from more ground stations than aircraft flying at low altitudes.

FIS-B NEXRAD does not differentiate between liquid and frozen precipitation types.

### CONUS & Regional NEXRAD Combined

Source options are selectable from the weather setup menu or the NEXRAD key at the bottom left of the FIS-B Weather page. The key label changes to reflect the active source.



CONUS



Regional








Combined

SOURCE	DESCRIPTION
<b>CONUS</b>	<ul style="list-style-type: none"> <li>• Large, low-resolution weather image for the entire continental U.S.</li> <li>• Pixels are 7.5 min (7.5 nm = 13.89 km) wide by 5 min (5 nm = 9.26 km) wide</li> </ul>
<b>Regional</b>	<ul style="list-style-type: none"> <li>• High-resolution weather image with limited range, centered around each broadcasting ground station</li> <li>• Pixels are 1.5 min (1.5 nm = 2.78 km) wide by 1 min (1 nm = 1.852 km) tall</li> <li>• Each weather pixel varies with latitude. Above 60° latitude, pixel block width doubles to 3 min/nm for regional maps</li> </ul>
<b>Combined</b>	<ul style="list-style-type: none"> <li>• Both CONUS and Regional NEXRAD images display simultaneously</li> <li>• White hash mark indicates regional boundary</li> </ul>

## 5.4.4 METARs and TAFs

METAR and TAF reports provide information on current and forecast conditions. Colored METAR flags display when a METAR reporting station is matched with a corresponding navigation database identifier. When selected, the METAR is decoded and shows above the original METAR text. METARs are provided only in areas covered by the navigation database currently loaded.

METAR SYMBOL	DESCRIPTION
	<b>VFR:</b> Ceiling greater than 3000 ft. AGL and visibility greater than five miles.
	<b>Marginal VFR:</b> Ceiling 1000 to 3000 ft. AGL and/or visibility three to five miles.
	<b>IFR:</b> Ceiling 500 to 1000 ft. AGL and/or visibility one to three miles.
	<b>Low IFR:</b> Ceiling below 500 ft. AGL and/or visibility less than one mile.
	Unknown

## 5.4.5 AIRMETS

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The AIRMET overlay draws the geographical boundaries of received AIRMETS on the dedicated weather page. AIRMETS include advisories of weather that may be particularly hazardous to single engine, light aircraft and VFR pilots. Tap an AIRMET graphic area to view the detailed AIRMET report text.

AIRMET TYPES	
<b>Icing</b>	<ul style="list-style-type: none"><li>• Areas of moderate airframe icing including areal extent</li></ul>
<b>Turbulence</b>	<ul style="list-style-type: none"><li>• Areas of moderate turbulence including vertical extent</li></ul>
<b>IFR</b>	<ul style="list-style-type: none"><li>• Weather conditions with ceilings &lt;1,000 ft and/or visibility &lt;3 mi</li></ul>
<b>MTN OBSR</b>	<ul style="list-style-type: none"><li>• Widespread mountain obscuration due to clouds, precipitation, smoke, haze, mist, or fog</li></ul>
<b>Surface Winds</b>	<ul style="list-style-type: none"><li>• Sustained surface winds &gt;30 kt and/or potential non-convective wind sheer below 2,000 ft AGL</li></ul>

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## 5.4.6 SIGMETS

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The SIGMET overlay draws the geographical boundaries of received SIGMETs on the dedicated weather page. Convective and non-convective SIGNificant METerological Information combine in a textual report and display graphically for the observed or forecast region. The SIGMET text displays when the graphical SIGMET is selected. Touch the graphical depiction for additional information.

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## 5.4.7 PIREPs

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PIREPs are pilot-generated weather reports that 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). Routine display with a blue map icon and urgent display with an amber icon. Selecting either icon displays a report window.

## 5.4.8 Winds Aloft

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Indicates wind speed and direction for the specified altitude.

Altitude range: surface to 45,000 ft

The wind barb extends outward from the reporting location dot in the direction of wind origination.



Plus and minus keys adjust altitude in 3,000 ft increments for altitude-based weather products.

## 5.4.9 TFRs

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### **WARNING**

*DO NOT EXCLUSIVELY USE DATALINK SERVICES FOR TFR INFORMATION. TFR DEPICTIONS MAY NOT BE A COMPLETE LISTING AND MAY VARY BETWEEN COCKPIT DEVICES. ALWAYS CONFIRM TFR INFORMATION WITH OFFICIAL SOURCES SUCH AS FLIGHT SERVICE STATIONS OR AIR TRAFFIC CONTROL.*

TFRs identify areas of airspace where aircraft are temporarily restricted from operating. TFRs are routinely issued for occurrences such as dignitary visits, military activities, and forest fires. Tapping the TFR graphic on the weather page brings up textual details for the selected TFR.



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## 5.5 Raw Text Reports

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To display raw textual data for a FIS-B product:

1. Open the FIS-B Status page.
2. Tap **Raw Text Reports**.
3. Select a weather product.

The latest uploaded data for the product displays on a dedicated page.

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## 5.6 FIS-B Ground Reception Status

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FIS-B ground station transmission status may be monitored when the UAT transceiver is powered and the FIS-B weather option is selected. A current report lists completeness of NOTAM-TFR, AIRMET, and SIGMET data for all received ground stations.

For the received ground station, the station range field indicates complete/incomplete status only for those products within the ground station's range.

To view the FIS-B Reception page, tap  
**Menu > Radio Stations**.

# Traffic Awareness

## FEATURE REQUIREMENTS

- External ADS-B In product (GPS 175)

## FEATURE LIMITATIONS

- Available functions and alerting features are dependent upon the ADS-B traffic system source

### ADS-B FEATURES

- Runway and taxiway depiction during SURF mode (< 2 nm range scale)
- Selectable traffic icons display intruder and vector information
- Customizable motion vectors (type, duration)
- Airborne and surface mode options

## 5.7 Traffic Applications

### FEATURE REQUIREMENTS

- Aviation database (SURF only)

The Traffic system supports AIRB and SURF applications.

#### AIRB

- Airborne traffic application
- Active in the en route environment (>5 nm and >1,500 ft above the nearest airport)

#### SURF

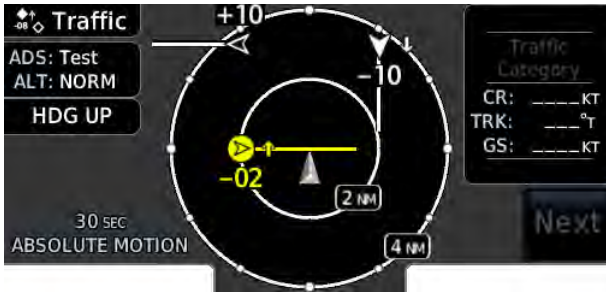
- Airborne and ground traffic application
- Active on ground or within the terminal environment (<5 nm and <1,500 ft above field elevation)
- Runway and taxiway depictions when the zoom scale is <2 nm (Traffic page only)
- Ground vehicle depictions

## 5.8 Traffic Display



Collision avoidance and traffic surveillance data display on the dedicated Traffic page and as overlays on the Map page.

The Traffic page displays intruding traffic in relation to the current position and altitude of the aircraft without clutter from other data.

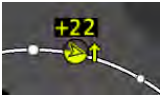


Traffic Page

1	<p><b>Ownship Icon</b> Depicts current aircraft position.</p> <ul style="list-style-type: none"> <li>Nose of the ownship is the actual ownship location</li> <li>Unlike the configured aircraft symbol on map displays, ownship icon is always a directional arrow</li> </ul>
2	<p><b>Page Orientation Label</b> Orientations:</p> <ul style="list-style-type: none"> <li><b>Heading Up</b> (HDG UP) during normal operation</li> <li><b>Track Up</b> (TRK UP) if there is no valid heading</li> </ul>
3	<p><b>Range Ring</b></p> <ul style="list-style-type: none"> <li>Outer ring represents selected range</li> <li>Range options: 2, 4, 6, 12, 24, 48</li> </ul>
4	<p><b>Altitude Separation Value</b> Indicates when an intruder is above or below the ownship.</p> <ul style="list-style-type: none"> <li>Value appears above the traffic symbol</li> <li>Plus or minus sign denotes higher or lower altitude</li> </ul>

5	<b>Vertical Trend Arrow</b> Active when an intruder is climbing or descending at a vertical speed greater than 500 fpm.
6	<b>Intruding Aircraft Symbol</b> Actual intruder location varies according to symbol type. <ul style="list-style-type: none"><li>• Tip of directional symbols</li><li>• Center of non-directional symbols</li></ul>

### OFF SCALE TRAFFIC ALERTS



Off scale (out of range) traffic alerts are depicted as half yellow symbols on the outermost range ring at the correct bearing.

### TRAFFIC OVERLAY STATUS ICON



Indicates the status of displayed traffic on the Map page. The icon is absent when the map is not displaying traffic.

### TRAFFIC GROUPS

When traffic grouping is active, traffic within close proximity of each other may display as a group.



- Asterisk indicates that the target belongs to a group
- Relative proximity of the closest target determines color
- Depiction is of the most immediate threat

### TRAFFIC UNITS









PARAMETER	UNITS
Altitude	ft
Distance	nm









Traffic units are always uniform.

Selections on the System Units page do not affect the traffic display.

## ADS-B TRAFFIC SYMBOLS

Traffic Information is for advisory use only. The pilot is responsible for identifying and avoiding traffic conflict.

SYMBOL	DESCRIPTION
	Basic Directional
	Basic Non-directional
	Basic Off-scale Selected
	Directional (On-Ground)
	Non-directional (On-Ground)
	Proximate Directional (On-Ground)
	Proximate Non-directional (On-Ground)
	Directional Surface Vehicle

SYMBOL	DESCRIPTION
	Proximate Directional
	Proximate Non-directional
	Proximate Off-scale Selected
	Non-directional Alerted
	Off-scale Non-directional Alerted Traffic
	Directional Alerted Traffic
	Off-scale Directional Alerted Traffic
	Non-directional Surface Vehicle

# 5.9 Traffic Interactions

## SELECTED TRAFFIC INFORMATION

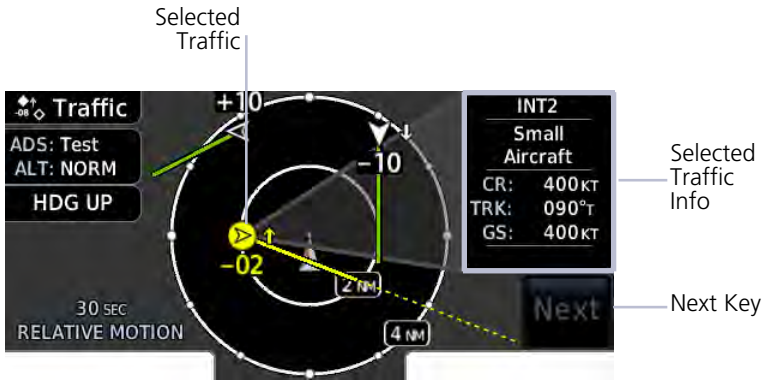
- Registration/call sign
- Vehicle type
- Closure rate
- Track
- Ground speed

Selecting a traffic symbol displays information about the aircraft in the upper right corner of the page.

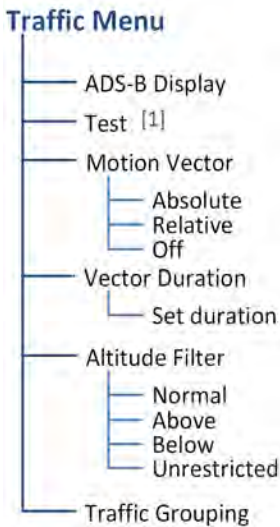
Selections remain active through altitude filtering, zoom scale, and page changes.



Tapping **Next** repeatedly steps through multiple symbols spaced closely together.



## 5.10 Traffic Setup



Tap **Menu** to access pilot selectable settings and the self-test and ADS-B display functions.

SELECTION	FUNCTION
<b>ADS-B Display</b>	Enable automatic mode selection. System selects between Surface and Airborne depending on the state of the aircraft. Selecting Off disables the function.
<b>Test</b>	Initiate a test of the traffic system. Not available when ADS-B Display function is active.
<b>Motion Vector</b>	Select motion vector type. Selecting Off removes all motion vectors from the display. Options: • Absolute • Relative • Off
<b>Vector Duration</b>	Select the amount of time represented by the endpoint. Options range from 0 seconds to 5 minutes. A longer duration results in a longer vector.
<b>Altitude Filter</b>	Select filter range. Options: • Normal • Above • Below • Unrestricted
<b>Traffic Grouping</b>	Display targets in close proximity as a group. Asterisk depicts the highest priority target.

## 5.10.1 Traffic Test

### FEATURE LIMITATIONS

- Available only when the aircraft is on ground (i.e., standby mode) and ADS-B Display is off



The test function displays a test pattern on the Traffic page. This option is accessible via the Traffic menu.

The system automatically returns to normal operating mode once the test is complete.

## 5.10.2 Motion Vectors

### FEATURE LIMITATIONS

- Motion vectors display on the Traffic page only

A motion vector is a line extending from the nose of an intruder icon. Its orientation represents the intruder’s direction and movement.

A yellow vector indicates when traffic meets intruding TA criteria (i.e., closing rate, distance, vertical separation).

MOTION VECTOR TYPES	
<b>Absolute</b>	<ul style="list-style-type: none"> <li>• White vector</li> <li>• Depicts intruder ground track</li> <li>• Calculations based on intruder direction and ground speed</li> <li>• Endpoint depicts intruder’s position over the ground at the end of the selected duration</li> <li>• Airborne and ground functionality</li> </ul>
<b>Relative</b>	<ul style="list-style-type: none"> <li>• Green vector</li> <li>• Depicts intruder movement relative to the ownship</li> <li>• Calculations based on track and ground speed of both intruder and ownship</li> <li>• Endpoint depicts intruder’s location relative to the ownship at the end of the selected duration</li> <li>• Airborne functionality only</li> <li>• “Relative Motion - Unavailable” annunciates during ground operations</li> </ul>



### 5.10.3 Altitude Filtering

Pilot selectable filters limit the display of traffic to a specific altitude range relative to the altitude of the ownship.

Filter selections apply to both the Traffic page and the traffic overlay on the Map page.

SELECTION	ALTITUDE RANGE
Normal	-2,700 ft to 2,700 ft
Above	-2,700 ft to 9,900 ft
Below	-9,900 ft to 2,700 ft
Unrestricted	-9,900 ft to 9,900 ft

## 5.11 Status Annunciations

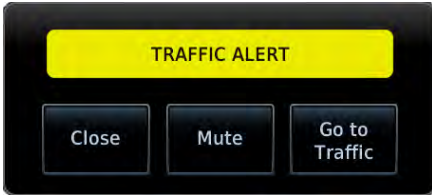
ANNUNCIATION	DESCRIPTION
Absolute Motion - XX SEC/MIN	Active motion vector type is absolute.
Failed	ADS data failure.
No Data	Unit is not receiving valid traffic data.
No GPS Position	ADS-B LRU detects that GPS is initializing.
Relative Motion - XX SEC/MIN	Active motion vector type is relative.
Relative Motion - UNAVAILABLE	Aircraft is not airborne and the active motion vector type is relative.
Unavailable	Necessary traffic data not available.

# 5.12 Traffic Alerting

## FEATURE LIMITATIONS

- Aural traffic alerts available on GNX 375 only

Traffic alerts occur anytime there is an increase in the number of traffic advisories. They remain active until the area is clear of all TAs.



**Traffic Pop-up**

Traffic alerts appear as textual annunciations on the the Traffic page, and as a pop-up window when another page is active.



**Traffic Alert Annunciation**

ANNUNCIATION	ALERT TYPE   POP-UP   CONDITION   VOICE MESSAGE
TRAFFIC	<p><b>Alert Type:</b> Caution</p> <p><b>Pop-up Alert:</b> Yes</p> <p><b>Condition:</b></p> <ul style="list-style-type: none"> <li>• Traffic reports a traffic advisory</li> </ul> <p><b>Voice Message:</b></p> <ul style="list-style-type: none"> <li>• Message content depends on current traffic system configuration</li> </ul>

## ALERTING PARAMETERS

ALERTING PARAMETER CONSIDERATIONS
<ul style="list-style-type: none"> <li>• Altitude separation and trend</li> <li>• Angle</li> <li>• Speed</li> <li>• Closure rate of each aircraft (ownship and target)</li> </ul>

Traffic alerting parameters consider several factors in order to allow you enough time to acquire the target and maneuver the aircraft away from conflicting traffic.

To minimize nuisance alerts, traffic alerting sensitivity is adaptive, based on altitude above ground level. In fixed winged aircraft, no aural alerts are given below 500 ft.

# Terrain Awareness



## WARNING

*DO NOT USE TERRAIN AND OBSTACLE DATA TO NAVIGATE OR MANEUVER AROUND TERRAIN. THEY ARE AN AID TO SITUATIONAL AWARENESS ONLY.*

Terrain controls are accessible from the Terrain menu. Map overlay keys are accessible from the associated map menu.

## 5.13 Terrain Configurations

### AVAILABLE TERRAIN CONFIGURATIONS

- Terrain Proximity
- Terrain Alerting

Alerting functions are dependent upon the configured terrain alerting options.

### 5.13.1 GPS Altitude for Terrain

#### FUNCTIONAL REQUIREMENTS

GPS altitude is derived from satellite measurements. To acquire an accurate 3-D fix (latitude, longitude, altitude), a minimum of four operating satellites must be in view of the GPS receiver antenna.

The terrain system uses GPS altitude and position data to:

- Create a 2-D image of surrounding terrain and obstacles relative to the aircraft's position and altitude
- Calculate the aircraft's flight path in relation to surrounding terrain and obstacles
- Predict hazardous terrain conditions and issue alerts

### **GSL ALTITUDE & INDICATED ALTITUDE**

The unit converts GPS altitude data to GSL altitude (i.e., the geometric altitude relative to MSL) for use in terrain functions. All Terrain page depictions and elevation indications are in GSL.

Variations between GSL altitude and the aircraft's corrected barometric altitude (or indicated altitude) are common. As a result, Terrain page altitude data may differ from current altimeter readings. Both GSL altitude and indicated altitude represent height above MSL, but differ in accuracy and reliability.

#### **GSL ALTITUDE**

- Highly accurate and reliable geometric altitude source
- Does not require local altimeter settings to determine height above MSL
- Not subject to pressure and temperature variations
- Affected primarily by satellite geometry

#### **INDICATED ALTITUDE**

- Barometric altitude source corrected for pressure variations
- Requires frequent altimeter setting adjustment to determine height above MSL
- Subject to local atmospheric conditions
- Affected by variations in pressure, temperature, and lapse rate

## 5.14 Database Limitations



### NOTE

Garmin cross-validates terrain and obstacle data in accordance with TSO-C151c. However, the information should never be considered all-inclusive. Database inaccuracies or omissions may exist.

Terrain and obstacle data are not available when the aircraft is operating outside of the installed database coverage area.

Garmin obtains terrain and obstacle data from government sources and cannot independently verify the accuracy and completeness of the information. Pilots must familiarize themselves with the appropriate charts and other data for safe flight.

DATABASE	LIMITATIONS
<b>Terrain</b>	<ul style="list-style-type: none"> <li>• Not available north of 89° N latitude and south of 89° S latitude</li> </ul>
<b>Obstacle</b>	<ul style="list-style-type: none"> <li>• Coverage areas vary according to database type</li> <li>• Power line indications for the contiguous United States and small parts of Canada and Mexico</li> <li>• Regional definitions may change without notice</li> <li>• May not contain uncharted obstacles</li> <li>• May include power lines or only HOT lines depending on database type [1]</li> </ul>

[1] HOT lines are power lines that share location with other obstacles identified by the FAA.

# 5.15 Terrain Display



Terrain, obstacle, and wire data display as overlays on the Terrain and Map pages.

### FEATURE REQUIREMENTS

All terrain functions require the following components to operate properly.

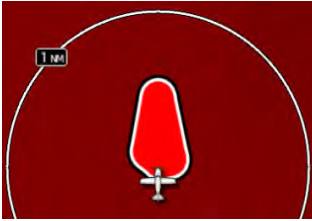
- Valid 3-D GPS position for terrain and obstacle data display
- Valid terrain/obstacle database



Terrain Page

1	<p><b>Ownship Icon</b> Depicts current aircraft position.</p>
2	<p><b>GSL Altitude</b> Displays current GPS height above mean sea level.</p>
3	<p><b>North Indicator</b> Indicates True north.</p>
4	<p><b>Page Orientation Label</b> Orientations:</p> <ul style="list-style-type: none"> <li>• <b>Heading Up</b> (HDG UP) during normal operation</li> <li>• Changes to <b>Track Up</b> (TRK UP) in the event of a heading failure</li> </ul>
5	<p><b>Legend</b> Shows color designations for terrain and obstacle relative altitude ranges.</p>
6	<p><b>Terrain Overlay Icon</b> Indicates power line or obstacle presence at the current zoom scale.</p>

## AUTOMATIC ZOOM



In the event an alert occurs, the page automatically zooms to provide the best depiction of that alerted terrain, obstacle, or power line.

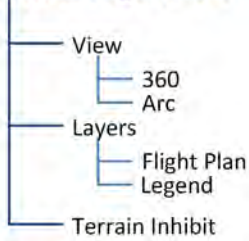
## AUTOMATIC DATA REMOVAL



Automatic removal of obstacle and power line data occurs at range scales greater than 10 nm.

## 5.16 Terrain Setup

### Terrain Page Menu



Tap **Menu** to access to pilot selectable settings as well as self-test and alert inhibit functions.

SELECTION	FUNCTION
<b>Terrain Inhibit</b>	<ul style="list-style-type: none"> <li>Inhibits visual alerts for terrain, obstacles, and power lines</li> </ul>
<b>View</b>	<ul style="list-style-type: none"> <li><b>360</b> changes view format to a 360° ring encircling the aircraft (default view)</li> <li><b>Arc</b> changes view format to a forward-looking 120° arc</li> </ul>
<b>Flight Plan</b>	<ul style="list-style-type: none"> <li>Toggles the active flight plan overlay on or off (Terrain page only)</li> </ul>
<b>Legend</b>	<ul style="list-style-type: none"> <li>Toggles the Terrain and Obstacle/Wire legend on or off</li> </ul>



## 5.17 Terrain Proximity

### FEATURE LIMITATIONS

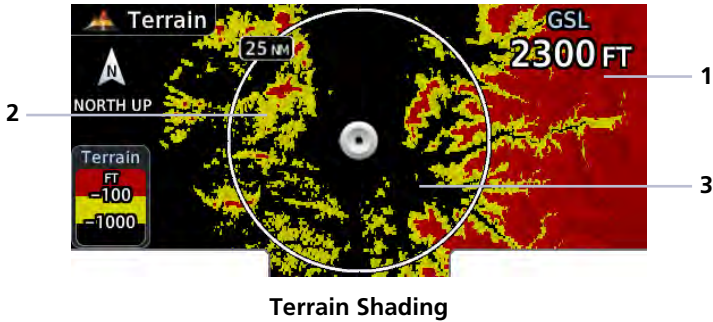
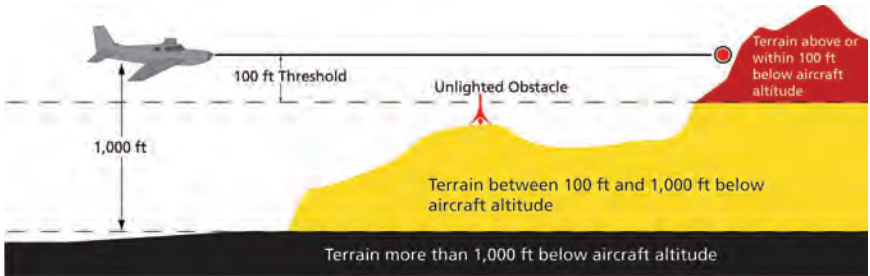
- Terrain and obstacle depictions are relative to aircraft altitude.
- Obstacle depictions are dependent upon database
- Setup does not provide visual or aural alerts

### TERRAIN PROXIMITY FEATURES

- Non-TSO C151c certified terrain display system
- 2-D graphical representation of surrounding terrain, obstacles, and power lines relative to aircraft position and altitude
- Declutter automatically removes obstacle and power line data at large ranges
- Continuous monitoring of database validity, GPS and hardware status
- Displays when higher level terrain functions are active

## 5.17.1 Terrain Elevation Depictions

Color shading depicts terrain elevations relative to the aircraft's position and altitude. Colors automatically adjust as the aircraft's altitude changes.



Terrain Shading













1	Red	2	Yellow	3	Black
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## 5.17.2 Obstacle Elevation Depictions







### FEATURE LIMITATIONS

- Obstacles more than 2,000 ft below current altitude do not display




### TOWER OBSTACLES

UNLIGHTED OBSTACLE		LIGHTED OBSTACLE		OBSTACLE LOCATION
<1000' AGL	>1000' AGL	<1000' AGL	>1000' AGL	
				Red obstacle is above or within 100 ft below current altitude.
				Yellow obstacle is between 100 ft and 1000 ft below current altitude.
				White obstacle is between 1,000 ft and 2,000 ft below current altitude.

### WIND TURBINE OBSTACLES

UNLIGHTED WIND TURBINE OBSTACLE	LIGHTED WIND TURBINE OBSTACLE	OBSTACLE LOCATION
		Red obstacle is above or within 100 ft below current altitude.
		Yellow obstacle is between 100 ft and 1,000 ft below current altitude.
		White obstacle is more than 1,000 ft below current altitude.

## POWER LINE OBSTACLES

OBSTACLE	POWER LINE OBSTACLE LOCATION
	Red power line is above or within 100 ft below current altitude.
	Yellow power line is between 100 ft and 1,000 ft below current altitude.
	White power line is between 1,000 ft and 2,000 ft below current altitude.

## OBSTACLE GROUPS

With the exception of power lines, obstacles within close proximity of each other may display as a group.



- Asterisk indicates that the obstacle belongs to a group
- Relative altitude of the highest obstacle determines color
- Depiction is of the most immediate threat

## 5.18 Terrain Alerting

Terrain-FLTA provides visual alerts for potential flight path conflicts involving terrain, obstacles, or power lines. Alerting function behavior is determined at installation.

### TERRAIN-FLTA FEATURES

- Non-TSO C151c certified terrain alerting system
- FLTA functions: RTC, RLC, ROC, ITI, ILI, and IOI
- Terrain depictions and display overlays
- Cautions and warnings indicate alert severity and threat type
- Textual annunciations
- Pop-up alerts
- Threat location indication on map displays (Map page, Terrain page)
- Self-test and alert inhibit functionality

### 5.18.1 Alert Types

Available alerting functions depend on the installed terrain system.

ALERT TYPE	CONDITION
<b>Imminent Impact [1]</b>	Aircraft reaches the minimum clearance altitude of any obstacle (IOI), terrain (ITI), or power line (ILI) in the projected flight path.
<b>Reduced Clearance [1]</b>	Aircraft's vertical flight path is projected to be within the minimum clearance altitude of an obstacle (ROC), terrain (RTC), or power line (RLC).
<b>Premature Descent [2]</b>	Aircraft is significantly below the normal approach path for the nearest runway. <ul style="list-style-type: none"> <li>• Altitude is &lt;700 ft above terrain</li> <li>• Distance from destination airport is 15 nm or less</li> </ul>

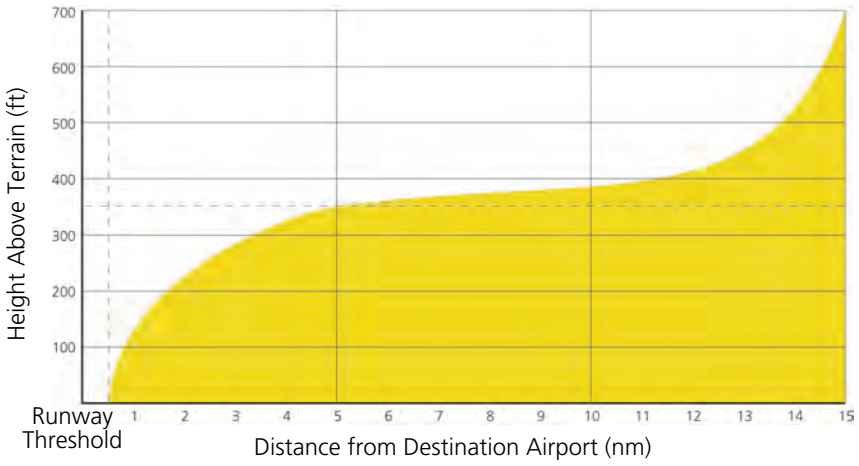
[1] Alerting inhibited <200 ft AGL within 0.5 nm of approach runway or <125 ft AGL within 1.0 nm of runway threshold.

[2] Alerting inhibited within 0.5 nm of approach runway or <125 ft AGL within 1.0 nm of runway threshold. Alerting thresholds for final descent are based on current position, speed, and flight path data.

## 5.18.2 Alerting Thresholds

FLIGHT PHASE	MINIMUM CLEARANCE ALTITUDE	
	LEVEL FLIGHT	DESCENDING
En Route	700 ft	500 ft
Terminal	350 ft	300 ft
Approach	150 ft	100 ft
Departure	100 ft	100 ft

### PDA THRESHOLD



Alerting Area

## 5.18.3 Inhibiting PDA & Terrain-FLTA Alerts



### NOTE

Always use discretion when inhibiting PDA or Terrain-FLTA alerts. Re-activate the alert function when appropriate.

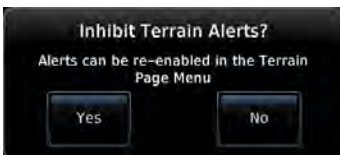


Inhibit Mode  
Annunciation

The **Terrain Inhibit** control is accessible via the terrain pop-up alert or Terrain page menu.

Installer configurable settings allow alert suppression for specific runway types.

INHIBITS	FUNCTION
<b>INHIBIT</b>	Manually inhibits PDA or Terrain-FLTA visual alerts for low altitude approaches.
<b>AUTOMATIC INHIBIT</b>	Automatically inhibits Terrain-FLTA alerts when the aircraft meets the following approach criteria. <ul style="list-style-type: none"> <li>• Altitude &lt;200 ft above runway elevation</li> <li>• Position &lt;0.5 nm of approach end or between each runway end</li> </ul>



Tapping **Terrain Inhibit** generates a pop-up. Confirm the request to inhibit terrain alerts.

## 5.18.4 PDA & Terrain-FLTA Alerts



Terrain Pop-up

Terrain alerts appear as textual annunciations on the the Terrain page, and as a pop-up window when another page is active.



Terrain Alert Annunciation

ANNUNCIATION	ALERT TYPE   POP-UP   CONDITION
TER FAIL	<p><b>Alert Type:</b> Caution</p> <p><b>Pop-up Alert:</b> N/A</p> <p><b>Condition:</b></p> <ul style="list-style-type: none"> <li>• Terrain reports a system failure</li> <li>• The database is missing or corrupt</li> </ul>
TER INHB	<p><b>Alert Type:</b> Advisory</p> <p><b>Pop-up Alert:</b> N/A</p> <p><b>Condition:</b></p> <ul style="list-style-type: none"> <li>• Terrain reports alert inhibit mode active</li> </ul>
TER N/A	<p><b>Alert Type:</b> Caution</p> <p><b>Pop-up Alert:</b> N/A</p> <p><b>Condition:</b></p> <ul style="list-style-type: none"> <li>• No certified GPS position</li> <li>• Degraded GPS signal</li> <li>• Aircraft is outside of the terrain database regional coverage</li> </ul>
TERRAIN	<p><b>Alert Type:</b> Caution</p> <p><b>Pop-up Alert:</b> Yes</p> <p><b>Condition:</b></p> <ul style="list-style-type: none"> <li>• Reduced Required Terrain Clearance</li> <li>• Imminent Terrain Impact</li> <li>• Premature Descent</li> </ul>



ANNUNCIATION	ALERT TYPE   POP-UP   CONDITION
<b>TER TEST</b>	<p><b>Alert Type:</b> Advisory</p> <p><b>Pop-up Alert:</b> N/A</p> <p><b>Condition:</b></p> <ul style="list-style-type: none"> <li>• Terrain system test is in progress</li> </ul>
<b>OBSTACLE</b>	<p><b>Alert Type:</b> Caution</p> <p><b>Pop-up Alert:</b> Yes</p> <p><b>Condition:</b></p> <ul style="list-style-type: none"> <li>• Reduced Obstacle Clearance</li> <li>• Imminent Obstacle Impact</li> </ul>
<b>PULL UP</b>	<p><b>Alert Type:</b> Warning</p> <p><b>Pop-up Alert:</b> Yes</p> <p><b>Condition:</b></p> <ul style="list-style-type: none"> <li>• Reduced Required Terrain Clearance</li> <li>• Imminent Terrain Impact</li> <li>• Reduced Obstacle Clearance</li> <li>• Imminent Obstacle Impact</li> <li>• Reduced Line Clearance</li> <li>• Imminent Line Impact</li> </ul>
<b>WIRE</b>	<p><b>Alert Type:</b> Caution</p> <p><b>Pop-up Alert:</b> Yes</p> <p><b>Condition:</b></p> <ul style="list-style-type: none"> <li>• Reduced Line Clearance</li> <li>• Imminent Line Impact</li> </ul>

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# 6 Messages

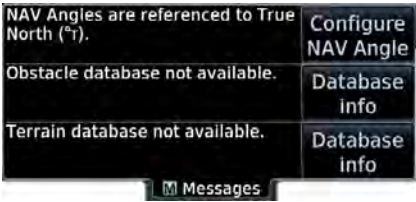
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## ADVISORY MESSAGES

6.1	Message Key .....	6-2
6.2	Airspace Advisories .....	6-3
6.3	Database Advisories .....	6-4
6.4	Flight Plan Advisories .....	6-5
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# Advisory Messages

Advisories are system-related messages relative to the display.



- Most recent advisories appear at the top of list
- View-once advisories remain in queue until viewed by the pilot
- Persistent (or conditional) advisories remain active until the indicated condition is resolved

All advisories are logged in the unit’s internal storage. This log may be exported to an SD card.

## 6.1 Message Key



This key displays at the left edge of the screen when an advisory condition is present. Tapping the key once displays an advisory list. Tapping it again acknowledges all active advisories and closes the list.

- Flashes when a new advisory is present
- Turns solid once all active advisories are acknowledged
- No longer displays after all active advisories are cleared

## 6.2 Airspace Advisories

Alerted airspace types are based on pilot settings in the Airspace Alerts page. These advisories are informational only. No action is necessary.

ADVISORY	CONDITION
AIRSPACE ALERT - Inside airspace.	Aircraft is inside the airspace.
AIRSPACE ALERT - Airspace within 4 nm and entry in less than 10 minutes	Airspace is within 4nm of the path and projected to enter in less than 10 minutes.
AIRSPACE ALERT - Airspace entry in less than 10 minutes	Aircraft is projected to enter the airspace in less than 10 minutes.
AIRSPACE ALERT - Within 4 nm of airspace	Airspace is less than 4 nm from the aircraft. May not be projected to enter the airspace.

## 6.3 Database Advisories

ADVISORY	CONDITION	CORRECTIVE ACTION
<Terrain/Obstacle> database not available.	The indicated database is unavailable or corrupt.	Re-download and install the indicated database. Contact a Garmin dealer for support.
Terrain display unavailable for current location.	Terrain database cannot provide elevation at the current GPS position. Aircraft is outside the database coverage area.	Load appropriate coverage area onto the external datacard.
Verify user-modified procedures in stored flight plans are correct.	Navigation database updates and the stored flight plan contains user-modified procedures.	Verify the procedures are correct.
Verify airways in stored flight plan are correct.	The stored flight plan contains an airway that is inconsistent with the current navigation database.	Verify all airways are correct. If necessary, reload airways to the stored flight plan routes.
A procedure has been modified in a cataloged flight plan.	Database update causes flight plan to exceed 100 waypoint limit. Procedure is removed or truncated as a result.	Verify cataloged flight plan and procedures are correct. If necessary, reload procedures to the stored flight plan routes.
Aircraft in area with large mag var. Verify all course angles.	Magnetic variation flagged as unreliable in the MagVar database. Typically occurs when operating at high latitudes that do not support a magnetic NAV angle.	Verify that the geographical region supports navigation based on magnetic variation.

## 6.4 Flight Plan Advisories

ADVISORY	CONDITION	CORRECTIVE ACTION
Flight plan import failed.	Unit unable to decode flight plan contents. Wireless import of the requested flight plan not possible.	Check for proper operation of all necessary components. If the problem persists, contact dealer for service.
Flight plan import failed. Catalog is full.	The flight plan catalog is full. Wireless import of the requested flight plan not possible.	Delete any unnecessary flight plans from the catalog.
<#> new imported flight plan(s) available for preview.	Unit receives the specified number of flight plans via the import function. They are available for viewing on the Preview page.	No action necessary.
Stored flight plan waypoint is not in current navigation database.	Current navigation database no longer contains a stored flight plan waypoint.	Verify all stored cataloged flight plans and procedures. Modify stored flight plans as necessary to include waypoints that are in the current navigation database.
Stored flight plan waypoint has changed location.	A waypoint in a stored flight plan moved by more than 0.33 arc minutes from its previous position.	Verify stored cataloged flight plans and procedures. Modify stored flight plans as necessary to include waypoints that are in the current navigation database.
Steep turn. Aircraft may overshoot course during turn.	The flight plan contains an acute course change ahead. Following the guidance requires a bank in excess of normal. If coupled, the autopilot may not be able to execute the steep turn.	Slowing the aircraft may shallow the turn.

## 6.5 GPS/WAAS Advisories

ADVISORY	CONDITION	CORRECTIVE ACTION
<GPS/GNX> GPS receiver has failed. Check GPS coax for electrical short.	Internal communication to the WAAS board is inoperative.	Use a different GPS receiver or a non-GPS based source of navigation. Contact dealer for service.
GPS loss of integrity (LOI). Verify GPS position with other navigation equipment.	GPS/WAAS board reports LOI. Antenna may be shaded from satellites.	Ensure the aircraft is clear of hangars, buildings, trees, etc. Use a different GPS receiver or a non-GPS based source of navigation. If the problem persists, contact dealer for service.
GPS navigation lost due to insufficient satellites. Use other navigation source.	GPS position 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 and may have erroneous position. Use other navigation source.	GPS position lost due to erroneous position.	Use a different GPS receiver or a non-GPS based source of navigation. Contact dealer for service.
Abort Approach. GPS approach is no longer available.	GPS approach not available. GPS unable to provide approach level of service (i.e., LPV, LNAV, LNAV+V, or L/VNAV).	Initiate a climb to the MSA or other published safe altitude, abort the approach, and execute a non-GPS based approach.
Approach not active. Approach guidance not available.	GPS approach could not transition to active (e.g., the unit remains in TERM as it does not have the required HPL/VPL for LNAV).	Abort the approach and then execute a non-GPS based approach.
GPS approach downgraded. Use LNAV minima.	Approach downgraded from LPV or LNAV/VNAV to an LNAV approach. Vertical guidance no longer available.	Continue to fly the approach using published LNAV minimums.



ADVISORY	CONDITION	CORRECTIVE ACTION
GPS searching sky. Ensure GPS antenna has unobstructed view of the sky.	WAAS board is acquiring position and may take longer than normal. Typically occurs when the unit is powered on after installation or being off for several weeks.	No action necessary.
Low internal GPS clock battery.	WAAS board indicates that its clock battery is low. May experience delay when attempting to acquire GPS position. Almanac data may be lost.	Contact dealer for service.
GPS receiver needs service.	WAAS board is reporting that it requires service. GPS module may continue to function.	Use a different GPS receiver or a non-GPS based source of navigation. Contact dealer for service.

## 6.6 Navigation Advisories

ADVISORY	CONDITION	CORRECTIVE ACTION
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.
Holding EFC time has expired.	It is past the specified EFC time for the user-defined hold.	No action necessary.
True north approach. Verify NAV angles are referenced to True north (°T).	The loaded procedure references true north and the active leg has a published true north reference.	Verify the NAV angle is set to True north.
Magnetic north approach. Verify NAV angles are referenced to Magnetic north.	The loaded approach is magnetic, but the NAV angle reference is not.	Change NAV angle setting to Magnetic.
NAV angles are referenced to True north (°T).	NAV angle is set to True.	No action necessary.
NAV angles are referenced to a user set value (°U)	NAV angle is set to User.	No action necessary.

## 6.7 System Hardware Advisories

ADVISORY	CONDITION	CORRECTIVE ACTION
<GPS/GNX> knob-push stuck.	Dual concentric inner knob is stuck.	Push the inner knob again. If it remains stuck, use the corresponding touchscreen controls. Contact dealer for service.
<GPS/GNX> cooling fan failed.	Unit detects a cooling fan fault. Coloration may be incorrect. Backlight may dim to reduce power and heat.	Extended operation at high temperatures is not recommended as damage to the unit may occur. Contact dealer for service.
<GPS/GNX> over temp. Reducing backlight brightness.	Unit temperature exceeds the over temperature threshold. Backlight dims to reduce power and heat.	Decrease cabin temperature and increase cabin airflow near the unit. If the problem persists, contact dealer for service.
<GPS/GNX> under temp.	Unit temperature is below the normal operating temperature threshold.	If the problem persists, contact dealer for service.
Pilot stored data was lost. Recheck settings.	An error occurred in the pilot stored data. The following user settings may be lost. <ul style="list-style-type: none"> <li>• Map menu settings</li> <li>• User waypoints</li> <li>• Catalog flight plans</li> <li>• User field settings</li> <li>• Unit convention selection</li> </ul>	Recheck settings.

ADVISORY	CONDITION	CORRECTIVE ACTION
<p>&lt;GPS/GNX&gt; needs service.</p>	<p>Loss of calibration data. GPS175 cannot communicate with its configuration module or other hardware. GNX 375 experiences a fault related to one of the following.</p> <ul style="list-style-type: none"> <li>• ADS-B/Nav communication</li> <li>• Altitude encoder calibration</li> <li>• Audio ROM</li> <li>• Configuration module</li> <li>• Non-volatile memory</li> <li>• Suppression bus</li> </ul>	<p>Contact dealer for service.</p>
<p>&lt;GPS/GNX&gt; SD card is invalid or failed.</p>	<p>The SD card is unreadable or corrupt (i.e., data is unavailable).</p>	<p>Reformat the SD card using an external computer. Re-insert the SD card in the slot. If the problem persists, contact dealer for service.</p>
	<p>User ejects Flight Stream 510 wireless datacard. Network connection lost.</p>	<p>Restart unit to reconnect.</p>
<p>&lt;Name&gt; log encountered an error when exporting.</p>	<p>Export failure. May occur for WAAS or traffic logs.</p>	<p>Reformat the SD card using an external computer. Re-insert the SD card in the slot. If the problem persists, contact dealer for service.</p>
<p>&lt;Name&gt; log has exported successfully.</p>	<p>Export to SD card successful. May occur for WAAS or traffic logs.</p>	<p>No action necessary.</p>
<p>Heading source inoperative or connection lost.</p>	<p>&lt;GPS/GNX&gt; is not receiving heading information from any source. Heading up map orientation not available.</p>	<p>Contact dealer for service.</p>

ADVISORY	CONDITION	CORRECTIVE ACTION
Pressure altitude source inoperative or connection lost.	<GPS/GNX> is not receiving pressure altitude data from any source.	Contact dealer for service.
Press "Enable APR Output" before selecting APR on autopilot.	Approach guidance is available from the connected KAP 140/KFC 225 autopilot.	Before engaging approach mode on the autopilot, tap the <b>Enable APR Output</b> key.
ADS-B Out fault. Pressure altitude source inoperative or connection lost.	Transponder loses communication with the pressure altitude source.	Contact dealer for service.
Transponder has failed.	Transponder detects an internal failure. Functionality may be unavailable. Possible causes: <ul style="list-style-type: none"> <li>• 1090ES ADS-B Out failure</li> <li>• Transponder failure</li> <li>• Communication with the transponder is lost</li> </ul>	Contact dealer for service.
Transponder is operating in ground test mode.	Transponder is being forced airborne for ground test. GNX 375 only.	Cycle power to the GNX 375 once ground test completes.
<GPS/GNX> demo mode.	The unit is in demo mode. Do not use for navigation.	Power cycle the unit to exit demo mode.

## 6.8 Terrain Advisories

ADVISORY	CONDITION	CORRECTIVE ACTION
Terrain alerts are inhibited. Re-enable alerts in the Terrain menu.	Pilot enables terrain alert inhibit function.	Open Terrain menu and deselect <b>Terrain Inhibit</b> .

## 6.9 Traffic System Advisories

ADVISORY	CONDITION	CORRECTIVE ACTION
1090ES traffic receiver fault.	ADS-B LRU unable to receive 1090 Extended Squitter traffic.	Service required. Contact dealer for support.
ADS-B traffic alerting function inoperative.	ADS-B LRU reports a traffic alerting failure.	
ADS-B traffic function inoperative.	ADS-B LRU reports a failure with the ADS-B Traffic input.	
Traffic/FIS-B functions inoperative.	ADS-B LRU reports a critical fault and is inoperative.	
	Communication with the ADS-B LRU is lost.	
UAT fault.	UAT LRU reports a low battery or fan fault.	
UAT traffic/data receiver fault.	ADS-B LRU unable to receive UAT traffic and FIS-B data.	

## 6.10 VCALC Advisories

ADVISORY	CONDITION	CORRECTIVE ACTION
Approaching top of descent.	User configured a vertical descent calculation, and the aircraft is within 60 seconds of the calculated top of descent.	No action necessary.
Arriving at VCALC target altitude.	User configured a vertical descent calculation, and the aircraft is approaching target altitude.	No action necessary.

## 6.11 Waypoint Advisories

ADVISORY	CONDITION	CORRECTIVE ACTION
User waypoint import failed.	User waypoint import failed due to improper file format.	Ensure media has the correct file format. If the problem persists, contact dealer for service.
User waypoint import failed. User waypoint database is full.	User waypoint catalog is full. Import of the requested user waypoints could not complete.	Delete any unnecessary user waypoints from the catalog and try again.
User waypoints were imported successfully.	User waypoint import successful.	No action necessary.
User waypoints imported successfully - existing waypoints reused.	User waypoint import successful. Import function reuses existing user waypoints instead of creating duplicates.	No action necessary.

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# 7 Qualification

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## NOTE

The procedures described in this section are not authorized for completion during flight. All tasks must be performed while the aircraft is on the ground.

## 7.1 Glove Qualification

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The touchscreen uses capacitive touch technology to sense the proximity of skin to the display. A glove creates a barrier between the skin and the display glass, potentially reducing the ability of the display to detect touches.

This procedure qualifies a specific glove for use with the touchscreen. Due to differences in finger size and glove size, the qualification procedure is specific to the pilot/glove combination. Multiple units must be evaluated individually.

### GLOVE SELECTION CONSIDERATIONS

- Thinner gloves perform better than thicker gloves.
- Leather gloves, and gloves designed specifically for use with capacitive touchscreen devices, are often found to be acceptable.
- To improve touchscreen sensitivity while wearing gloves, use the pad of your finger instead of the tip during touch interactions.

### GLOVE QUALIFICATION GUIDANCE

- Table 1 contains the tasks required to qualify a glove.
- Table 2 contains tasks that are not required to qualify a glove, but may limit how some functions are accessed while wearing a glove.

### **GLOVE QUALIFICATION STEPS**

Complete only the tasks for the capabilities relevant to the installed navigator.

1. Sit in the pilot's seat.
2. Start the unit in normal mode.
3. Perform the tasks listed in table 1 and table 2, tapping each key with a non-gloved finger. It is not necessary to record any results for this step.
4. Repeat step 3 using a gloved hand.
5. For each task, determine whether the touchscreen response is the same or worse than without the glove.
6. Record the results in the applicable table. Items that may cause the operation to be worse include, but are not limited to:
  - Multiple attempts to select a key
  - Unintentional selection of adjacent key(s)
  - Excessive force on the touchscreen to select a key
7. If all applicable tasks produce the same response with and without a glove, the pilot may use the glove in flight.

### **GLOVE QUALIFICATION PROCEDURE**

Pilot: \_\_\_\_\_

Glove Description: \_\_\_\_\_

Circle the applicable navigator.

GPS 175   GNX 375

**TABLE 1: TASKS REQUIRED FOR GLOVE QUALIFICATION**

<b>TASK</b>	<b>OPERATION WITH GLOVE (CIRCLE ONE)</b>	
Starting from the Home page:		
<b>GPS</b>	Same	Worse
<b>Waypoint</b>	Same	Worse
Type the airport identifier "KSLE."	Same	Worse
<b>Enter</b>	Same	Worse
Return to the Home page.		
<b>Flight Plan</b>	Same	Worse
<b>Add Waypoint</b>	Same	Worse
Type the airport identifier "KSLE."	Same	Worse
<b>Enter</b>	Same	Worse
Add each of the following waypoints in the same manner.		
KMMV	Same	Worse
KONP	Same	Worse
BTG	Same	Worse
Select <b>BTG</b> .	Same	Worse
<b>Load Airway</b>	Same	Worse
<b>V23</b>	Same	Worse
<b>ALFOR</b>	Same	Worse
<b>Load</b>	Same	Worse
Scroll the list of flight plan waypoints up and down.	Same	Worse
<b>Back</b>	Same	Worse

**TABLE 2: TASKS NOT REQUIRED FOR GLOVE QUALIFICATION**

TASK	OPERATION WITH GLOVE (CIRCLE ONE)	
Open the Active Flight Plan page.	Same	Worse
With one finger on the page, drag the waypoint list up and down.	Same	Worse
With one finger, swipe the list up and down.	Same	Worse
<b>Back</b>	Same	Worse
Open the Map page.		
<b>Graphically Edit FPL</b>	Same	Worse
Drag KONP to an empty area of the map, panning and zooming as necessary. Observe that KONP is removed from the flight plan.	Same	Worse
Drag the leg between KMMV and BTG to KSPB. Observe that KSPB is added to the flight plan.	Same	Worse

# 8 Glossary

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## A

ACT	Altitude Compensated Tilt
ADAHRS	Air Data/Attitude & Heading Reference System
ADC	Air Data Computer
ADIZ	Air Defense Identification Zone
ADS-B	Automatic Dependent Surveillance Broadcast
AFM	Aircraft Flight Manual
AFMS	Aircraft Flight Manual Supplement
AGL	Above Ground Level
AHRS	Attitude Heading Reference System
AIM	Airman's Information Manual
AIRB	Basic Airborne Application
ALT	Altitude Hold
AP	Autopilot
ARTCC	Air Route Traffic Control Center
ASOS	Automated Service Observing System
ATC	Air Traffic Control
ATIS	Automatic Terminal Information Service
ATK	Along Track
AWOS	Automated Weather Observing Station

## C

CDI	Course Deviation Indicator
CDU	Control and Display Unit
CRS	Course
CTAF	Common Traffic Advisory Frequency

### D

- DG Directional Gyro
- DME Distance Measuring Equipment

### E

- EDR Excessive Descent Rate
- EFC Expected Further Clearance
- ENR En Route
- ESP Electronic Stability and Protection

### F

- FAF Final Approach Fix
- FDC Flight Data Center
- FIS-B Flight Information Services Broadcast
- FLTA Forward Looking Terrain Avoidance
- FMS Flight Management System
- FPM Feet Per Minute
- FSS Flight Service Station

### G

- GCS Ground Clutter Suppression
- GDC Garmin Air Data Computer
- GDL Garmin Data Link
- GDU Garmin Display Unit
- GFC Garmin Flight Controller
- GP Glidepath
- GPS Global Positioning System
- GPSS Global Positioning System Steering

GRS	Garmin Reference System
GS	Glideslope
GSL	Geometric Sea Level
GSU	Garmin Sensing Unit
GTP	Garmin Temperature Probe

## H

HDG	Heading
HOT	Hazardous Obstacle Transmission
HPL	Horizontal Protection Level
HSDB	High Speed Data Bus

## I

IAF	Initial Approach Fix
IAS	Indicated Airspeed
IAT	Induction Air Temperature
IFR	Instrument Flight Rules
IGRF	International Geomagnetic Reference Field
ILI	Imminent Line Impact
ILS	Instrument Landing System
INT	Intersection
IOI	Imminent Obstacle Impact
ISA	International Standard Atmosphere
ITI	Imminent Terrain Impact

## K

KIAS	Knots Indicated Airspeed
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## L

LDI	Lateral Deviation Indicator
LOA	Letter of Authorization
LOC	Localizer
LRU	Line Replaceable Unit

### M

MAP	Missed Approach Point
MAHP	Missed Approach Holding Point
MDA	Minimum Descent Altitude
METAR	Meteorological Terminal Aviation Routine Weather Report
MOA	Military Operations Area
MSL	Mean Sea Level

### N

NAVAID	Navigation Aid
NCR	Negative Climb Rate
NDB	Non-Directional Beacon
NEXRAD	Next-Generation Radar

### O

OAT	Outside Air Temperature
OBS	Omni Bearing Selector
OCN	Oceanic

### P

PCL	Pilot Controlled Lighting
PDA	Premature Descent Alert
PRF	Pulse Repetition Frequency
PVT	Position, Velocity, and Time

### R

RAIM	Receiver Autonomous Integrity Monitoring
RLC	Reduced Line Clearance
ROC	Reduced Required Obstacle Clearance
RTC	Reduced Required Terrain Clearance



**S**

SAT	Static Air Temperature
SBAS	Satellite-Based Augmentation System
SD	Secure Datacard
SSID	Service Set Identifier
SURF	Surface Situation Awareness
SVID	Satellite-Vehicle Identification

**T**

TA	Traffic Advisory
TAF	Terminal Aerodrome Forecast
TAS	Traffic Advisory System
TAT	Total Air Temperature
TCAD	Traffic Alert and Collision Avoidance Devices
TCAS	Traffic Alert and Collision Avoidance System
TERM	Terminal
TFR	Temporary Flight Restriction
TIS	Traffic Information Service
TSAA	Traffic Situational Awareness with Alerting
TSO	Technical Standard Order

**U**

UTC	Universal Time Coordinated
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### V

VCALC	Vertical Calculator
VDI	Vertical Deviation Indicator
VFR	Visual Flight Rules
VLOC	VOR/Localizer
VNAV	Vertical Navigation
VOR	Very High Frequency Omni-directional Range
VPL	Vertical Protection Level
VRP	Visual Reporting Point
VS	Vertical Speed

### W

WAAS	Wide Area Augmentation System
WP	Waypoint

### X

XPDR	Transponder
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