



# 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 USE OUT OF DATE DATABASE INFORMATION AT YOUR OWN RISK.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**

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**

ALWAYS REFER TO CURRENT AERONAUTICAL CHARTS FOR APPROPRIATE MINIMUM CLEARANCE ALTITUDES. THE DISPLAYED MSAs 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](https://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](https://flyGarmin.com) by selecting "Aviation Database Declarations."

**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](https://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](https://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	02/06/19	Experimental Release.
A	03/20/19	Production Release.
B	04/17/19	Minor edits.

## 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
GDL 88 ADS-B Transceiver Pilot's Guide	190-01122-03

### 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>
FAA Regulatory and Guidance Library	<a href="https://rgl.faa.gov">https://rgl.faa.gov</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**

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

## **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 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>• Terrain</li> <li>• Flight Plan</li> <li>• Graphical Flight Planning</li> <li>• Waypoint Information</li> <li>• Nearest</li> <li>• FIS-B Weather Display [1] [2]</li> <li>• ADS-B In Traffic Display [1] [2]</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>• Database Concierge Access [3]</li> </ul>	<ul style="list-style-type: none"> <li>• Moving Map</li> <li>• Terrain</li> <li>• Flight Plan</li> <li>• Graphical Flight Planning</li> <li>• Waypoint Information</li> <li>• Nearest</li> <li>• FIS-B Weather Receiver &amp; Display [2]</li> <li>• ADS-B In Traffic Receiver &amp; Display [2]</li> <li>• ADS-B Out on 1090 MHz Extended Squitter</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>• Mode S Transponder</li> <li>• Database Concierge Access [3]</li> </ul>

[1] Requires external ADS-B In product.

[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	—°
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

---



### **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 unit power is off and 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**

1. Power off the unit.
2. Release the spring latch by pressing lightly on exposed edge of card.

# 1.5 Touchscreen

## GESTURES

### TAP



Touching the screen briefly with a single finger.

Use this gesture for:

- Opening a page or menu
- Activating a command key or data entry field
- Displaying map feature information
- Selecting an option within an application

### TAP AND HOLD



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.

Use this gesture for:

Use this gesture for:

- Scrolling with arrow keys
- Increasing/decreasing values continuously

### SWIPE



A smooth motion that involves touching an object, then sliding your finger across the screen and lifting up.

Use this gesture for:

- Accessing multiple panes (right or left swipes)
- Viewing and scrolling lists
- Panning across a map display

### FLICK



Swiping the screen in a quick upward or downward motion. Information moves at a fast speed (faster than if holding the arrow key), then slows to a stop.

Use this gesture for:

- Scrolling an item list

### PINCH & STRETCH



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.

Use this gesture for:

- Magnifying map features

## 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



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

### APP ICONS

Tapping one of these icons opens the corresponding application. Some apps provide additional icons for accessing functions on subpages (e.g., Utilities, System).



## 1.5.2 Menus

Menu 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.



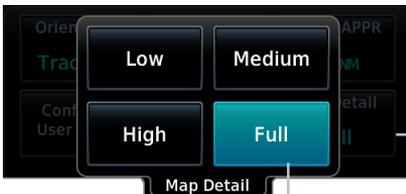
Multiple panes are accessible by way of a left/right swipe or inner knob turn.

Active Pane



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

### POP-UP MENUS



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.

**Backspace** and **Enter** keys always appear at the right of the screen.

#### ALPHANUMERIC

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



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

## 1.6 Control Knobs



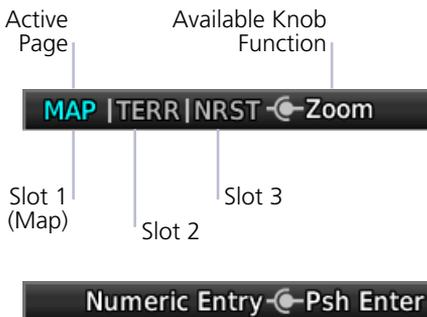
Outer Inner

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>• Scrolling lists</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

---

### FUNCTIONAL LIMITATIONS

- Not available with Flight Stream 510

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

---

**Red**

- Warning conditions
- Operating limits

**Yellow**

- Cautionary conditions
- Conditional operating ranges

**Green**

- Safe operating conditions
- Normal operating ranges
- Engaged modes

**White**

- Scales and markings
- Current data and values
- Heading legs

**Magenta**

- GPS data
- Active flight plan legs
- Parallel track

**Cyan**

- Pilot-selectable references

**Gray**

- Missing or expired data
- Product unavailable

**Blue**

- Sky
- Water

**Brown**

- Ground

# Compatible Equipment

## 1.8 Line Replaceable Units

SYSTEM REQUIRED LRUS
GPS antenna
SYSTEM OPTIONAL LRUS
ADAHRS or ADC with AHRS
GAD 29 adapter
GAE 12 altitude encoder (applicable to GNX 375 only)
G3X Touch
G500/G600
G500/G600 TXi
GMX 200
MX 20
OPTIONAL INTERFACES
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.

### 1.8.1 ADC & AHRS

AHRS units have a magnetometer interface for determining magnetic heading. ADC units have a Pitot-static interface for measuring pressure altitude.

LRU	DISPLAY	FUNCTION
GDC 74 ADC	GNX	<ul style="list-style-type: none"> <li>Air temperature</li> <li>Pressure Altitude</li> </ul>
G3X G500/G600	GPS GNX	<b>ADC</b> <ul style="list-style-type: none"> <li>Air temperature</li> <li>Pressure Altitude</li> </ul>
GSU 25/73 Integrated ADAHRS	GNX	<b>AHRS</b> <ul style="list-style-type: none"> <li>Heading</li> </ul>
GRS 77 AHRS	GNX	<ul style="list-style-type: none"> <li>Heading</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 ADS-B In Data

LRU	DISPLAY	FUNCTION
GDL 88 GTX 345 Provides datalink traffic and weather.	GPS	<p><b>Traffic Services</b></p> <ul style="list-style-type: none"> <li>• ADS-B</li> <li>• TIS-B</li> </ul> <p><b>Weather Services</b></p> <ul style="list-style-type: none"> <li>• FIS-B</li> </ul> <p><b>Weather Products</b></p> <p>Map &amp; FIS-B Weather:</p> <ul style="list-style-type: none"> <li>• Precip</li> <li>• METARs</li> </ul> <p>FIS-B Weather only:</p> <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>

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# 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. Do not attempt either of these while in flight (on ground only).

- **Load databases via SD card.** Once loading completes, you may power off the unit and remove the card.
- **Transfer databases from a Flight Stream 510 wireless datacard.** This method requires the Garmin Pilot app 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.



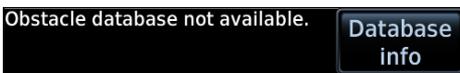
Yellow text denotes when a database is:

- 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.

Database Not Present

## 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.

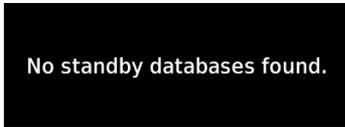
Basemap Database			
Cycle:	18M1	Version:	5.15
Obstacle Database			
Region:	US/Canada/Europe Fixed-Wing		
Cycle:	18B5	Type:	OBST/HOT
Effective:	13-SEP-18	Expires:	08-NOV-18
SafeTaxi Database			
Region:	US	Cycle:	18S5

**Active DB Info**

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



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



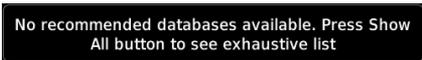
Select individual databases for transfer, or choose **Select All** if all listed databases require updating.



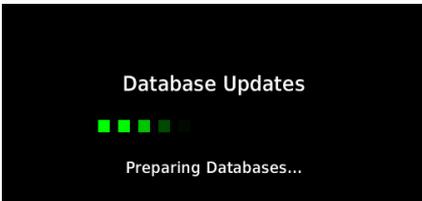
Basemap and Terrain update automatically and require no action.

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.

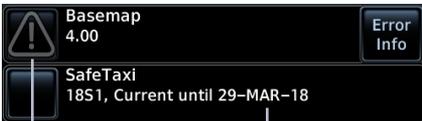


The unit automatically restarts once all updates are complete.

## SHOW ALL DATABASES



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



Error Icon

Older Timestamp

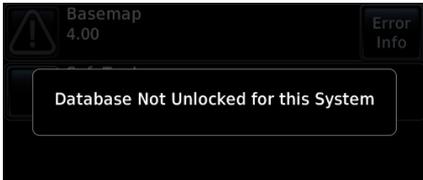
This list may include databases that are:

- 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, where a list of the newest databases is available for review.

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
- The aircraft is on ground



Database Concierge allows wireless transfer of databases from a mobile device while the aircraft is on ground.

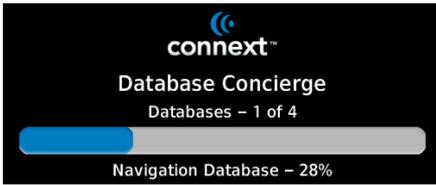
A pilot selects and downloads databases inside the Garmin Pilot app. Transfers occur once Flight Stream 510 establishes a wireless connection inside the aircraft.

### Database Concierge Transfer Function

- Provides 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
- Allows manual operation via **Start** key
- Requires pilot confirmation

### TRANSFER A DATABASE USING DATABASE CONCIERGE

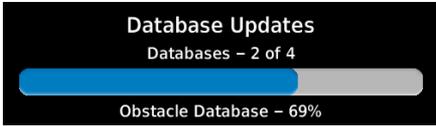
1. Purchase database(s) from [flyGarmin.com](http://flyGarmin.com).
2. Open Garmin Pilot and follow the download instructions.
3. Install Flight Stream 510 and then power on unit.
4. Connect to Wi-Fi.
5. Follow the on screen prompts.



**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.

## 2.5.1 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 KEY STATUS ANNUNCIATIONS

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 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.

### CONNECT 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 **Wi-Fi 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.

# Connectivity

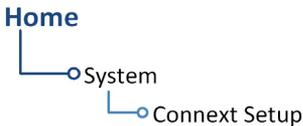


Connex works via the Bluetooth data link to provide up-to-date, wireless information throughout the cockpit.

## 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



The Connex interface allows communication with applications (i.e., Garmin Pilot) from a portable electronic device.

### Connex Features

The following features are available on your portable electronic device.

- GPS position and velocity information
- Uncorrected barometric pressure altitude used by transponder and ADS-B [1]
- ADS-B In traffic data [2]
- FIS-B weather and flight information [2]
- AHRS data from built-in sensor [3] [4]

[1] GNX 375 only.

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

[3] 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**.

To enable automatic connection between the unit and a paired device at power up, tap **Auto Reconnect**.

### 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.

### CONNECTION STATUS



The device is configured and communicating properly.



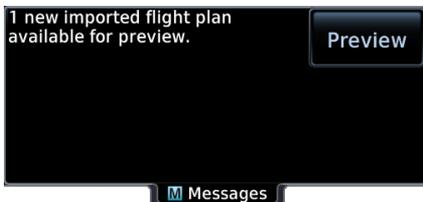
The device is not available and is not configured or it is not communicating properly.

## 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.



Once transfer is complete, an advisory message informs that a new flight plan is available for preview.

To view the flight plan, acknowledge the advisory and tap **Preview**.

# XPDR

## FEATURE LIMITATIONS

- GNX 375 only

## 2.8 XPDR Control Panel



Transponder controls are accessible via the **XPDR** key. This key is unavailable when the control panel is active.



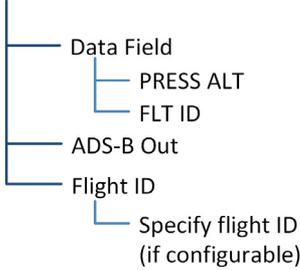
1	Squawk Code Entry Field	4	Squawk Code Entry Keys
2	VFR Key	5	Data Field
3	XPDR Mode Key		

### The XPDR key becomes available when you:

- Enter a squawk code
- Open the XPDR menu
- View a message
- Select the **Mode** key
- Leave the control panel

## 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 (if configured)
- 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

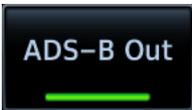
Displays the current pressure altitude.

#### 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. Tapping 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.



Activate the new code by tapping **Enter**.

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 XPDR Key



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

Tapping this key when another page is active immediately opens the control panel.

## TRANSPONDER STATUS INDICATIONS

### IDENT



- Reply active
- IDENT 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)



Reply active



IDENT function active



Transponder in operation



Altitude Reporting



Standby



Tap to initiate the IDENT function (code unmodified)



Tap 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
GNX 375	ADS-B interboard communication failure.

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

# ADS-B Altitude Reporting

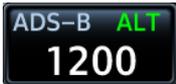
## FEATURE REQUIREMENTS

- GDL 88

## FEATURE LIMITATIONS

- GPS 175 only
- Display and control functionality dependent on GDL 88 configuration

## 2.14 ADS-B Control Panel



ADS-B Out controls are accessible via the **ADS-B** key.



1	Altitude Reporting Status (from GDL 88)	3	Flight ID Key
2	Anonymous Mode Key		

### GDL 88 Features

- Remote-mount ADS-B transceiver
- Transmits ADS-B Out messages to ATC and other aircraft
- Communicates ADS-B In data to panel-mounted avionics for the display of traffic and weather

When interfaced to a GDL 88 transceiver, GPS 175 allows control over some aspects of the ADS-B Out message and provides position information to the GDL 88.

Not all installations allow pilot control of ADS-B Out transmissions.

For more information, consult the *GDL 88 ADS-B Transceiver Pilot's Guide*.

## 2.14.1 ADS-B Key

### FEATURE LIMITATIONS

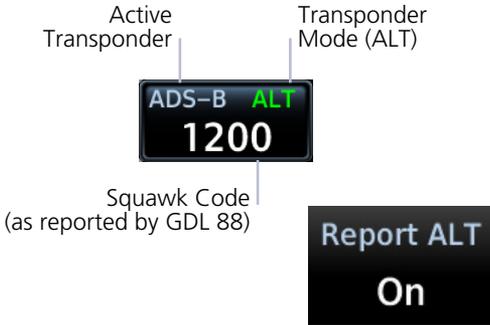
- Functionality dependent upon GDL 88 configuration

Depending on the configuration of your GDL 88, tapping the **ADS-B** key:

- Reports GDL 88 altitude reporting status

OR

- Allows on/off control of the GDL 88's altitude reporting function



“ALT” indicates that the unit is in altitude reporting mode. This indication corresponds to the function status announcement on the control panel.

## 2.14.2 Enabling Anonymous Mode

### FEATURE LIMITATIONS

- Availability dependent on GDL 88 configuration

During anonymous mode, the unit replaces identifying information in the ADS-B Out message with a temporary randomized number for privacy while providing position information. Instead of a flight ID, the unit transmits the call sign "VFR."



Tap **ADS-B > Anonymous**.

The key label changes from “Off” to “Armed.”

Tapping **Anonymous** again toggles the mode off.

## 2.14.3 Assigning a Flight ID

### FEATURE LIMITATIONS

- Availability dependent on GDL 88 configuration



If the flight ID is editable, tap **Flight ID** and assign a unique identifier. The key is not selectable (read-only) when the ID is received from the GDL 88.

Flight IDs are alphanumeric (upper-case only) and have an eight character limit. The active flight ID displays by default.

## 2.15 GDL 88 Alert



If the GDL 88 fails:

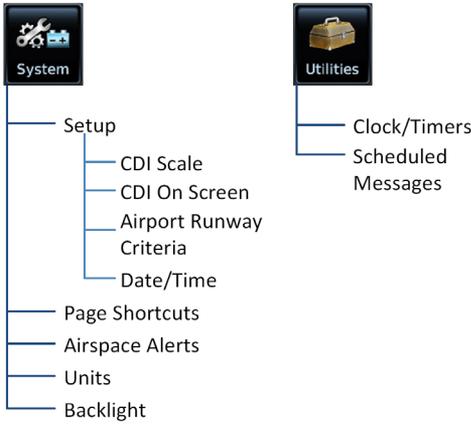
- Red “X” displays over the IDENT key
- Advisory message alerts
- ADS-B reporting functions are not available

Failure 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.

For information regarding pilot response to ADS-B failures, consult the AFMS.

# Pilot Settings

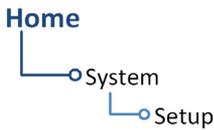


System customization options allow you to:

- 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.

## 2.16 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

Scale selections are reflected in the annunciator bar.

### Auto Setting Annunciation



### Manual Setting Annunciation



**CDI scale is set to “Auto” (default).** At the default setting, the scale sets to 2.0 nm during the en route phase of flight.

**Aircraft is within 31 nm of the destination airport (i.e., terminal area).**

The scale linearly ramps down to 1.0 nm over a distance of 1 nm.

**Aircraft is leaving the departure airport.** The scale is set to 1.0 nm once the aircraft is over 30 nm from the departure airport. It begins to gradually ramp up to 2 nm when the flight phase changes from terminal (TERM) to en route (ENR).

During GPS approach operations, the scale gradually transitions down to an angular scale.

**Aircraft is 2.0 nm before the final approach fix.** Scaling tightens from 1.0 nm to the angular full-scale deflection defined for the approach (typically 2.0°).

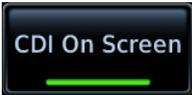
Selecting a lower value (0.3 nm or 1.0 nm) prevents the selection of higher scale settings during ANY phase of flight. Example: If you select 1.0 nm, the unit uses this setting for en route and terminal phases, and ramps down further during approach.

## 2.16.1 Horizontal Alarm Limits

Horizontal alarm limits (HAL) are used to compare against GPS position integrity. These protection limits follow the CDI scale, unless the corresponding flight phase requires a lower HAL. 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).

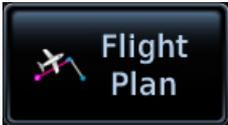
FLIGHT PHASE	CDI SCALE	HORIZONTAL ALARM LIMIT
Approach	0.30 nm or Auto	0.30 nm
Terminal	1.00 nm or Auto	1.00 nm
En Route	2.00 nm or Auto	2.00 nm
Oceanic	Auto	2.00 nm

## 2.16.2 CDI On Screen



toggling 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



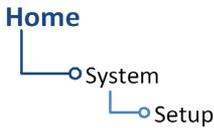
Lateral deviation indications display when there is an active flight plan.

### Visual Approach Guidance



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

## 2.17 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.

### 2.17.1 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.

### 2.17.2 Minimum Runway Length

Specify a minimum runway length to:

- Exclude airports with shorter runways from the nearest airport list
- Inform the terrain function of which airports are available for use, so that terrain alerts do not generate when landing at one of these airports

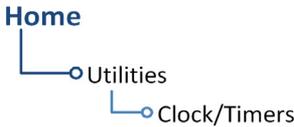
Typing “0” allows runways of any length to display on Map, appear in the nearest airport list, and be considered for use by Terrain.

# 2.18 Clocks & Timers

## 2.18.1 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

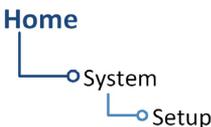


Measure elapsed airborne time since the last ground-to-air transition. Set timer to start at unit power up or once the aircraft is in air.

Controls:

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

## 2.18.2 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.

## 2.19 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.

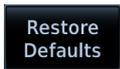
Tap a slot key and assign a page to that slot.

### Page Shortcut Options

- Traffic
- Terrain
- Weather
- Nearest Airport
- 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).

## 2.20 Alerts Settings



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

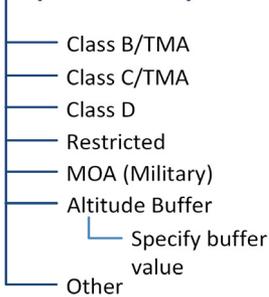
### FEATURE LIMITATIONS

- 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



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.

Airspace alerts for Prohibited airspace cannot be disabled.

## 2.21 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.

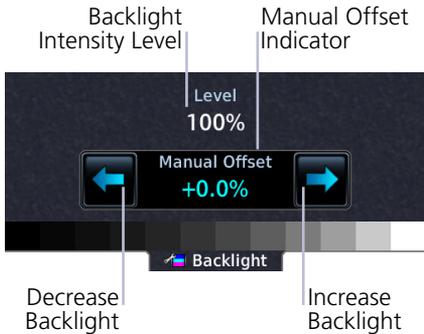
## 2.22 Display Brightness Control



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

### 2.22.1 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.

### 2.22.2 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.

## 2.23 Scheduled Messages



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

Home

Utilities

Scheduled Messages

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.

#### 2.23.1 Message Types

TYPE	DISPLAYS...
One time	When the timer expires, or following each power cycle until message deletion.
Periodic	After a specified duration of time. Countdown repeats once the message displays.
Event	According to a specified date and time. Message timer not applicable.

#### 2.23.2 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

## 2.24 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.** These display on a dedicated message list. Depending on the number of advisories, this list may be scrollable.

**Function or mode specific advisories.** These appear as unobstructed annunciations in the annunciator bar.



**Advisory Messages & Annunciations**

1	System Messages List	3	Mode Advisory Annunciation
2	Message Key		

For a complete list of all system-related advisories, refer to section 6

## 2.24.1 Alert Annunciations

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

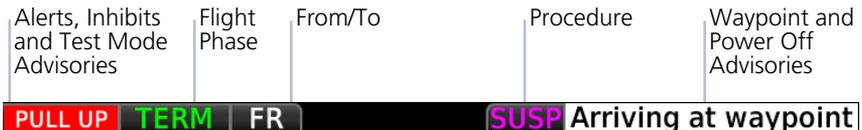
ALERT COLORS
<b>WARNING</b>
<b>CAUTION</b>
<b>ADVISORY</b>

- 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.



Annunciator Bar

## 2.24.2 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	Close Pop-up Window Key	5	Go to <Page> Key
3	Alert Annunciation		

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

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

## 2.24.3 Aural Alerts

### FEATURE LIMITATIONS

- GNX 375 only (traffic alerts)\*
- Mute alert function is applicable only to the active aural alert (does not mute future alerts)



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

A **Mute Alert** key allows you silence the active traffic alert voice message.

\* GPS 175 systems interfaced to a traffic system (GDL 88 or GTX 345): Aural alerts are available. They are provided directly from the traffic system LRU to the audio panel.

## 2.25 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**

For more about active and standby databases, refer to section 2.2.

## 2.26 GPS Status Page

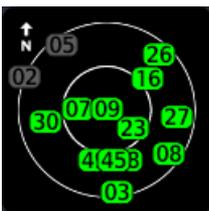


Monitor GPS receiver performance, establish a baseline for normal system operation, and troubleshoot weak or missing signal issues.

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

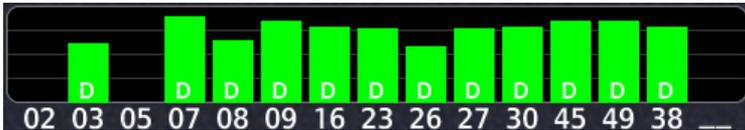
### Satellite SVIDs

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.

## 2.26.1 Circle of Uncertainty

### FEATURE LIMITATIONS

- Available only when the aircraft is on ground
- Displays only on the Map page

Circle of Uncertainty



- Depicts area surrounding the ownship when GPS cannot accurately determine aircraft location
- Expands as GPS horizontal accuracy degrades
- Shrinks as accuracy improves
- Translucent with minor shading so as not to obstruct other features

## 2.26.2 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.

## 2.26.3 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.

## 2.26.4 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.

## 2.27 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)

OR

- GNX 375

### UPLINK TIME

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

This field displays the number of minutes since last uplink. Digital values may change color depending on duration.

"> 15" displays when the time exceeds 15 minutes.

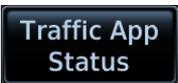
Dashes indicate when valid uplink data is unavailable (e.g., the device is offline).

### FIS-B WX STATUS



Tap this key to view the status of FIS-B weather products. 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 • ATAS (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.
Unavailable to Run	Required input data is not available due to a failure (e.g., aircraft surveillance 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

## 2.28 Export to SD Card



A logging function stores WAAS diagnostic and ADS-B traffic data (GNX 375 only) in the unit's internal memory. This information is available for export to an SD card for later analysis.

### FEATURE REQUIREMENTS

- SD card

### FEATURE LIMITATIONS

- ADS-B traffic data logging available on GNX 375 only



To export a diagnostic log:

1. Insert an SD card.
2. Navigate to the Logs page.
3. Select **WAAS Diagnostic Log** or **ADS-B Log**.

If no log files are present, these keys are not available.

### WAAS Diagnostic Log Functions

- Generates log files automatically upon unit power-up
- Overwrites oldest file when the internal log reaches capacity
- Exports to the "log\_files" folder on the SD card

### ADS-B Log Functions (GNX 375 only)

- Generates log files automatically upon unit power-up
- Overwrites oldest file when the internal log reaches capacity
- Exports to the "log\_files" folder on the SD card

ADS-B log files may take several minutes to export.

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# 3 Navigation

## MAP

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## DIRECT TO

3.13	Direct To Basics .....	3-40
------	------------------------	------

## WAYPOINTS

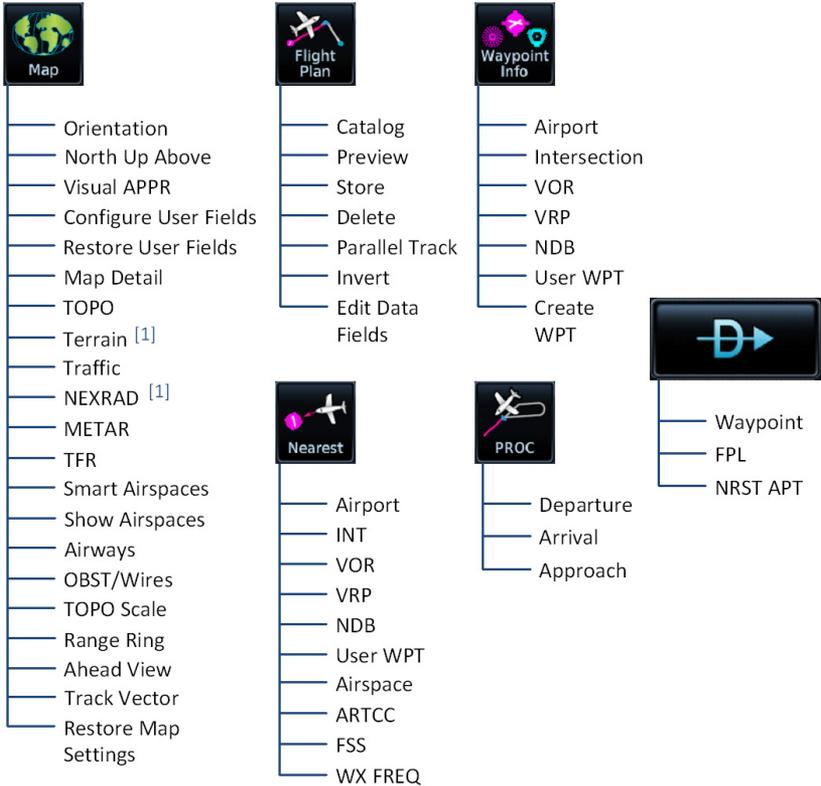
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## NAVIGATION APPS & FUNCTIONS

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, Map 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.



Default Map Features

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>	<b>Map Range Indicator</b> Displays current map range in the upper left quadrant of the range ring (i.e., the distance from the aircraft to the range ring).
<b>7</b>	<b>North Indicator</b> Indicates True north.
<b>8</b>	<b>Page Orientation Label</b> <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>	<b>Map Overlay Icons</b> Indicates status of overlays at the current map range. Includes: obstacles, power lines, precipitation, terrain, and traffic

### 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 Map.

## 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.

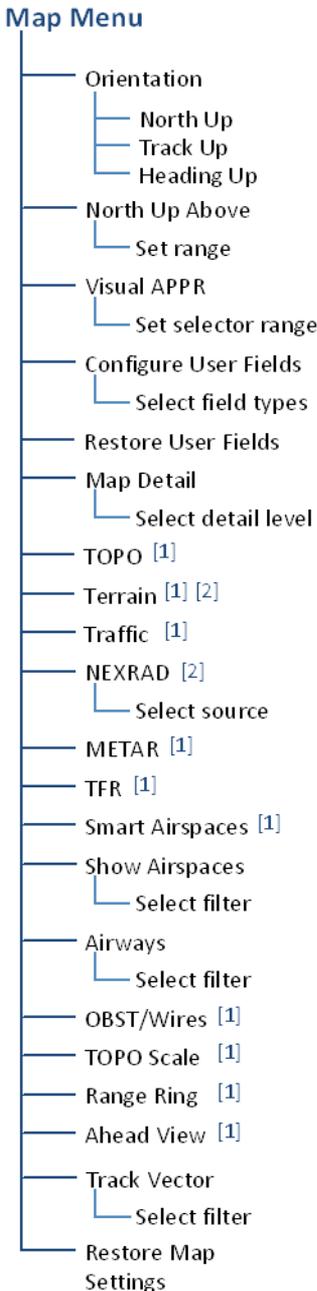
## DATA DRAWING ORDER

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 Setup



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.

## 3.1.1 Configure User Fields

### Default User Fields

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

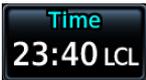
Displays Map in configuration mode, allowing you to customize the display of data in each corner of the Map page.

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

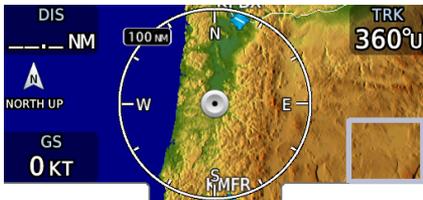


In configuration mode:

- 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 and removes the TOPO scale if present.



For convenience, Map user fields may be toggled on and off by pushing the control knob.

Fields remain hidden when you use the knob shortcut to move between Map and the Active FPL page. They reappear in their respective corners when you return to the Home page or use the knob to move between Map and any other application.

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.

### 3.1.2 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.

### 3.1.3 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.

### 3.1.4 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.

### 3.1.5 TOPO Scale



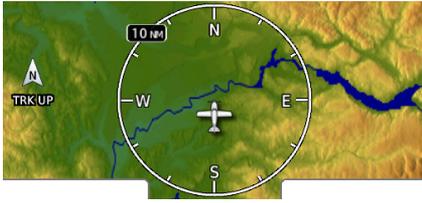
Displays a topographical elevation scale. To remove the scale:

- Toggle **TOPO Scale** off

**OR**

- Tap **Restore User Fields**

### 3.1.6 Range Ring



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

### 3.1.7 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).

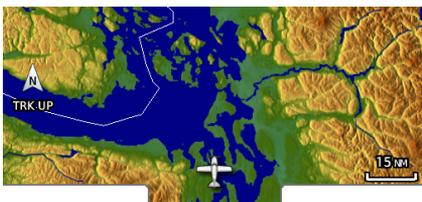
Track vector length options display as a dashed line and arrow extending from the aircraft icon, showing current track and distance the aircraft will travel in the selected time.

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.

### 3.1.8 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.

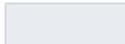
### 3.1.9 Map Detail

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**

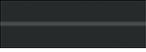


### AVIATION DATA SYMBOLS

	Non-towered, non-serviced airport [1]		Non-towered, serviced airport [1]
	Towered, non-serviced airport [1]		Towered, serviced airport [1]
	Soft surface, non-serviced airport		Soft surface, serviced airport
	Restricted (private) airport		Unknown airport
	Heliport		ILS/DME or DME only
	Intersection		LOM
	NDB		TACAN
	VOR		VOR/DME
	VORTAC		VRP
	Runway extension		

[1] Symbol depicts orientation of longest runway.

### LAND DATA SYMBOLS

	Railroad		National Highway
	River/Lake		Freeway
	State/Province Border		Small City
	Local Road		Medium City
	Local Highway		Large City

## 3.2 Map Interactions

### 3.2.1 Basic Interactions

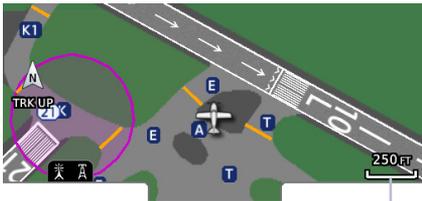
Typical map interactions include zoom, pan, and object selection.

#### 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. A map pointer icon corresponds with the touch point on the map.

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

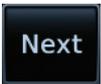
### DATA FIELDS

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

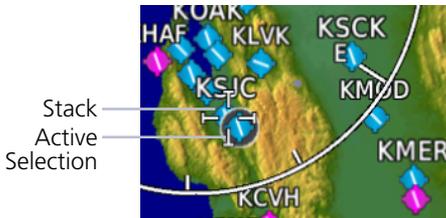
### CONTROLS

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

## STACKED OBJECTS



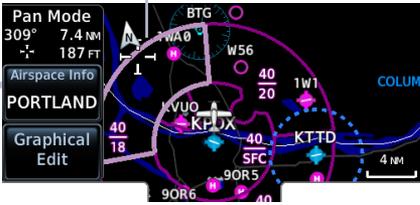
To move the selector through each object in proximity of the map pointer, select an object and tap **Next**.



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

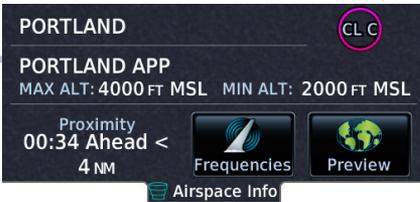
## AIRSPACE INFO

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

## 3.2.2 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

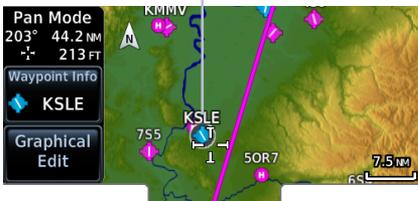


You can edit, add, or omit flight plan legs by tapping or dragging your finger directly on the map.



Existing Leg

Selected Waypoint



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

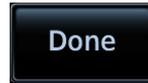


3. Tap and drag the leg to a new waypoint or airway, then release.



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**.

## 3.3 Map Overlays

### Overlay Selections

- TOPO
- Terrain
- Traffic
- NEXRAD
- METAR
- TFR
- Airspaces
- Airways
- Obstacles & 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.

Weather product and traffic overlays are optional on GPS 175. They are available only when configured for ADS-B In equipment.

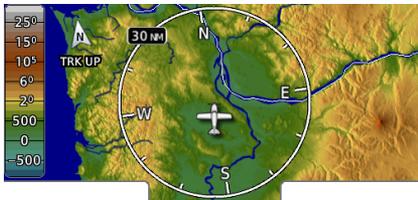
### 3.3.1 Overlay Controls



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.

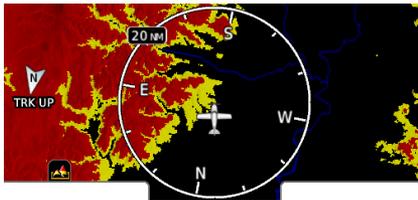
Overlay controls reside in the Map menu.

#### 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



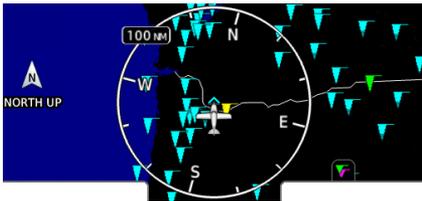
- Overlays traffic information
- Filter selection on the Traffic page determines altitude range
- Feature optional for GPS 175

## NEXRAD



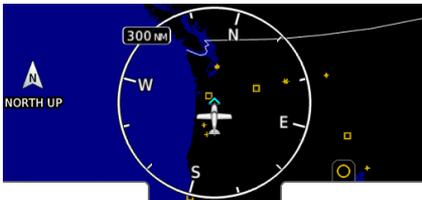
- Overlays datalink precipitation weather information
- Options include: CONUS, Regional, or off (none)
- Feature optional for GPS 175

## 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.

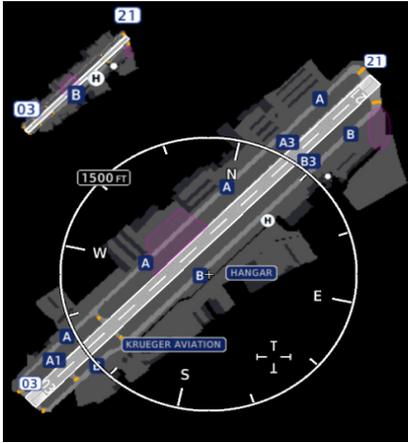
SMART AIRSPACE CRITERIA	
AIRCRAFT ALTITUDE	AIRSPACE PROXIMITY TO AIRCRAFT <sup>[1]</sup>
Sea level	>1,000 ft
>10,000 ft	2,000 ft

[1] Vertical distance above and below aircraft altitude.

#### AIRSPACE DATA SYMBOLS

	Class B Altitude Label (ceiling/floor)		Class C/TCA
	Class C Altitude Label (ceiling/floor)		Class D
	Class D Altitude Label (ceiling only)		Restricted/Prohibited
	TFR		MIL
	Class B/TMA		Other/ADIZ

### 3.3.4 SafeTaxi



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

Feature labels denote:

- Runways
- Taxiways
- Airport landmarks

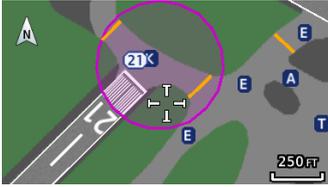
#### SafeTaxi Features

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

#### SAFETAXI DATA SYMBOLS

	Runway		Taxiway
	Helipad		Construction Area
	Airport Beacon		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.

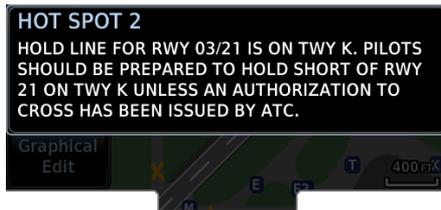


Selecting the border of a hot spot displays a brief summary of the indicated hazard and an information key.

**TAXIWAY HOLD POSITION**



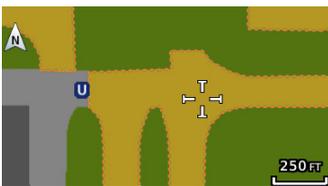
Tapping this key provides additional location information. Numbering corresponds to a list on the airport diagram.



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



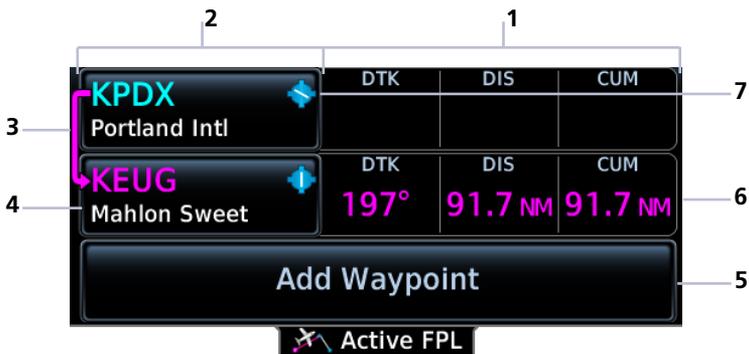
Current flight plan information displays as a scrolling list on the Active Flight Plan (FPL) page.

## FEATURE REQUIREMENTS

- Active flight plan

## FEATURE LIMITATIONS

- Displays up to 100 waypoints for an active flight plan



Active Flight Plan Page

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

## 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

Symbols denote active leg status on the GPS NAV indicator. Fix type symbols (e.g., FAF, MAP) correspond with labels appearing on the flight plan.

	IAF		Arc Left
	FAF		Holding Pattern (Right Turns)
	MAP		Holding Pattern (Left Turns)
	MAHP		Right Arrow
	Parallel Track		Direct To
	Arc Right		

## 3.4 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**.

## 3.5 OBS



The Omni Bearing Selector (OBS) allows you to select between manual or automatic sequencing of waypoints.

When active, this function allows you to set the desired course To/From a waypoint using the provided controls or with an external OBS selector on HSI or CDI.



Direct To FPL Tab

The following example shows OBS course selection for To waypoint UBG.



Route Indication



1. Tap **OBS**.
  2. Specify a heading course.
- CDI indicates the OBS heading. The mode displays on the annunciator bar.

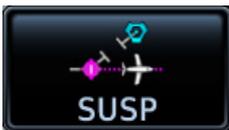


The unit retains the active To waypoint as a navigation reference even after passing the waypoint (i.e., prevents sequencing to the next waypoint).

Tapping the key again resumes automatic sequencing of waypoints (normal mode).

## SUSPEND/UNSUSPEND

**SUSP**



This key displays for leg types that do not support OBS.

**UNSUSP**



This key displays for legs that auto suspend (e.g., leg holds, missed approaches).

## 3.6 Dead Reckoning



### **WARNING**

*DO NOT USE PROJECTED POSITION DATA AS THE ONLY MEANS OF NAVIGATION.*

### **Points About Dead Reckoning**

- Provides limited navigation using the last known position and speed following the loss of GPS navigation while on an active flight plan
- Becomes active after a loss of GPS position while navigating using an active flight plan and the flight phase is either En Route or Oceanic
- Allowed only during en route and oceanic phases of flight

### **When dead reckoning mode is active:**

- Map reports “No GPS Position”; overlays are not available
- DR mode annunciation replaces ENR or OCN
- Terrain functionality is not available
- Traffic displays on its dedicated page only
- CDI is not available

Dead reckoning mode ends once GPS position is restored.

## 3.7 Parallel Track

### Parallel Track

Create a parallel course offset relative to the current flight plan. Setup controls provide offset distance and direction setting (left of track or right of track).

#### FEATURE REQUIREMENTS

- Active flight plan

#### FEATURE LIMITATIONS

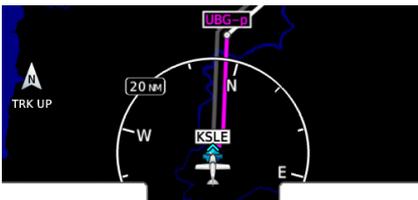
- Function not available when Direct-to is active.
- Graphical editing of the active leg cancels the parallel track function
- Offset range: 1 nm to 99 nm
- Large offset values combined with certain leg types (e.g., approach) or leg geometries (i.e., changes in track  $>120^\circ$ ) do not support parallel track

TRACK	COLOR
Offset	Magenta
Original	Gray

Once activated, a new track line appears to the left or right of the original course line at the specified distance. The aircraft navigates to the offset track with external CDI/HSI guidance now driven from the parallel track.



Corresponding fix symbols on the GPS NAV key and flight plan indicate when the active leg is on a parallel track.

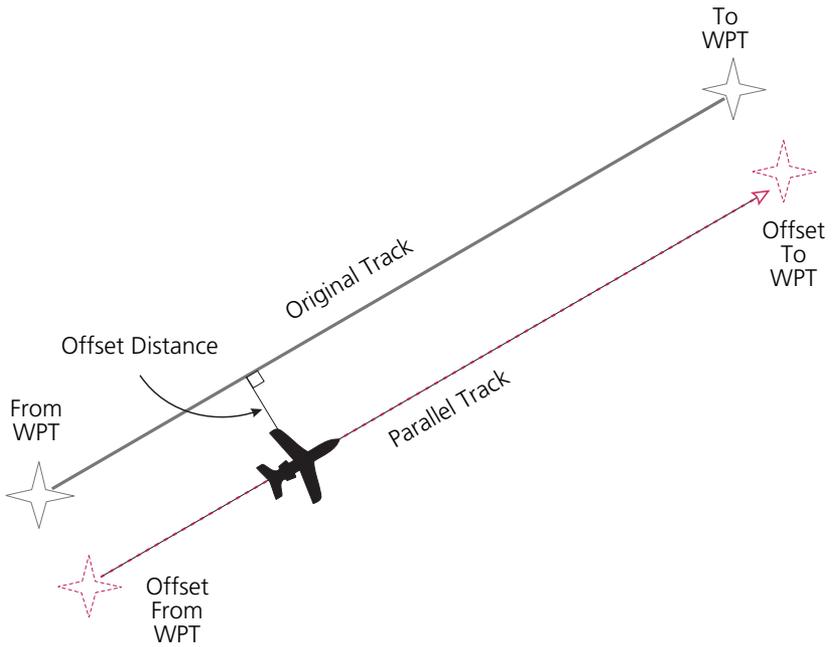


Map

A graphical depiction overlays on the map.



GPS NAV Key



## ACTIVATE A PARALLEL TRACK



1. Tap **Menu** > **Parallel Track**.
2. Tap **Offset** and specify a distance between 1 nm and 99 nm.
3. Tap **Direction** and select left of track or right of track.
4. Tap **Activate**.

To deactivate parallel track, tap **Menu** > **Deactivate PTK**.

## 3.8 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

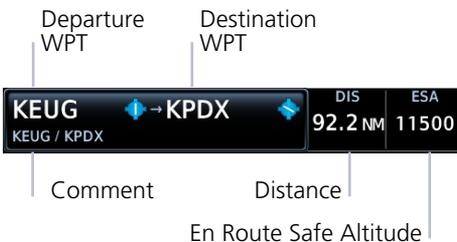
## 3.9 Flight Plan Catalog



Create, activate, edit, copy, and delete flight plans within the catalog.

### FEATURE LIMITATIONS

- Stores up to 99 flight plans with a maximum of 100 waypoints each



Each catalog entry includes a route identifier, the route distance, and en route safe altitude.

The identifiers of the departure and destination waypoints comprise the route identifier.

### 3.9.1 Catalog Route Options

#### Route Options

- Activate
- Invert & Activate
- Preview
- Edit
- Copy
- Delete

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

- Activate the selected flight plan (replacing the active flight plan)
- Reverse and activate the selected flight plan
- Preview a selected flight plan
- Make changes to a flight plan
- Copy the flight plan and modify it to create a similar one
- Remove individual or multiple flight plans

#### ACTIVATE

Activating a stored flight plan overwrites the active flight plan.

#### INVERT & ACTIVATE

Reverse and activate the selected flight plan for guidance back to your original departure point. The inverted flight plan is a copy. Changes do not affect the original flight plan, which remains stored in the catalog.

#### PREVIEW



View the flight plan route as it will appear on Map and on the Active FPL page.

Options include **Store**, **Edit**, and **ACTV (Activate)**.

#### EDIT

Modify the selected flight plan on the Edit Catalog Flight Plan page.

#### COPY

Create a copy of the selected flight plan. A copy may be used as a starting point for creating a similar flight plan. Select the copy and tap Edit to make modifications.

## DELETE A FLIGHT PLAN

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

### From the FPL menu:

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.

## DELETE ALL CATALOGED FLIGHT PLANS

To remove all flight plans from the catalog:

1. Open the catalog.
2. Tap **Menu > Delete All**.
3. Confirm the request to clear the catalog.
4. Tap **Delete Pending**.
5. Confirm the request to remove all flight plans pending preview.

## 3.10 Create a Flight Plan



### NOTE

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

There are three methods for creating a new flight plan.

### CREATE FROM THE ACTIVE FLIGHT PLAN PAGE

1. Tap **Flight Plan**.
2. Delete the existing flight plan if necessary (**Menu > Delete**).
3. Tap **Add Waypoint**.
4. Select an identifier using the provided search options.
5. Repeat steps 3 - 4 for each waypoint in the route.

### CREATE FROM MAP

Build a flight plan by selecting waypoints directly on the map using the Graphical Edit feature. For more about this method, read section 3.2.2.

### CREATE FROM THE FLIGHT PLAN CATALOG

1. Tap **Flight Plan > Menu > Catalog**.
2. Scroll to the end of the flight plan list.
3. Tap **Create New Catalog Route > Add Waypoint**.
4. Add waypoints using the provided search options.
5. Tap **Menu > Preview > Store** or **ACTV (Activate)**.

As a general practice, never save flight plans with modified procedures in the catalog.

## 3.10.1 Flight Plan Waypoint Options

### Options Menu

- Insert Before
- Insert After
- Load PROC
- Load Airway
- Activate Leg
- Hold at WPT
- WPT Info
- Remove

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

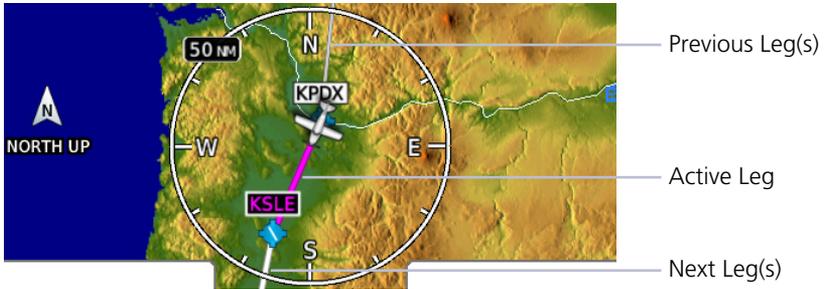
- Insert a new waypoint into a flight plan
- Add an airway or procedure
- Change the active leg
- Remove a selected waypoint
- Add a holding pattern to an existing waypoint
- View information about a waypoint

<b>Insert Before</b>	Insert a new waypoint before the selected waypoint.
<b>Insert After</b>	Insert a new waypoint after the selected waypoint.
<b>Load PROC</b>	Open the Procedures app to specify a departure, arrival, or approach for loading. Available controls are dependent upon the relative position of the aircraft to the active flight plan. Options may include: <ul style="list-style-type: none"> <li>• Activate Approach</li> <li>• Vectors to Final</li> <li>• Activate Missed Approach</li> </ul>
<b>Load Airway</b>	Assign an airway and exit waypoint to the selected entry waypoint (e.g., intersection, VOR).
<b>Activate Leg</b>	Designate any TO waypoint as the active flight plan leg. Requires an active catalog flight plan.
<b>Hold at WPT</b>	Create a user-defined hold at the selected waypoint. Specify hold parameters and preview holding patterns from a dedicated menu page.
<b>WPT Info</b>	Open the dedicated information page for the selected waypoint.
<b>Remove</b>	Remove the selected waypoint or hold from the active flight plan.

# 3.11 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**

## 3.12 GPS NAV Status

This indicator 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 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. This function is controlled via the System Setup screen.

# Direct To



Tapping this key opens the Direct To function. Search tabs provide three different methods of waypoint selection.

## FEATURE LIMITATIONS

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

## 3.13 Direct To Basics

### Direct To is useful for quickly navigating to:

- New waypoints
- An existing waypoint in the active flight plan
- Nearby airports
- Map waypoints
- An off-route course
- User-defined holds

Set a course to any waypoint using Direct To.

Selecting an identifier automatically displays information about the waypoint.

When navigating to a single waypoint (e.g., a nearby airport), the Direct To function provides a quicker alternative to using the active flight plan.

### 3.13.1 Direct To Search Tabs

Search tabs include: Waypoint, FPL, and NRST APT



Direct To Window

## WAYPOINT

Similar to an information page, but with course and hold options. This tab is active by default.

### DATA FIELDS

- Distance and bearing from current aircraft position
- Applicable city, state, country and/or region (e.g., "NW USA")
- Identifier and type icon

### CONTROLS

- **Waypoint Identifier** key with access to multiple search tabs
- **Course To** key for specifying the course angle for the navigation path
- **Hold** key for creating, loading, and activating user-defined holds

## FPL & NRST APT

FPL and NRST APT tabs provide a list of selectable identifiers. These tabs have a uniform layout.

**FPL:** Lists all waypoints contained in the active flight plan.

**NRST APT:** Lists up to 25 waypoints within a 200 nm radius. The closest airport appears at the top of the list.

## 3.13.2 Direct To Activation



Activating a direct-to course establishes a point-to-point line from the aircraft's present position to the selected destination. The unit provides course guidance until you remove the direct-to waypoint, or replace it with a new direct-to or flight plan.

Upon activation, Map automatically opens to show a graphical representation of the active direct-to leg.



GPS Nav key changes to indicate active leg status.



For convenience, you may open the Direct To function by pushing the control knob. Once a waypoint is selected, pushing the knob again activates the direct-to course.

## 3.13.3 Navigating Direct To

While most direct-to operations follow the same basic steps, the method for selecting a waypoint may vary.

### DIRECT TO A NEW WAYPOINT

1. Tap **Direct To**.
2. Select a waypoint identifier.
3. Tap **Course** and specify the course heading (if a specific course is necessary).
4. Activate the selection.

### DIRECT TO A FLIGHT PLAN WAYPOINT

#### Flight Plan Waypoints

If a flight plan exists, waypoint sequencing resumes once you reach the direct-to waypoint. If the waypoint is not in the flight plan, the flight plan is no longer active but remains available.

Direct To options are not available for all flight plan entries. Some entries include holds and course reversals which are not selectable using Direct To.

1. Tap **Direct To**.
2. Select **FPL** tab.
3. Select a flight plan leg.
4. Activate the selection.

### DIRECT TO THE NEAREST AIRPORT

1. Tap **Direct To**.
2. Select **NRST APT** tab.
3. Select an airport.
4. Activate the selection.

### DIRECT TO A MAP WAYPOINT

#### MAPWPT

For map locations without an existing name, Direct To assigns the "MAPWPT" identifier. Bearing, distance, and map coordinates display on the Waypoint tab.

Apply a direct-to course to any location on the map.

1. Tap a location on Map.
2. Tap **Direct To**.
3. Activate the selection.

You can modify direct-to routes on Map using the **Graphical Edit** function the same as you would a flight plan.

## DIRECT TO AN OFF-ROUTE COURSE

You may activate an off-route course using any of the described direct-to methods. Activating an off-route direct-to course automatically deactivates the current leg of the active flight plan.

### Direct To & Procedure Fixes

Approach guidance is not available for procedure fixes. An example would be activating a direct-to course to a waypoint between the final approach fix and missed approach point. Upon arriving at the waypoint, approach guidance does not become active.

## 3.13.4 Removing a Direct-to Course



To cancel the current direct-to course, tap **Remove**.

Removing a direct-to course:

- Reactivates the original active flight plan
- Assigns the leg nearest to the aircraft's position as the active leg
- Resumes waypoint sequencing

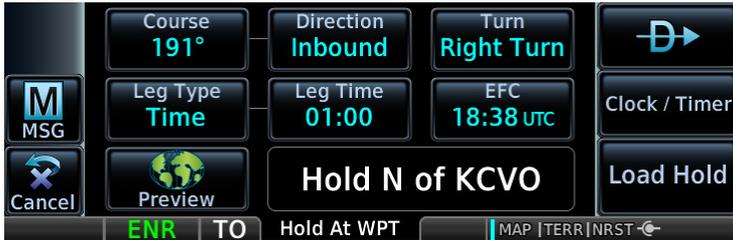
If no active flight plan exists, the aircraft continues on its current heading without any navigation guidance.

### 3.13.5 User Holds

You may define a holding pattern for any direct to waypoint. User holds suspend automatic waypoint sequencing until they expire or are removed.



Tapping **Hold** displays available hold options.



<b>Load Hold</b>	Accept the specified hold parameters and return to the Direct To window.
<b>Hold Activate</b>	Activate the loaded holding pattern.
<b>Course</b>	Specify the course angle.
<b>Direction</b>	Select between Inbound or Outbound.
<b>Turn</b>	Select between Left Turn or Right Turn.
<b>Leg Type</b>	Select Time or Distance.
<b>Leg Time</b>	Specify the leg time in minutes and seconds (MM:SS).
<b>Leg Distance</b>	Specify the leg distance.
<b>EFC</b>	Specify a time for the Expect Further Clearance reminder.
<b>Preview</b>	View the defined holding pattern as it will appear on Map and on the Active FPL page.

#### CREATE & ACTIVATE A HOLD

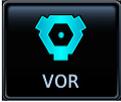


Create a hold for a direct-to waypoint. From the Waypoint tab:

1. Tap **Hold**.
2. Specify hold parameters.
3. Tap **Load Hold > Hold Activate**.

# Waypoints

There are two types of waypoints: database and user



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

- Airport (APT)
- Intersection (INT)
- Very High Frequency Omni-directional Range (VOR)
- Visual Reporting Point (VRP)
- Non-Directional Beacon (NDB)

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.

## 3.14 Waypoint Information



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

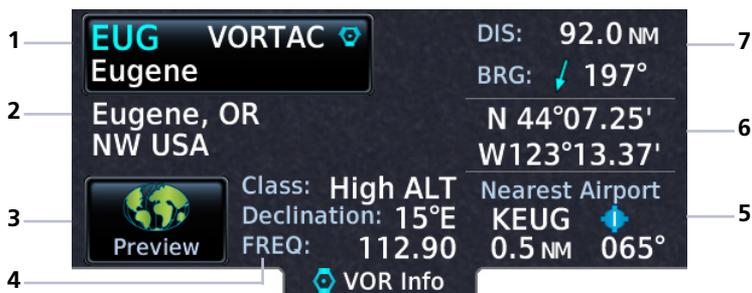
### FEATURE REQUIREMENTS

- 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**

1	Waypoint Identifier key	5	Nearest NAVAID information
2	Location Information	6	Waypoint coordinates
3	Preview key	7	Waypoint distance and bearing
4	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>Waypoint 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

Features listed here are unique to the corresponding waypoint.

### Airport

Selectable tabs:

**Info:** Airport location, elevation, time zone, and fuel availability.

**Procedures:** Available approach procedures.

**Runways:** Identifiers, size, surface type, and traffic pattern direction.



Tapping **Runway** opens a list of available runways.

**Frequencies:** Available communication and localizer frequencies. The “c” symbol denotes frequencies that function as the CTAF.

View additional frequency information by tapping

**More Information**, if available.

**WX Data:** Applicable METARs, city forecasts, and TAF weather information.

**NOTAMS:** Applicable distant and FDC NOTAMS.

**VRPs:** Nearest VRPs.



### Intersection

Data fields:

- Nearest VOR (identifier, type icon, bearing, and distance)



### Very High Frequency Omni-directional Range

Data fields:

- Frequency
- Nearest airport (identifier, type icon, bearing, and distance)
- Station declination
- VOR class



### Visual Reporting Point

Data fields:

- Nearest VRP (identifier, type icon, bearing, and distance)



### Non-Directional Beacon

Data fields:

- Frequency
- Nearest airport (identifier, type icon, bearing, and distance)
- Marker description

### User Waypoint

Selectable functions:

**Edit:** Opens the Create User Waypoint page for editing purposes.

**View List:** Displays a list of all user waypoint identifiers.

**Delete:** Removes the selected user waypoint from the list.

**Delete All:** Removes all user waypoints from the list. All deletions require user confirmation.

User waypoints in the active flight plan cannot be edited or deleted.

Data fields:

- Reference position or nearest waypoint (identifier, type icon, radial, and distance), whichever is applicable
- Number of waypoints used out of 1,000



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.

## 3.15 Waypoint Selection



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

### 3.15.1 Waypoint Autofill

Autofilled Character



Identifier Name

Waypoint Icon

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.



**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.

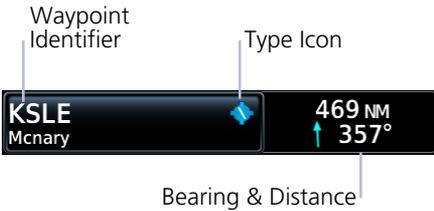
### 3.15.2 Search Tabs



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



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



Search by City

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

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

## 3.16 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 an existing waypoint displays the Create Waypoint access key.

### USER WAYPOINT IDENTIFIER

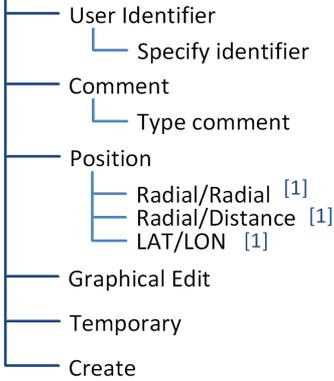


Assign a unique identifier or keep the unit generated identifier. By default, the identifier format is "USR" followed by a sequential three digit number.

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.

### 3.16.1 Define Waypoint Criteria

#### Create Waypoint



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

[1] Waypoint position options are mutually exclusive. Enabling one disables the other.

<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.

### LAT/LON



<LAT> <LON>

### Radial/Distance



<Waypoint><Radial> / <Distance>

### Radial/Radial



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

## 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.

## 3.16.2 Edit an Existing User Waypoint

---

### FEATURE LIMITATIONS

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

### OPEN EDIT WAYPOINT PAGE

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 FPL 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**.

## 3.16.3 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.

## 3.17 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.



### Nearest Airport

- Identifier • symbol • distance • bearing • approach type
- length of longest runway



### Nearest Intersection

- Identifier • symbol • distance • bearing



### Nearest Very High Frequency Omni-directional Range

- Identifier • symbol • distance • bearing • frequency



### Nearest Visual Reporting Point

- Identifier • symbol • distance • bearing



### Nearest Non-Directional Beacon

- Identifier • symbol • distance • bearing • frequency



### Nearest User Waypoint

- Identifier • symbol • distance • bearing



### Nearest Airspace

- Identifier • symbol • proximity



## Nearest Air Route Traffic Control Center

- Facility name • distance • bearing • frequency
- 



## Nearest Flight Service Station

- Facility name • distance • bearing • frequency ("RX" denotes receive-only frequencies)
- 



## Nearest Weather Frequency

- Facility name • distance • bearing
  - frequency of nearest ATIS, ASOS, and AWOS
- 

## 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 allow 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 a procedure type, then define the criteria for that procedure on the corresponding setup page.

By default, these keys display underscores.



Upon completion, the specified airport and procedure appear on the associated key.

When loading a procedure, always remember to check the runway, transition, and all waypoints.

## COMMON PAGE CONTROLS

All procedure pages provide the following setup controls.

**Airport:** Select an airport for the procedure.

**Transition:** Select a transition.

**Runway:** Select a runway for the selected airport.

**Preview:** View a 2-D map of the surrounding area (includes SafeTaxi airport depictions).

For page specific controls, refer to the appropriate procedure description.

## 3.18 Flight Procedure Basics



### NOTE

Advisory climb altitudes for SIDs may not match charted altitudes. Do not rely solely on advisory altitudes.

- Always check the runway, transition, and waypoints for all procedures.
- Heading legs indicate in white as “HDG XXX°” on flight plans.
- The unit provides lateral and, when appropriate, vertical guidance for visual and GPS/RNAV approaches.
- Use Map as an aid to situational awareness during ILS, VOR, NDB, and non-precision localizer-based approaches. A magenta line depicts the active leg (or the portion of the approach currently in use).
- Always use the appropriate radio navigational aid for primary approach course guidance during non-GPS approaches.
- Check the annunciator bar for the current phase of flight.
- Many non-precision approaches have GPS overlays, improving accuracy so that approaches do not require overflying a VOR or NDB.
- The unit guides you through complex overlay approaches, automatically sequencing each leg up to the missed approach point.
- Fly approaches as published with the full transition using any published feeder route or initial approach fix, or with a vectors-to-final transition.
- While not required under TSO-C146e, an optional baro-corrected altitude source is recommended for automatic sequencing of altitude leg types.

### When adding procedures to a flight plan:

- Arrange procedures around the existing flight plan as follows:  
Departure, En route, Arrival, Approach
- Insert departure waypoints before en route waypoints
- Insert arrival waypoints between en route and approach waypoints
- Always verify that the transition waypoints between each phase are correct

Map complements your printed approach plates by improving situational awareness during the approach. It does not replace printed approach plates.

**Always fly an approach as it appears on the approach plate.**

## Roll Steering Autopilots

Roll steering terminates when approach mode is selected on the autopilot. It becomes available once you initiate the missed approach.

## TO/FROM LEGS ON CDI

### TO LEGS

On these legs, the FROM/TO flag on the CDI indicates "TO" and the Distance field on the flight plan decreases as you navigate the leg. Most legs are this type.

### FROM LEGS

On these legs, the FROM/TO 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.



**Composite CDI.** When interfaced to a composite type CDI, the composite CDI flag shows only "TO" indications. Always refer to the FROM/TO field on the annunciator bar when using composite CDI.

### 3.18.1 GPS Flight Phase Annunciations

Flight Phase  
(Caution)



Check the annunciator bar for current phase of flight.

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

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.

ANNUNCIATION	FLIGHT PHASE
0.30 NM	<ul style="list-style-type: none"> <li>• 0.3 nm CDI scale</li> <li>• Based on pilot selection</li> </ul>
1.00 NM	<ul style="list-style-type: none"> <li>• 1.0 nm CDI scale</li> <li>• Based on pilot selection</li> </ul>
DPRT	<p><b>Departure</b></p> <ul style="list-style-type: none"> <li>• Terminal level with departure procedure as the active navigation</li> <li>• System using non-precision approach integrity</li> <li>• CDI full-scale deflection: 0.30 nm</li> </ul>
DR	<p><b>Dead reckoning</b></p> <ul style="list-style-type: none"> <li>• CDI not available</li> </ul>
ENR	<p><b>En route</b></p> <ul style="list-style-type: none"> <li>• CDI full-scale deflection: 2.0 nm or current CDI scale selection, whichever is smaller</li> </ul>
LNAV	<p><b>Lateral Navigation Approach</b></p> <ul style="list-style-type: none"> <li>• Fly to published LNAV minimums</li> </ul>
LNAV+V	<p><b>Lateral Navigation Approach with Advisory Vertical Guidance</b></p> <ul style="list-style-type: none"> <li>• Fly to published LNAV minimums</li> </ul>
LVNAV	<p><b>Lateral and Vertical Navigation Approach</b></p> <ul style="list-style-type: none"> <li>• Fly to published LNAV/VNAV minimums</li> </ul>
LOW ALT	<p><b>Low Altitude</b></p> <ul style="list-style-type: none"> <li>• Aircraft's estimated height is lower than the final approach waypoint height by approximately 50 meters</li> <li>• For LNAV+V, LNAV/VNAV, or LPV approaches</li> <li>• Not active when Terrain is operational</li> </ul>

ANNUNCIATION	FLIGHT PHASE
LP	<b>Localizer Performance Approach</b> <ul style="list-style-type: none"> <li>Fly to published LP minimums</li> </ul>
LP +V	<b>Localizer Performance Approach with Advisory Vertical Guidance</b> <ul style="list-style-type: none"> <li>Fly to published LP minimums</li> </ul>
LPV	<b>Localizer Performance with Vertical Guidance Approach</b> <ul style="list-style-type: none"> <li>Fly to LPV minimums</li> </ul>
MAPR	<b>Missed Approach</b> <ul style="list-style-type: none"> <li>System using missed approach integrity</li> <li>CDI full-scale deflection: <math>\pm 0.30</math> nm</li> </ul>
OCN	<b>Oceanic</b> <ul style="list-style-type: none"> <li>CDI full-scale deflection: 2.0 nm</li> </ul>
TERM	<b>Terminal</b> <ul style="list-style-type: none"> <li>CDI full-scale deflection: 2.0 nm or current CDI scale selection, whichever is smaller</li> </ul>
VISUAL	<b>Visual Approach</b> <ul style="list-style-type: none"> <li>Vertical guidance based on advisory terrain avoidance calculations</li> <li>CDI scaling is identical to LPV approaches</li> </ul>

# 3.19 Departures

## Loading a Departure into Flight Plan

- Always load the departure at the departure airport in the flight plan
- Flight plans allow only one departure procedure at a time
- Loading a departure when one is already present will replace the existing entry
- Selecting a departure, transition waypoint, and runway defines the route

### FEATURE LIMITATIONS

- Vector-only departures are not available in the Procedures database

### PAGE SPECIFIC CONTROLS



**Load Departure:** Loads departure procedure into the active flight plan.

**Activate Departure:** Activates the loaded departure procedure.

**Remove Departure:** Removes the loaded departure procedure.

### SELECT A DEPARTURE

From the Home page:

1. Tap **PROC > Departure**.
2. Confirm the selected airport. If necessary, tap **Airport** and choose an airport using the provided search options.
3. Tap **Departure** > Select a departure from the list.
4. Tap **Transition** > Select a transition.
5. Tap **Runway** > Select a runway.
6. Tap **Preview** > Review the departure diagram and sequence list.
7. Tap **Load Departure**. The Active FPL page opens.
8. Scroll the flight plan to view all departure waypoints.



To change or remove the departure:

- Tap the existing flight plan departure
- Select a different one.

**OR**

- Tap **Remove Departure**.

## 3.19.1 Flight Plan Departure Options

---

### Departure Options

- Select Departure
- Remove Departure

Selecting a departure on the flight plan opens a menu. Changes to the active flight plan take effect immediately.

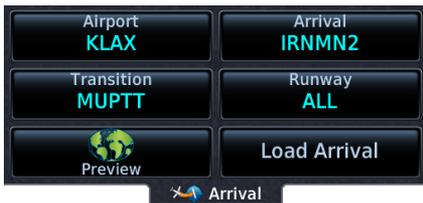
- Select a new departure
- Remove the selected departure from the flight plan

## 3.20 Arrivals

### Loading an Arrival into Flight Plan

- Load a Standard Terminal Arrival (STAR) at any airport with a published arrival procedure
- Flight plans allow only one arrival procedure at a time
- Loading an arrival when one is already present will replace the existing entry
- Selecting an arrival, transition waypoint, and runway defines the route

### PAGE SPECIFIC CONTROLS



**Load Arrival:** Loads arrival procedure into the active flight plan.

**Activate Arrival:** Activates the loaded arrival procedure.

**Remove Arrival:** Removes the loaded arrival procedure.

### SELECT AN ARRIVAL

From the Home page:

1. Tap **PROC > Arrival**.
2. Confirm the selected airport. If necessary, tap **Airport** and choose an airport using the provided search options.
3. Tap **Arrival >** Select an arrival from the list.
4. Tap **Transition >** Select a transition.
5. Tap **Runway >** Select a runway.
6. Tap **Preview >** Review the arrival diagram and sequence list.
7. Tap **Load Arrival**. The Active FPL page opens.
8. Scroll the flight plan to view all arrival waypoints.



To change or remove the arrival:

- Tap the existing flight plan arrival.
- Select a different one.

#### OR

- Tap **Remove Arrival**.

## 3.20.1 Flight Plan Arrival Options

---

### Arrival Options

- Select Arrival
- Remove Arrival

Selecting an arrival on the flight plan opens a menu. Changes to the active flight plan take effect immediately.

- Select a new arrival
- Remove the selected arrival from the flight plan

## 3.21 Approaches

### Loading an Approach into Flight Plan

- Always check the runway, transition, and all waypoints
- Flight plans allow only one approach procedure at a time
- You may load an alternate approach during a missed approach procedure (flight plan retains all missed approaches)
- Loading an approach when one is already present will replace the existing entry
- Selecting an approach, transition waypoint, and runway defines the route

### PAGE SPECIFIC CONTROLS



**Load Approach:** Loads approach procedure into the active flight plan.

**Activate Approach:** Activates the loaded approach procedure.

**Remove Approach:** Removes the loaded approach procedure.

**Channel/ID:** Loads an SBAS approach based on the specified channel.

### SELECT AN APPROACH

From the Home page:

1. Tap **PROC** > **Approach**.
2. Confirm the selected airport. If necessary, tap **Airport** and choose an airport using the provided search options.
3. Tap **Approach** > Select an approach from the list.
4. Tap **Transition** > Select a transition.
5. Tap **Runway** > Select a runway.
6. Tap **Preview** > Review the approach diagram and sequence list.
7. Tap **Load Approach**. The Active FPL page opens.
8. Scroll the flight plan to view all approach waypoints.



To change or remove the approach:

- Tap the existing flight plan approach.
- Select a different one.

OR

- Tap **Remove Approach**.

## SBAS APPROACHES

### Channel ID Key

- Select the channel ID for an SBAS approach to the current destination
- Provides an alternate means of loading an approach.
- IDs are available from an approved approach chart
- In the case of duplicate numbers, select an approach from the provided list

To load an SBAS approach:

1. Tap **Channel/ID**.
2. Specify an approach channel.

If present, both channel and ID load automatically.

## SUSPENDED APPROACH PROCEDURE ANNUNCIATION

“SUSP” indicates that automatic sequencing of approach waypoints is suspended on the active leg. This annunciation appears in the procedure field of the annunciator bar.

Suspended approaches typically occur during:

- Holding patterns
- Crossing the missed approach point
- Climb to altitude legs
- Hold to altitude legs

## PROCEDURE TURNS

### Roll Steering & Procedure Turns

The steering provided for a procedure turn does not guarantee that the aircraft will stay within the charted procedure turn boundaries. Always be sure to fly within the confines of the charted procedure.

A procedure turn is stored as another approach leg. It does not require any special operations other than flying the procedure itself.

Roll steering is available for aircraft with a compatible autopilot.

## 3.21.1 Flight Plan Approach Options

---

### Approach Options

- Activate Approach
- Activate Vectors to Final
- Activate Missed Approach
- Select Approach
- Remove Approach

Selecting an approach on the flight plan opens a menu. Changes to the active flight plan take effect immediately.

- Activate the selected approach
- Activate vectors to final for the selected approach
- Activate a missed approach
- Select a new approach
- Remove the selected approach from the flight plan

## 3.21.2 Missed Approach

The method for activating a missed approach depends on your position in relation to the missed approach point.

### BEFORE MISSED APPROACH POINT

Select **Activate Missed Approach**. This function is available in two locations.

Active FPL:

Home > **Flight Plan** > Select the approach > **Activate Missed Approach**

**OR**

Procedures:

Home > **Procedures** > **Activate Missed Approach**

Once selected, guidance continues along an extension of the final approach course (i.e., final approach fix to missed approach point).

The unit automatically sequences to the first leg of the missed approach. This allows you to execute the missed approach prior to reaching the missed approach point.

### AFTER MISSED APPROACH POINT

Upon reaching the missed approach point, a pop-up presents two options.



To continue with sequencing suspended, tap **Remain Suspended**.

To receive guidance to the missed approach hold point, tap **Activate GPS Missed Approach**.

### 3.21.3 Approach Hold

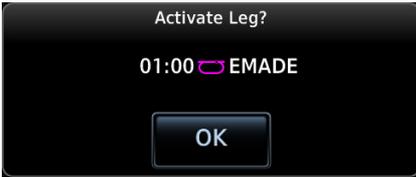
#### Hold Options

- Activate Hold
- Insert After
- Edit Hold
- Exit Hold
- Remove

Selecting an approach hold on the flight plan opens a menu. Changes to the active flight plan take effect immediately.

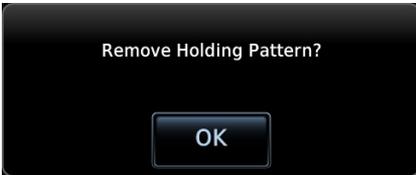
- Activate the selected hold
- Insert a waypoint after the hold
- Edit hold details
- Exit the holding pattern before the timer expires
- Remove the selected hold from the flight plan

#### ACTIVATE HOLD



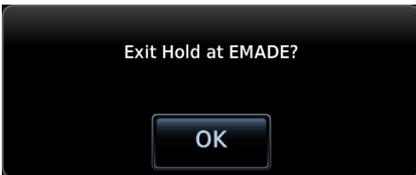
1. Select the hold.
2. Tap **Activate Hold**.
3. Confirm the request.

#### REMOVE HOLDING PATTERN



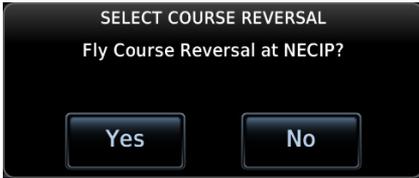
1. Select the hold.
2. Tap **Remove**.
3. Confirm the request.

#### EXIT HOLDING PATTERN



1. Tap **SUSP**.
2. Select the hold.
3. Tap **Exit Hold**.
4. Confirm the request.

## NON-REQUIRED HOLDING PATTERNS



Upon activating an RNP GPS approach, decide whether to skip non-required holding patterns during the initial transitions of the approach.

A pop-up presents two options.



Selecting **Yes** adds the hold to the flight plan.

Preview shows the hold in white.



Selecting **No** means the hold is not included in the flight plan.

Preview shows the hold in gray.

Timer/Distance field displays on the active flight plan (refer here when flying the outbound portion of the holding pattern). Holding pattern appears on Map with the active flight plan leg indication.

## CROSSING MISSED APPROACH POINT

When crossing the missed approach point:

- “SUSP” annunciation indicates that approach waypoint sequencing is suspended at the missed approach point
- FROM/TO flag on the CDI indicates “From” for non-composite CDIs
- FROM/TO field on the annunciator bar indicates “FR”
- Course guidance continues along the final approach course

If you need to go around the holding pattern again to lose extra altitude or speed, tap **SUSP** to manually suspend waypoint sequencing before crossing the holding waypoint the second time.

If you have already passed the waypoint, re-activate the holding pattern.

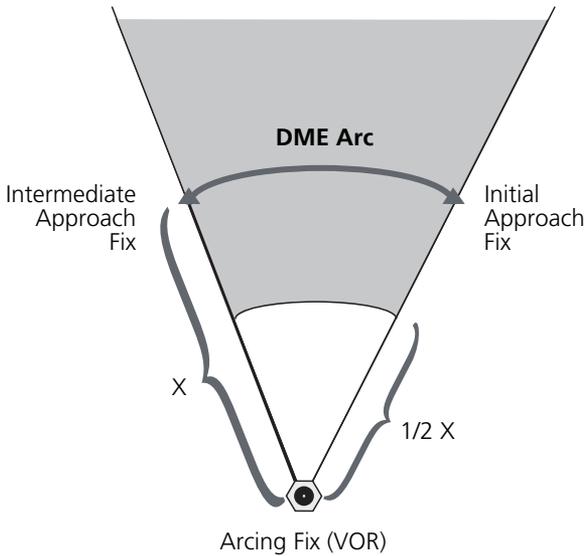
### 3.21.4 DME Arc

#### DME Arc Approaches

- Left/right guidance relative to the arc
- Manual arc leg activation once aircraft is near the arc

The unit supports approaches containing DME arcs.

To manually activate DME Arc, the aircraft must be within the shaded area.



## 3.21.5 RF Legs

### AC 90-101A - RF Legs

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.”

The unit supports radius-to-fix (RF) legs associated with RNAV RNP 1.0 non-AR approaches, when approved by the installation.

Flying a radius-to-fix approach is similar to flying a DME arc approach (status indications are identical).

Unlike DME arcs, however, RF legs are not based on a VOR. They may have varying radii, making them larger or smaller than arc legs.

For details regarding RF legs for specific aircraft, consult the AFMS.

## 3.21.6 Vectors to Final

Activate  
Vectors to  
Final

Activating the approach with vectors to final displays an extension of the final approach course on Map.



Magenta depicts the active leg of the flight plan.



CDI needle remains off center until you are established on the final approach course. As a reminder, “vtf” annunciates as part of the active leg on the GPS Nav status key.

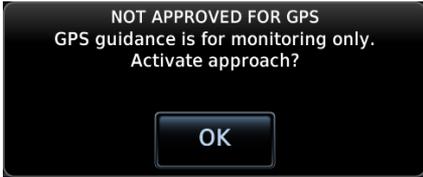
Activating vectors-to-final while on the From side of the final approach fix suspends automatic waypoint sequencing. “SUSP” annunciates at the bottom of the screen. Sequencing resumes once the aircraft is on the To side of the final approach fix and within full-scale deflection.

## 3.21.7 ILS Approach



### NOTE

ILS and LOC approaches are not approved for GPS. GPS guidance is for monitoring purposes only.



Selecting an ILS or LOC approach results in a pop-up message. Activate the approach or select a different one.

Do not attempt to use the unit as the primary navigation source during ILS approach.

## 3.21.8 RNAV Approaches

### Always fly to the published minimums for:

- LNAV/VNAV
- LNAV
- LNAV+V
- LPV
- LP
- LP+V

Fly RNAV approaches according to the published chart.

### LNAV APPROACH

RNAV non-precision lateral navigation approach.

### LNAV+V APPROACH

RNAV non-precision LNAV approach with advisory vertical guidance.

The glidepath is a light dashed line on the vertical profile (Jeppesen charts 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.

## LPV APPROACH

Localizer performance with vertical guidance. Similar to flying the standard ILS approach.

This segment describes a typical LPV approach sequence and the necessary pilot actions.

### **Within 31 nm of destination:**

- Mode switches from En Route to Terminal
- CDI scale transitions from 2.0 nm to 1.0 nm, full-scale deflection

### **Approaching initial approach fix:**

- Waypoint message annunciates
- Time to Turn advisory annunciates and 10 second timer counts down as the distance approaches zero

### **2.0 nm from final approach fix:**

- CDI scaling tightens from 1 nm to the approach-defined angular full-scale deflection

### **60 seconds before final approach fix:**

- System verifies GPS position integrity is within approach limits

If GPS integrity exceeds the horizontal and/or vertical alarm limits:

- Approach downgrades to non-precision
- "LNAV" annunciates on Map to inform of the change if there are LNAV minimums for the approach
- Advisory message: "GPS approach downgraded. Use LNAV minima."
- Glideslope indication disappears
- Pilot continues approach using LNAV non-precision minimums, if applicable

If GPS integrity does not meet the non-precision horizontal alarm limits:

- Advisory message: "Abort Approach. GPS approach is no longer available."
- Pilot acknowledges message
- Unit reverts to terminal limits of 1 nm to support navigation to the missed approach

### **After the aircraft passes final approach fix:**

- Approach aborts due to a loss of WAAS integrity
- Pilot captures the glideslope (method is same as for ILS glideslope)

### **When crossing the final approach fix:**

- Waypoint sequences to the missed approach point (e.g., RW31, the runway threshold)
- Pilot flies toward missed approach point, keeping the needle on the external CDI (or HSI) at center, and observing published altitude minimums
- Final course segment becomes the active flight plan leg on Map

### **Approaching missed approach point:**

- Advisory message: "Arriving at Waypoint."

### **Crossing missed approach point:**

- Sequencing suspends
- Pop-up message: "Missed Approach Waypoint Reached"
- Pilot decides whether to remain suspended or activate the missed approach
  - Tapping **Remain Suspended** allows you to continue with sequencing suspended
  - Tapping **Activate GPS Missed Approach** allows you to continue with guidance to the missed approach hold point

### **Prepare aircraft for missed approach operation:**

- Pilot taps **UNSUSP** (sequences missed approach), then follows the unit provided guidance to the missed approach hold point and holds

## LP APPROACH

### Points About LP Approaches

- Use SBAS accuracy, making them similar to an LNAV approach but more precise
- Combine the lateral accuracy of an LPV approach with the angular scaling of a localizer approach
- Often contain step-down altitudes
- Always result in a minimum descent altitude and missed approach point

This segment describes a typical LP approach sequence and the necessary pilot actions.

#### **Within 30 nm of destination:**

- Mode switches from En Route to Terminal
- CDI scale transitions from 2.0 nm to 1.0 nm, full-scale deflection

#### **Approaching initial approach fix:**

- Turn direction message annunciates
- Time to Turn advisory annunciates and 10 second timer counts down as the distance approaches zero

#### **Approaching final approach fix:**

- Unit begins to automatically rescale in an angular fashion, allowing you to fly as you would a standard localizer approach

#### **2.0 nm from final approach fix:**

- CDI scaling tightens from 2 degrees or 0.3 nm full-scale deflection, whichever is smaller

#### **60 seconds before final approach fix:**

- System verifies GPS position integrity is within the horizontal limits to complete the LP non-precision approach

If pilot exceeds the horizontal alarm limits:

- Approach downgrades to non-precision
- “LNAV” annunciates on Map to inform of the change
- Advisory message: “GPS approach downgraded. Use LNAV minima.”
- Pilot continues approach using LNAV non-precision minimums, if applicable

If GPS integrity does not meet the non-precision horizontal alarm limits:

- Advisory message: “Abort Approach. GPS approach is no longer available.”
- Pilot acknowledges message
- Unit reverts to terminal limits of 1 nm to support navigation to the missed approach

If the approach indicates “LP+V,” then advisory vertical guidance may be removed without annunciation. This is due to the vertical guidance not being within tolerances.

This does not constitute a downgrade. You may still fly the approach to LP minimums.

### **When crossing the final approach fix:**

- Waypoint sequences to the missed approach point (e.g., RW31, the runway threshold)
- Pilot flies toward missed approach point, keeping the needle on the external CDI (or HSI) at center, observing published altitude minimums
- Final course segment becomes the active flight plan leg on Map

### **Approaching missed approach point:**

- Advisory message: “Arriving at Waypoint.”

### **At the missed approach point:**

- Pilot initiates missed approach, if necessary

**Crossing missed approach point:**

- Sequencing suspends
- Pop-up message: “Missed Approach Waypoint Reached”
- Pilot decides whether to remain suspended or activate the missed approach
  - Tapping **Remain Suspended** allows you to continue with sequencing suspended
  - Tapping **Activate GPS Missed Approach** allows you to continue with guidance to the missed approach hold point

**Prepare aircraft for missed approach operation:**

- Pilot taps **UNSUSP** (sequences missed approach)

**NOTE:** For missed approaches with heading legs, fly manually until you reach the first active course leg.

- Pilot follows the unit provided guidance to the missed approach hold point and holds

**LP+V**

Flying an LP approach with advisory vertical guidance (LP+V) does not change how the approach should be flown. The pilot is still responsible for descending to the correct altitude at each step down.

The result is still an MDA and missed approach point.

## 3.21.9 Visual Approach

### Points About Visual Approaches

- Provide advisory horizontal and optional vertical guidance for the selected runway
- Lateral guidance is always provided for visual approaches
- Helps stabilize the runway approach
- Three methods for loading and activation

### FEATURE REQUIREMENTS

- Valid terrain database

### FEATURE LIMITATIONS

- Not all airports in the database support visual approaches
- Only external CDI/VDI displays provide vertical deviation indications

Published data is used to determine the visual approach GPA and threshold crossing height (TCH) for the selected runway. If no published data is available, the default is 3 degrees GPA and 50 ft TCH.

You may load and activate a visual approach from the following apps.

- Map
- Procedures
- Waypoint Info



Upon loading the visual approach, a pop-up informs when vertical guidance is available.

If available, the pop-up contains the glidepath angle (GPA) and threshold crossing (TCH).

If unavailable, it reads: "NO VERTICAL GUIDANCE"

Terrain and obstacle obstructions along the approach path determine the availability of vertical guidance advisories for visual approaches.

- If no known obstructions are within the approach path, vertical guidance is provided to a maximum distance of 28 nm from the runway.
- If there are known obstructions further than 3 nm, but within the 28 nm maximum distance from the runway along the approach, vertical guidance is limited to the approach path 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 available.

## LOAD A VISUAL APPROACH FROM MAP

When the aircraft is within 10 nm of the destination airport, the **Visual Approach** selector key becomes active. This key may appear in one of two places:

On the map or at the left of the screen if the supporting airport is selected.

1. Select the airport icon.
2. Tap **Visual**.
3. Select from the list of available visual approaches.

Once selected, the visual approach immediately loads and activates.

For more about **Visual Approach** key configuration, refer to section 3.1.4.

## LOAD A VISUAL APPROACH FROM PROCEDURES

Two methods:

Home > **PROC** > **Approach**

**OR**

Home > **Waypoint Info** > **Airport** > **PROC** > Select an approach (similar to published instrument approaches)

### 3.21.10 Autopilot Outputs



#### CAUTION

ENGAGE THE AUTOPILOT HEADING MODE AND SET THE HEADING BUG APPROPRIATELY TO USE THE AUTOPILOT ON HEADING LEGS USING THE AUTOPILOT'S NAV, GPSS, OR APR MODE. NOT ALL AUTOPILOTS FOLLOW GUIDANCE ON THESE LEG TYPES, SOME REVERT TO A ROLL ONLY OR WINGS LEVEL MODE.

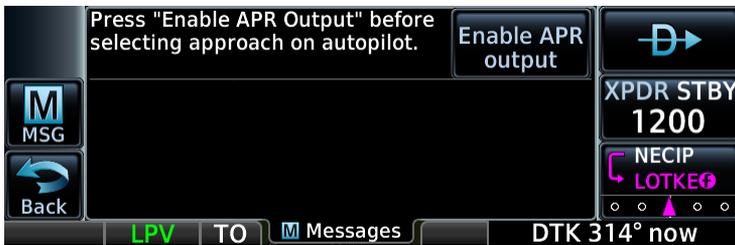
#### FEATURE REQUIREMENTS

- Availability dependent upon configuration

#### FEATURE LIMITATIONS

- Applicable to King KAP 140 and KFC 225 autopilots

Outputs for the King KAP 10/KFC 225 autopilot units require manual activation. If configured, this function prompts you to enable autopilot outputs during the approach procedure.



**Enable APR Output Advisory**

Once enabled, the unit provides guidance information consistent with what the autopilot expects (i.e., angular CDI scaling and glideslope capture for LPV or other vertically guided GPS approaches).

#### ENABLE AUTOPILOT OUTPUTS

1. Acknowledge the advisory message.
2. Tap **Enable APR Output**.
3. Follow the unit provided guidance.

# 4 Planning

---

## VERTICAL CALCULATOR

4.1	VCALC Page .....	4-3
4.2	VCALC Setup .....	4-4

## FUEL PLANNING

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## DALT/TAS/WIND CALCULATOR

4.4	DALT/TAS/Wind Page .....	4-8
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## RAIM PREDICTION

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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

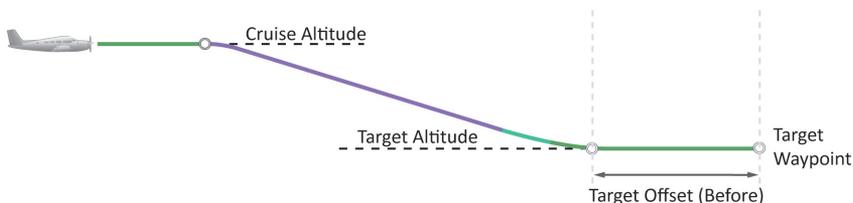
Home

Utilities

VCALC

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.



<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

### VCALC Menu

- Restore Defaults
- Display Messages

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.

#### For Planning Purposes Only

- Fuel on Board and Fuel Flow are pilot specified values. They are not a direct indication of actual aircraft fuel on board or fuel flow.
- Fuel Required to <destination> is a calculated prediction based on pilot specified values. It is not a direct indication of actual fuel quantity once the aircraft reaches its destination.
- All data entries on this page are used exclusively by the Fuel Planning app.
- Fuel computations are for planning purposes only.

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>Utilize current GPS ground speed data</li> </ul>
	Ground Speed	<ul style="list-style-type: none"> <li>Behavior based on state of <b>Use Sensor Data</b></li> <li><b>Use Sensor Data key inactive:</b> <ul style="list-style-type: none"> <li>Function selectable</li> <li>Specify ground speed</li> </ul> </li> <li><b>Use Sensor Data key active:</b> <ul style="list-style-type: none"> <li>Function not selectable</li> <li>Displays current GPS ground speed when the <b>Use Sensor Data</b> key is active</li> <li>This value is used to calculate fuel statistics when you press the <b>Compute</b> key</li> </ul> </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. Selecting the active flight plan sets the starting waypoint at the aircraft’s current position.
  - 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

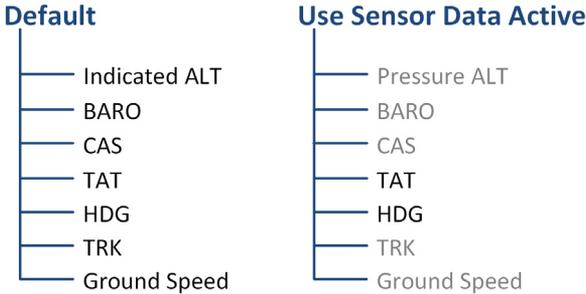
## 4.4 DALT/TAS/Wind Page



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. TAT and HDG may also be available via an external data source.



Not Selectable 

<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 [3]</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 (internal or received from air data computer)</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.

[3] This field is absent when sensor data is 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 <b>2229 FT</b>	TAS <b>206 KT</b>
Wind Direction <b>021°</b>	Wind Speed <b>7 KT</b>
Head Wind Component <b>6 KT</b>	

**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.



## NOTE

RAIM availability prediction is for use in areas where WAAS coverage is not available. It is not required in areas where WAAS coverage is available.

## 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.

RAIM prediction results are valid for up to 90 days from the current date. Arrival dates beyond 90 days, or in the past, may not provide accurate results.

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

Use a non-GPS based approach when RAIM is not available. To determine WAAS availability, including for LPV approaches, 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
- **Waypoint 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 **Waypoint 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

## WEATHER AWARENESS

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## TRAFFIC AWARENESS

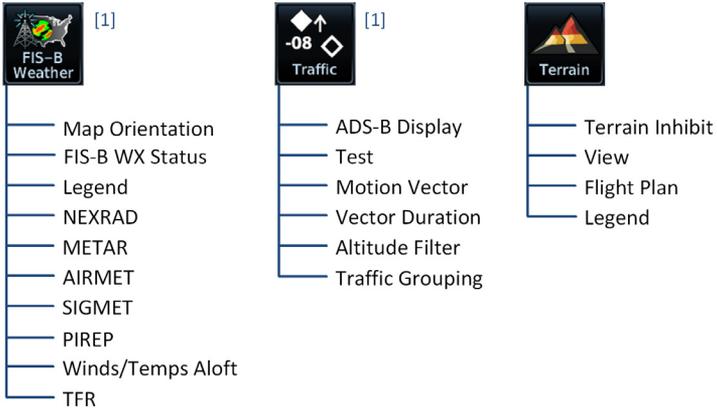
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## HAZARD AWARENESS APPS & FUNCTIONS

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



[1] GPS 175: Feature availability dependent upon unit configuration. Requires external ADS-B In product (GDL 88, GTX 345) and FIS-B.

# Weather Awareness



## 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.

### FEATURE REQUIREMENTS

- GPS 175 with UAT receiver (GDL 88, GTX 345) and FIS-B

#### OR

- GNX 375 and FIS-B

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

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

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. 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

---

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 00-63A or latest revision.

## 5.2 FIS-B Weather Display



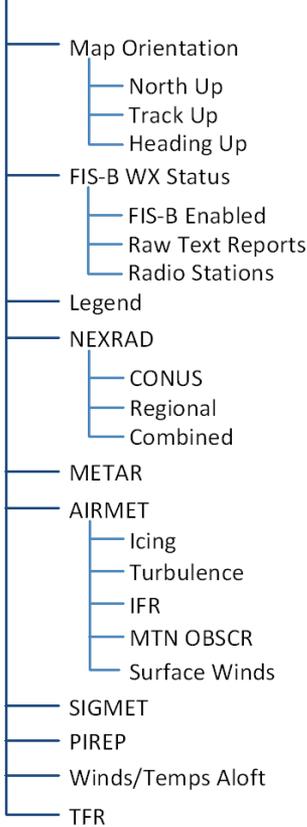
FIS-B weather data displays on the dedicated weather page and as overlays on Map. No pilot action is required to receive FIS-B weather information.



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> <ul style="list-style-type: none"> <li>• <b>North Up</b> orients page to True north</li> <li>• <b>Track Up</b> orients page to current aircraft GPS track</li> <li>• <b>Heading Up</b> orients page to current aircraft heading (requires heading data source interface)</li> </ul>
4	<p><b>Basemap</b></p> <p>Presents a graphical depiction of land and water data.</p>
5	<p><b>NEXRAD Controls</b></p> <p>Includes source key and animation control. Source options include CONUS, Regional, or Combined.</p>
6	<p><b>Zoom Scale</b></p> <p>Value adjusts with changes to the current magnification.</p>
7	<p><b>Product Timestamp</b></p> <p>Approximate time of data collection for each active weather product.</p>

## 5.3 FIS-B Weather Setup

### FIS-B Weather Menu



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

#### Map WX Overlays

Overlay controls reside in the Map setup menu.

Home > **Map** > **Menu** > Select from **NEXRAD**, **METAR**, and **TFR**.

### FIS-B WEATHER ENABLED



To mitigate any possibility of the avionics receiving unexpected data formats in the FIS broadcast, you may disable FIS-B Weather by toggling the **FIS-B Enabled** key to off.

This key is active by default. It is not intended for use under normal broadcast conditions.

From the setup menu, tap **FIS-B WX Status** > **FIS-B Enabled**.

This function is also accessible from the ADS-B Status page:

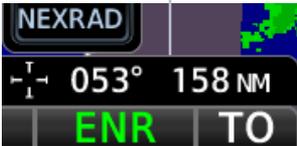
Home > **System** > **ADS-B Status** > **FIS-B WX Status** > **FIS-B Enabled**

## 5.4 FIS-B Weather Interactions

### WX INFO BANNER

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

WX Info Banner

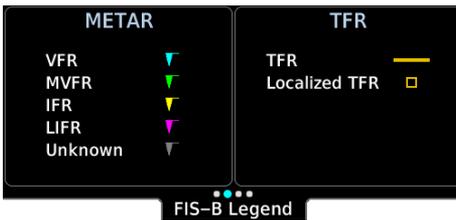


### Banner Information:

- Pan mode symbol
- Bearing and distance to map pointer from aircraft's current position

### LEGENDS

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

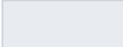


1. Tap **Menu > Legend**.
2. Use the inner knob to view the available product legends.

## 5.5 FIS-B Weather Products

When available, FIS-B weather products display as follows.

FIS-B WEATHER PRODUCT	WEATHER DISPLAY				
	FIS-B WX PAGE	WX POP-UP TEXT	MAP PAGE	APT INFO	RAW TEXT REPORT
AIRMET					
METAR w/Decoding					
NEXRAD					
NOTAM-D					
NOTAM-FDC					
PIREP					
SIGMET					
TAF					
Temps Aloft					
TFR					
Winds Aloft					

Product Present 

### 5.5.1 Product Status



View the status of all FIS-B weather products. States include:

- Unavailable
- Awaiting Data
- Data Available

From the FIS-B menu, tap **FIS-B WX Status**.

This page is also accessible from the ADS-B Status page.

## 5.5.2 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



#### Yellow

Weather product 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).

#### Green

Weather product considered current. Its age is newer than half its expiration time.

Tapping timestamp window displays the time for all green colored weather products.

#### Gray

Weather product data is one of the following:

- Expired
- Not received
- Not supported at the selected altitude

“No Data” or “ALT UNAVBL” displays next to the weather product title

FIS-B weather product update and transmission intervals are published in the SBS Description Document associated with TSO-C157b. This information is available electronically at the FAA’s Regulatory and Guidance Library:

<https://rgl.faa.gov/>

### 5.5.3 FIS-B NEXRAD

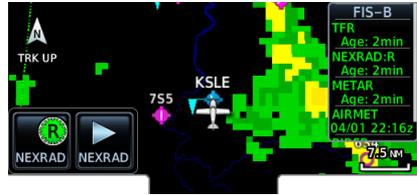


#### WARNING

**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. Per AC 00-63A, FIS-B CONUS and Regional NEXRAD are composite reflectivity images.

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



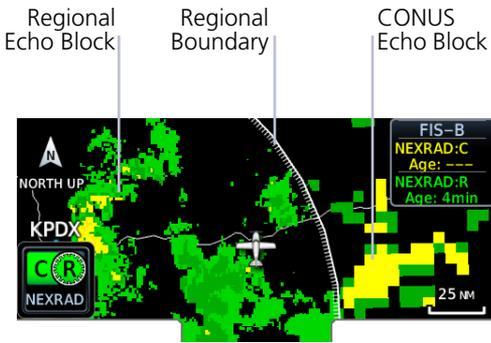
To depict trending weather movements over time, an animation function stitches the last three to six received radar images together in sequence, from oldest to newest, and replays them on a continuous loop.



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.



**CONUS & Regional NEXRAD Combined**

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.

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**



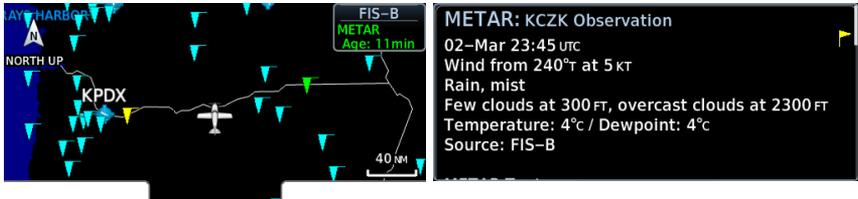
**Combined**

<p><b>CONUS</b></p>	<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>
<p><b>Regional</b></p>	<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>
<p><b>Combined</b></p>	<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>

## 5.5.4 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 displayed above the original METAR text. METARs are provided only in areas covered by the navigation database currently loaded.



### METAR SYMBOLS



**VFR**

Ceiling greater than 3000 ft AGL and visibility greater than five miles.



**Marginal VFR**

Ceiling 1000 to 3000 ft AGL and/or visibility three to five miles.



**IFR**

Ceiling 500 to 1000 ft AGL and/or visibility one to three miles.



**Low IFR**

Ceiling below 500 ft AGL and/or visibility less than one mile.



**Unknown**

Ceiling and/or visibility data unavailable.

## 5.5.5 AIRMETS

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.

Tapping an AIRMET opens a detailed report.



### 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 shear below 2,000 ft AGL</li> </ul>

### 5.5.6 SIGMETs

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.

Tapping a SIGMET opens a detailed report.



FIS-B  
SIGMET  
04/01 22:16z

Report: SIGMET CWEG 021949 SIGMET L4 VALID 021950/022350 CWEG- WTN 20 NM OF LN /4847N12519W/25 SE TOFINO - /5016N12801W/35 SW PORT HARDY - /5105N12801W/35 NW PORT HARDY. SEV MECH TURB FCST BLO 40. AT 1900Z SOLANDER ISLAND REPS WND 63G71KT.

### 5.5.7 PIREPs

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.



FIS-B  
PIREP  
Age: 18min

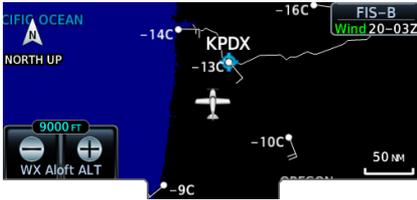
PIREP:  
Location: EUG  
Time: 21:50 UTC [ Age: 45 mins ]  
Urgent: No  
AC Type: CRJ2  
Altitude: 9000 FT  
Temperature: -9°C  
Icing Intensity: LIGHT MODERATE

#### PIREP SYMBOLS

-  Routine (UA)
-  Urgent (UUA)
-  Route

PIREPs are issued as either Routine (UA) or Urgent (UUA). Tapping a PIREP symbol displays textual details.

## 5.5.8 Winds/Temps Aloft



Indicates wind speed and direction, and temperature forecast 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 for altitude-based weather products.

Not all altitudes provide winds/temps aloft forecasts for all regions.

## 5.5.9 TFRs



### 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. They are routinely issued for occurrences such as dignitary visits, military activities, and forest fires.

Tapping a TFR displays textual details.



**TFR:**  
 ID: 9/5151  
 Effective Immediately  
 Until further notice  
 Max Alt: 3000 FT AGL  
 Min Alt: Surface  
 Report: NOTAM-TFR 9/5151 261634Z PART 1 OF 2 .. SPECIAL NOTICE .. SPORTING EVENTS.

# 5.6 Raw Text Reports



View raw textual data for a FIS-B product.

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



```
PIREP ALW 022310Z ALW UA /OV ALW360015/TM
2310/FL160/TP LJ35/TA M20/TB LGT /IC MOD RIME
/RM DURD 160-150 ..ZSE
PIREP BAM 022250Z WMC UA /OV BAM280115/TM
2250/FL380/TP H25/TB MOD MTN WAVE/ZLC
PIREP BFI 022258Z BFI UUA /OV BFI330006 /TM
2258 /FL021 /TP H25B /RM LLWS +/-10KTS
SFC-021
```

Raw PIREPs

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



Location	
KAAT	<input type="button" value="View"/>
KACV	<input type="button" value="View"/>
KALW	<input type="button" value="View"/>

Raw METARs

Multiple reporting stations appear in a list. Tapping **View** displays raw text for the corresponding identifier.



```
FIS-B SERVICE OUTAGE 210201Z
ZBW,ZDC,ZJX,ZMA,ZME,ZNY,ZTL GUAM NEXRAD
PRODUCT UPDATES UNAVAILABLE
FIS-B SERVICE OUTAGE 211321Z ZLC SUA
PRODUCT UPDATES UNAVAILABLE
FIS-B SERVICE OUTAGE 212200Z ZJX,ZMA,ZDC
SAN JUAN NEXRAD PRODUCT UPDATES
UNAVAILABLE
```

Raw UNAVAIL

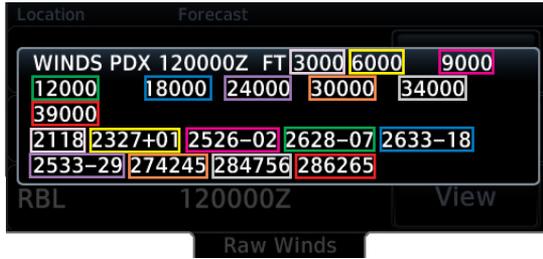
To view information about products not available due to a service outage, select **Unavailable Products**.

## READING WINDS/TEMPS ALOFT REPORTS

Tapping **Winds/Temps Aloft** displays a forecast of winds and temperatures for different altitudes. Temperature forecasts are not included for altitudes below 2,500 ft AGL.

On the raw text report, altitude values do not align with the corresponding forecast. Match the color of the altitude and forecast to interpret the information.

Color markings are for reference only.



### ALTITUDE (FT)

3,000	6,000	9,000	12,000	18,000	24,000	30,000	34,000	39,000
2118	2327+0	2526-02	2628-07	2633-08	2533-29	274245	284756	286265

# 5.7 FIS-B Ground Reception Status

## FEATURE REQUIREMENTS

- UAT transceiver (powered)
- FIS-B Enabled function active



Monitor FIS-B ground station transmission status from the FIS-B Reception page. 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.

1. Open the FIS-B WX Status page.
2. Tap **Radio Stations**.

# Traffic Awareness

## FEATURE REQUIREMENTS

- GPS 175 with External ADS-B In product (GDL 88, GTX 345)

## OR

- GNX 375

## 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)

## 5.8 Traffic Applications

### FEATURE REQUIREMENTS

- Aviation database (SURF only)

### FEATURE LIMITATIONS

- ATAS does not alert to traffic on ground

ADS-B In traffic support three applications:

**AIRB:** Basic Airborne Application

**ATAS:** ADS-B Traffic Advisory System

**SURF:** Surface Situation Awareness

AIRB is considered the fundamental airborne traffic application. ATAS provides alerts when airborne traffic trajectories pose a potential collision risk. SURF provides additional situational awareness when you are on ground or within the terminal environment.

TRAFFIC APPLICATIONS	
<b>AIRB &amp; ATAS</b>	<ul style="list-style-type: none"> <li>• Both active when ADS-B is “On” (airborne traffic indications are available; ATAS arms to provide airborne alerts)</li> <li>• Alerts occur when potential collision risks are determined based on current airborne position and trajectory and the position and trajectories of other airborne traffic</li> <li>• Airborne traffic alerts only (no alerts on ground or for traffic on the ground)</li> <li>• Nominally allow 20 to 40 seconds for flight crew response</li> <li>• Provide aural alerting when traffic alerts occur</li> </ul>
<b>SURF</b>	<ul style="list-style-type: none"> <li>• Active on ground or within the terminal environment (&lt;5 nm and &lt;1,500 ft above field elevation)</li> <li>• Traffic on ground may display when SURF is active</li> <li>• Runway and taxiway depictions when the zoom scale is &lt;2 nm (Traffic page only)</li> <li>• Depicts only traffic and ground vehicles equipped with ADS-B Out</li> </ul>

### 5.8.1 Traffic Application Failures

During normal operation, the “ADS: On” status annunciation means that both AIRB and ATAS applications are active. In the rare event of an application failure, it is possible that only one of the applications may be active. The unit provides indications to reflect which application is no longer operational.

- ADS field indicates “On”
- If AIRB is active and ATAS is failed, the unit displays the system message: “ADS-B traffic alerting function inoperative”
- If AIRB is failed and ATAS is active (and still capable of providing a no-bearing aural alert), “Unavailable” annunciates across the traffic display

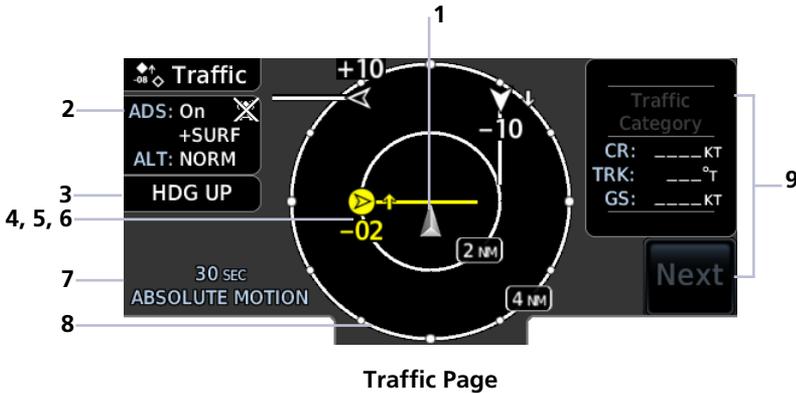


## 5.9 Traffic Display



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

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



1	<p><b>Ownship Icon</b></p> <p>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>ADS-B Status &amp; Active Applications</b></p> <ul style="list-style-type: none"> <li>ADS-B indications:           <ul style="list-style-type: none"> <li><b>On</b> means the AIRB and ATAS traffic applications are active</li> <li><b>Off</b> means that air and ground applications are inactive</li> <li><b>Test</b> means the traffic test function is active</li> <li><b>Fail</b> means that ADS-B reports a failure</li> </ul> </li> <li>Ground station transmitter status icon</li> <li><b>+SURF</b> means that ground targets displays in addition to airborne targets</li> <li>Altitude filter setting (NORM, ABV, BLW, UNR)</li> </ul>
3	<p><b>Page Orientation Label</b></p> <ul style="list-style-type: none"> <li><b>Track Up</b> orients page to current aircraft GPS track</li> <li><b>Heading Up</b> orients page to current aircraft heading (requires heading data source interface)</li> </ul>

4	<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>
5	<b>Altitude Separation Value</b> Indicates when an intruder is above or below the ownship. <ul style="list-style-type: none"><li>• Value appears above or below the traffic symbol, depending on relative altitude</li><li>• Plus or minus sign denotes higher or lower altitude in hundreds of feet</li></ul>
6	<b>Vertical Trend Arrow</b> Active when an intruder is climbing or descending at a vertical speed greater than 500 fpm.
7	<b>Selected Vector Type and Duration</b> Types: Absolute and Relative For more about motion vectors, read section 5.10.1.
8	<b>Range Ring</b> <ul style="list-style-type: none"><li>• Outer ring represents selected range</li><li>• Range options vary according to traffic application</li></ul>
9	<b>Selected Traffic Information Window &amp; Next Key</b> Select and view aircraft information for multiple traffic symbols. For more about traffic interactions, read section 5.10.

## GROUND STATION TRANSMITTER STATUS ICON



TIS-B ground station transmitter is providing a traffic picture specific to the ownship aircraft.



Traffic picture may be incomplete in the vicinity of the ownship. A partial traffic picture may be available due to:

- aircraft-to-aircraft ADS-B and/or
- traffic pictures from the ground station customized for other nearby aircraft

## 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.

	Basic Directional		Proximate Directional
	Basic Non-directional		Proximate Non-directional
	Basic Off-scale Selected		Proximate Off-scale Selected
	Directional (On-Ground)		Non-directional Alerted
	Non-directional (On-Ground)		Off-scale Non-directional Alerted Traffic
	Proximate Directional (On-Ground)		Directional Alerted Traffic
	Proximate Non-directional (On-Ground)		Off-scale Directional Alerted Traffic
	Directional Surface Vehicle		Non-directional Surface Vehicle

## TRAFFIC GROUPS

When the Traffic Grouping function 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

## OFF SCALE TRAFFIC ALERTS

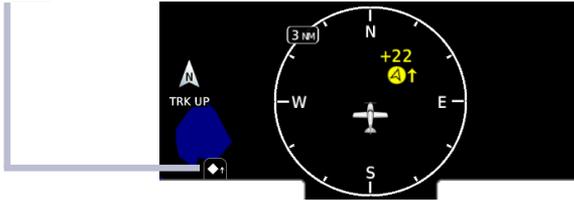


Off scale (out of range) traffic alerts are depicted as half yellow symbols on the outermost range ring at the correct bearing.

## TRAFFIC OVERLAY STATUS ICON (MAP ONLY)



This icon appears on Map when the traffic overlay is active. It is absent when the overlay function is off.

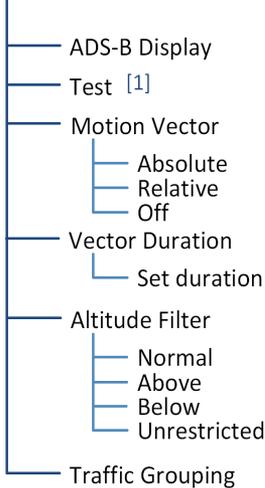


**Map Traffic Overlay**

An “X” appears over the icon when the overlay is on but unavailable.

## 5.10 Traffic Setup

### Traffic Menu



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

### Map Traffic Overlay

The overlay control resides in the Map setup menu.

Home > **Map** > **Menu** > Select **Traffic**.

<b>ADS-B Display</b>	Enable AIRB/ATAS. Depending on the state of the aircraft, the system may additionally select SURF. Selecting Off disables the ADS-B In function.
<b>Test</b>	Initiate a test of the traffic system. A test pattern displays on the page. System returns to normal operating mode once the test is complete. [1]
<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 30 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>	Show targets in close proximity as a group. When active, the highest priority target is displayed. Asterisk indicates one or more targets are decluttered by grouping.

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

## 5.10.1 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>

## 5.10.2 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 Map.

SELECTION	LABEL	ALTITUDE RANGE
Normal	NORM	-2,700 ft to 2,700 ft
Above	ABV	-2,700 ft to 9,900 ft
Below	BLW	-9,900 ft to 2,700 ft
Unrestricted	UNR	-9,900 ft to 9,900 ft

## 5.11 Traffic Interactions

### Selected Traffic Information

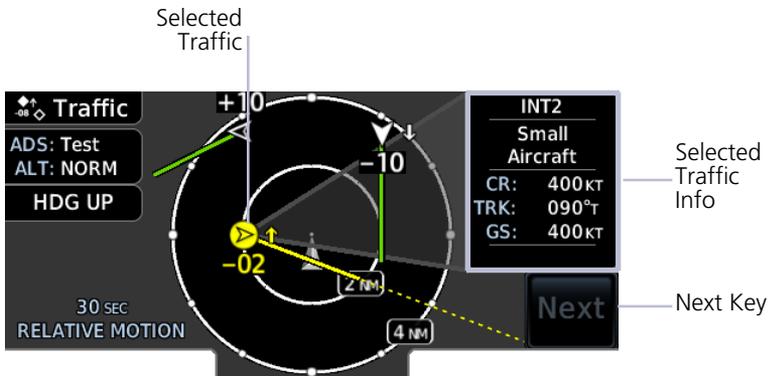
- Registration/call sign
- Vehicle type
- Closure rate
- Track
- Ground speed

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.



When a traffic alert occurs, the **Mute Alert** option temporarily replaces the **Next** key.

## 5.12 Traffic Annunciations

<b>ANNUNCIATION</b>	<b>DESCRIPTION</b>
Absolute Motion - XX SEC/MIN	Active motion vector type is absolute and vector time is XX seconds/minutes.
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.

## 5.13 Traffic Alerting

### Traffic Alert Types

- Textual annunciations at the bottom of the screen
- Color-coded target icons on Traffic page
- Pop-up window when another page is active

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.

### FEATURE LIMITATIONS

- Aural traffic alerts available on GNX 375 only
- Mute alert function is applicable only to the active aural alert (does not mute future alerts)



Traffic Pop-up



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>

To silence the active traffic alert voice message, tap **Mute Alert**.

### ALERTING PARAMETERS

#### Alerting Parameter Considerations

- Altitude separation and trend
- Angle
- Speed
- Closure rate of each aircraft (ownship and target)

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. 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.**

### 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

### FEATURE LIMITATIONS

- Alerting functions are dependent upon the configured terrain alerting options
- Terrain Alerting functions do not provide aural alerts

## 5.14 Terrain Configurations

### Available Terrain Modes

- Terrain Proximity
- Terrain Alerting (FLTA/PDA)

Terrain Proximity displays relative elevations on moving map depictions (Terrain page, Map). It does not provide visual alerts.

Terrain Alerting adds Forward Looking Terrain Alert (FLTA) and Premature Descent Alert (PDA) functions. These include visual alerts when the aircraft flies below an alerting threshold.

## 5.14.1 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	INDICATED ALTITUDE
<ul style="list-style-type: none"><li>• Highly accurate and reliable geometric altitude source</li><li>• Does not require local altimeter settings to determine height above MSL</li><li>• Not subject to pressure and temperature variations</li><li>• Affected primarily by satellite geometry</li></ul>	<ul style="list-style-type: none"><li>• Barometric altitude source corrected for pressure variations</li><li>• Requires frequent altimeter setting adjustment to determine height above MSL</li><li>• Subject to local atmospheric conditions</li><li>• Affected by variations in pressure, temperature, and lapse rate</li></ul>

## 5.15 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.

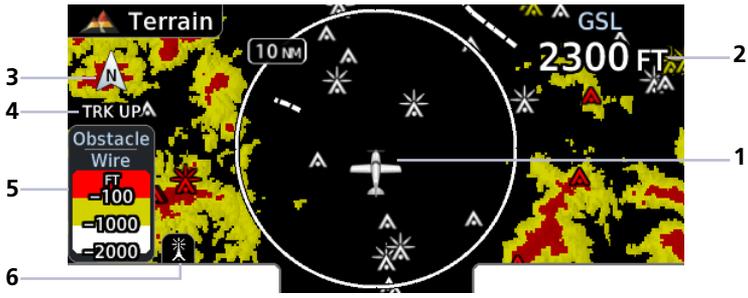
DATABASE	LIMITATION
<b>Terrain</b>	<ul style="list-style-type: none"> <li>• Not available north of 89° N latitude and south of 89° S latitude</li> </ul>
<b>Obstacle</b>	<ul style="list-style-type: none"> <li>• Coverage areas vary according to database type</li> <li>• Power line indications for the contiguous 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.

# 5.16 Terrain Display



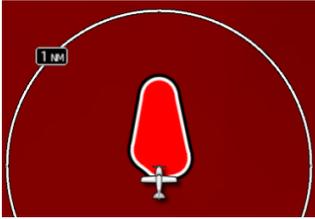
Terrain, obstacle, and wire data display as overlays on the dedicated Terrain page and as overlays on Map.



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></p> <ul style="list-style-type: none"> <li>• <b>Track Up</b> orients page to current aircraft GPS track</li> <li>• <b>Heading Up</b> orients page to current aircraft heading (requires heading data source interface)</li> </ul> <p>Heading Up takes priority over Track Up when both orientation inputs are available.</p>
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.

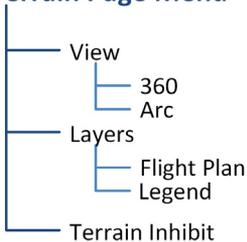
## AUTOMATIC DATA REMOVAL



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

# 5.17 Terrain Setup

### Terrain Page Menu



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

### Map Terrain Overlays

Overlay controls reside in the Map setup menu.

Home > **Map** > **Menu** > Select from **Terrain** and **OBST/Wires**.

<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>

# 5.18 Terrain Proximity

## FEATURE LIMITATIONS

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

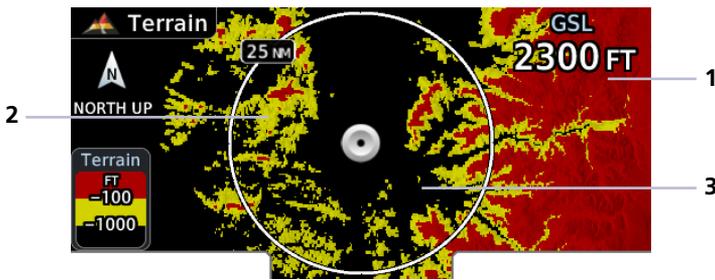
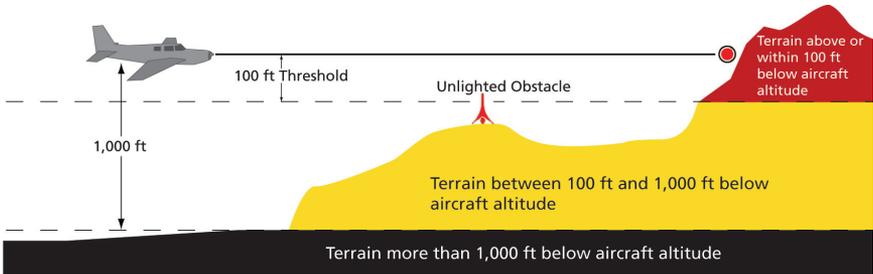
View color depictions of terrain and obstacle elevations relative to your current position and altitude.

## 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

### 5.18.1 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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## 5.18.2 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



An asterisk indicates when the obstacle database contains only a single latitude and longitude for a group of obstacles. This occurrence is rare.

## 5.19 Terrain Alerting

Receive visual alerts for potential flight path conflicts involving terrain, obstacles, or power lines. Alerting behavior is determined at installation.

### Terrain Alerting Features

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

### 5.19.1 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>

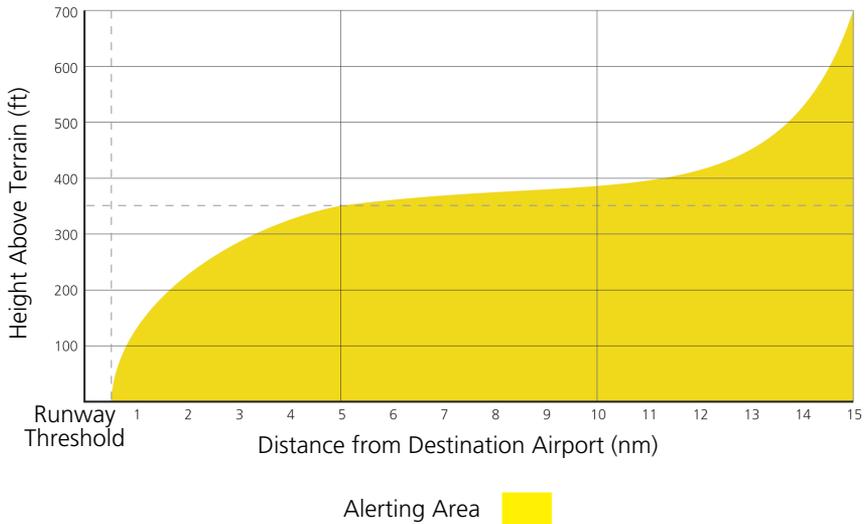
[1] Alerting inhibited <200 ft AGL within 0.5 nm of approach runway or <125 ft AGL within 1.0 nm of runway threshold.

[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.

## 5.19.2 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



## 5.19.3 Inhibiting FLTA & PDA Alerts



### NOTE

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

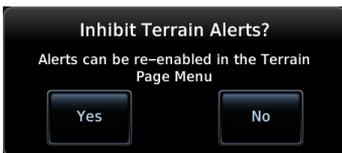


Inhibit Mode  
Annunciation

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

Runway surface and minimum length settings impact the terrain alerting criteria when considering potential runways.

INHIBITS	FUNCTION
<b>INHIBIT</b>	Manually inhibits FLTA or PDA visual alerts for low altitude approaches.
<b>AUTOMATIC INHIBIT</b>	Automatically inhibits 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 off approach end or between each runway end</li> </ul>



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

## 5.19.4 FLTA & PDA Alerts

### Terrain Alert Types

- Textual annunciations at the bottom of the screen
- Color-coded graphics on Terrain page and Map
- Pop-up window when another page is active



Terrain Pop-up



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 GPS position</li> <li>• Degraded GPS signal</li> <li>• Aircraft is outside of the terrain database regional coverage</li> </ul>

ANNUNCIATION	ALERT TYPE   POP-UP   CONDITION
<b>TERRAIN</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 Required Terrain Clearance</li> <li>• Imminent Terrain Impact</li> <li>• Premature Descent</li> </ul>
<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

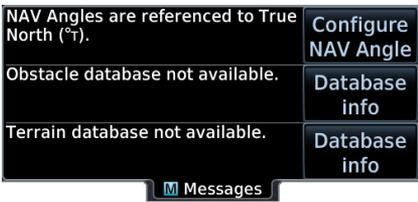
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## ADVISORY MESSAGES

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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.

ADVISORY	CONDITION	CORRECTIVE ACTION
Changes to active route are disabled.	Unit receives a flight plan from G3X Touch, but the External FPL Crossfill function is off.	Enable the External FPL Crossfill function. Home > <b>System</b> > <b>Setup</b> > <b>External FPL Crossfill</b> .
GDU disconnected. External flight plan crossfill inoperative.	Communication with the G3X Touch is lost.	Verify that the GDU is on. Contact dealer for service.

## 6.5 GPS/WAAS Advisories

ADVISORY	CONDITION	CORRECTIVE ACTION
<Unit> 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. <b>NOTE:</b> This advisory is not provided when interfaced to a composite type CDI.	Set the CDI/HSI selected course to the current desired track.
Holding EFC time has expired.	It is past the specified Expected Further Clearance time for the user-defined hold.	No action necessary. Consider contacting ATC as appropriate.
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.
Non-WGS84 Waypoint. See pilot's guide. Location may be different than where surveyed for <WPT>.	The active waypoint does not reference the WGS84 datum.	No action necessary. For more information, read "Points About Non-WGS84 Waypoints" in this section.

## Points About Non-WGS84 Waypoints

- There are several types of geodetic datums that a waypoint can reference.
- TSO-C146 requires that all waypoints reference the WGS84 datum, but allows for navigation to coordinates not compliant with this standard as long as the pilot is notified of the potential difference in location.
- Not all waypoints in the navigation database reference the WGS84 datum. For some of these coordinates the reference datum is unknown. In such cases, the “Non-WGS84 Waypoint” advisory displays.
- Garmin cannot determine the exact proximity of a non-compliant waypoint to the WGS84 datum in use by the system. Typically, the distance is < 2 nm.
- Most non-WGS84 waypoints are outside of the United States.

## 6.7 Pilot Specified Advisories

These advisories display when the associated timer expires or reaches a preset value. They are informational only. No action is necessary.

ADVISORY	CONDITION	CORRECTIVE ACTION
SCHEDULED MESSAGE - <Text>.	The custom message timer expired.	Acknowledge message. <b>Edit Message</b> key provides direct access to scheduled message options.
Timer has expired.	The generic timer is past its preset value.	Acknowledge message. <b>Timers</b> key provides direct access to the generic clock/timer function.

## 6.8 System Hardware Advisories

ADVISORY	CONDITION	CORRECTIVE ACTION
<Unit> knob-push stuck.	Dual concentric inner knob is stuck.	<ol style="list-style-type: none"> <li>1. Push the inner knob again. If it remains stuck, use the corresponding touchscreen controls.</li> <li>2. Contact dealer if the problem persists.</li> </ol>
<Unit> cooling fan failed.	<ul style="list-style-type: none"> <li>• Unit detects a cooling fan fault.</li> <li>• Coloration may be incorrect.</li> <li>• Backlight may dim to reduce power and heat.</li> </ul>	Extended operation at high temperatures is not recommended as damage to the unit may occur. Contact dealer for service.
<Unit> 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.
<Unit> 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.	<p>An error occurred in the pilot stored data. The following user settings may be lost.</p> <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.
Remote Go Around key is stuck.	System detects the remote go around key/switch depressed for at least 30 seconds. It will now ignore this input.	Press the key/switch again. If it remains stuck, contact dealer for service.

ADVISORY	CONDITION	CORRECTIVE ACTION
Transponder 1/2 overtemp.	GTX 345 1/2 reports that its internal temperature exceeds the over temperature threshold (GPS 175 only).	Decrease cabin temperature and increase cabin airflow near the transponder. If the problem persists, contact dealer for service.
Transponder 1/2 under temp.	GTX 345 1/2 reports that its internal temperature is below the normal operating threshold (GPS 175 only).	If the problem persists, contact dealer for service.
<Unit> needs service.	<p>Loss of calibration data. GPS175 cannot communicate with its configuration module or other hardware.</p> <p>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>	Contact dealer for service.
<Unit> SD card is invalid or failed.	The SD card is unreadable or corrupt (i.e., data is unavailable).	<ol style="list-style-type: none"> <li>1. Reformat the SD card using an external computer.</li> <li>2. Re-insert the SD card in the slot.</li> <li>3. Contact dealer if the problem persists.</li> </ol>
	User ejects Flight Stream 510 wireless datacard. Network connection is lost.	Restart unit to reconnect.

ADVISORY	CONDITION	CORRECTIVE ACTION
<Name> log encountered an error when exporting.	Export failure. May occur for WAAS or traffic logs.	<ol style="list-style-type: none"> <li>1. Reformat the SD card using an external computer.</li> <li>2. Re-insert the SD card in the slot.</li> <li>3. Contact dealer if the problem persists.</li> </ol>
<Name> log has exported successfully.	Export to SD card successful. May occur for WAAS or traffic logs.	No action necessary.
Heading source inoperative or connection lost.	<Unit> is not receiving heading information from any source. Heading up map orientation not available.	Contact dealer for service.
Pressure altitude source inoperative or connection lost.	<Unit> 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.	For GNX 375, or GPS 175 configured to receive ADS-B In data from GTX 345: Transponder loses communication with the pressure altitude source.	Contact dealer for service.

ADVISORY	CONDITION	CORRECTIVE ACTION
Transponder has failed.	For GNX 375, or GPS 175 configured to receive ADS-B In data from GTX 345: 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.	For GNX 375, or GPS 175 configured to receive ADS-B In data from GTX 345: Transponder is being forced airborne for ground test.	Cycle power to the GNX 375 once ground test completes.
ADS-B is not transmitting position.	For GNX 375: Transponder is not receiving a valid GPS position.	If the problem persists, contact dealer for service.
<Unit> demo mode.	The unit is in demo mode. Do not use for navigation.	Power cycle the unit to exit demo mode.

## 6.9 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> .

## 6.10 Traffic System Advisories

### 6.10.1 Traffic Advisories, GPS 175

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 Out fault. Check transponder is in correct mode.	GDL 88 reports a control panel input failure.	Verify transponder is in the correct mode. Contact dealer if message persists.
ADS-B failure. Unable to transmit ADS-B messages.	GDL 88 is unable to transmit ADS-B messages due to a failure occurring with one of the following: <ul style="list-style-type: none"> <li>• GPS position</li> <li>• ICAO address verification</li> <li>• UAT transmitter</li> <li>• UAT broadcast</li> <li>• Bottom antenna</li> <li>• Bottom and top antenna (GDL 88D only)</li> </ul>	Service required. Contact dealer for support.
ADS-B fault. GDL 88 needs service.	ADS-B LRU reports one of the following conditions. <ul style="list-style-type: none"> <li>• Low battery</li> <li>• Fan fault</li> <li>• GDL 88D fault with only one antenna operational</li> </ul>	
ADS-B traffic alerting function inoperative.	ADS-B LRU reports a CSA or TSAA/ATAS failure.	

ADVISORY	CONDITION	CORRECTIVE ACTION
ADS-B traffic function inoperative.	ADS-B LRU reports a failure with the ADS-B Traffic input.	Service required. Contact dealer for support.
Traffic/FIS-B functions inoperative.	ADS-B LRU reports a critical fault and is inoperative.	
	Communication with the ADS-B LRU is lost.	
UAT traffic/FIS-B receiver fault.	ADS-B LRU unable to receive UAT traffic and FIS-B data.	
GDL 88 configuration module needs service.	GDL 88 cannot communicate with its configuration module.	

## 6.10.2 Traffic Advisories, GNX 375

ADVISORY	CONDITION	CORRECTIVE ACTION
1090ES traffic receiver fault.	Unit is unable to receive 1090 Extended Squitter traffic.	Service required. Contact dealer for support.
ADS-B traffic alerting function inoperative.	TSAA application reports it is unavailable to run.	
ADS-B traffic function inoperative.	Unit reports a failure with the ADS-B Traffic input. Possible causes: <ul style="list-style-type: none"> <li>• ADS-B/ADS-RTIS-B input fault</li> <li>• ADS-B In electrical fault</li> <li>• All installed traffic applications report as "Unavailable to Run" or "Unavailable - Fault"</li> </ul>	
Traffic/FIS-B functions inoperative.	ADS-B In configuration data fault (configuration parameters are invalid)	
UAT traffic/FIS-B receiver fault.	Unit unable to receive UAT traffic and FIS-B data.	

## 6.11 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.

## 6.12 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

- Checklist 1 contains the tasks required to qualify a glove.
- Checklist 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 each checklist, tapping the specified keys 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 column. 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

## CHECKLIST 1 REQUIRED TASKS

TASK	OPERATION WITH GLOVE (CIRCLE ONE)	
Starting from the Home page:		
<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

**CHECKLIST 2  
NON-REQUIRED TASKS**

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
AR	Approval Required
ASOS	Automated Service Observing System
ATAS	ADS-B Traffic Advisory 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
- FPL Flight Plan
- 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

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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
RF	Radius to Fix
RLC	Reduced Line Clearance
RNAV	Area Navigation
RNP	Required Navigation Performance
ROC	Reduced Required Obstacle Clearance
RTC	Reduced Required Terrain Clearance

**S**

SAT	Static Air Temperature
SBAS	Satellite-Based Augmentation System
SBX	Surveillance and Broadcast Services
SD	Secure Datacard
SSID	Service Set Identifier
STAR	Standard Terminal Arrival
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
TCH	Threshold Crossing Height
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
WPT	Waypoint

### X

XPDR	Transponder
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