



GTN Xi Series

Software v20.40

Upgrade Supplement

This supplement contains revised pages from *GTN Xi Series Pilot's Guide*, P/N 190-02327-03, Rev. F. These pages contain new and significant information regarding the features of software v20.40 as well as changes in terminology and additional information to clarify unit operation.

Black bars adjacent to revised information correspond to changes described in the revision summary table.

Features and screen images are dependent upon the installed software version and its configuration. For more information regarding feature availability, refer to the pilot's guide.

An electronic version of the pilot's guide is available for viewing on your computer or portable device. Go to garmin.com/manuals.

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INFORMATION & SUPPORT

For information regarding the [Aviation Limited Warranty](#), refer to Garmin's website.

For aviation product support, visit flyGarmin.com.

Overview

GTN Xi Series Main software v20.40 provides the following significant features:

GWX 8000 Weather Radar Support

GTN Xi Series navigators now support GWX 8000 weather radars. Additional features include:

- Predictive hail and lightning depictions
- Symbols denoting regions of severe turbulence
- Ability to enable modes and features for all configured GTN Xi and/or GDU TXi units via display groups
- Automatic radar mode option

Learn more about GWX 8000 integration in section 5, *Hazard Awareness*.

Baro-corrected Vertical Deviation Data via Selected Side TXi PFD

For dual TXi PFD installations configured with Selected Side enabled, GTN Xi improves data transfer prioritization for output to a Garmin transponder, sourcing data from the selected side PFD as required to provide Enhanced Surveillance and accurate VNAV guidance.

Learn more about Selected Side functionality and transponder data priority in section 3, *Navigation*.

Common Point & Deferred Runway Selection Options

You can now choose the common point as the transition point for departures and arrivals. An added No Runway option allows you to defer the runway selection for runway dependent arrivals.

Learn more about loading common point procedures and deferring runway selection in section 3, *Navigation*.

Optional Flight Plan Auto Scrolling

A new setup option allows you to enable or disable the auto-scrolling function of the flight plan display. When enabled, the flight plan automatically scrolls to the active leg after 10 seconds of inactivity. The flight plan remains at the last scrolled location when you disable the function.

Learn more about the flight plan auto scroll option in section 3, *Navigation*.

Filtering Options for ARTCC Frequencies

New filtering options allow you to monitor ARTCC frequencies at varying altitudes. An indication on the nearest ARTCC page shows the active filter state (high or low altitude).

Select the Auto option to automatically switch between high and low altitudes based on aircraft altitude.

Learn more about ARTCC frequency filtering options in section 3, *Navigation*.

Calm Wind Notifications on Map

“Wind Calm” annunciates in place of the Wind map user field when calculated winds are less than or equal to 2.5 kts.

Learn more about Wind map data in section 3, *Navigation*.

Change List

GTN Xi Series Pilot's Guide, P/N 190-02327-03, Rev. F contains the following significant changes.

REV E PAGE	REV F PAGE	DESCRIPTION
General Edit		
--	--	Changed all instances of "internal standby queue" to "internal Standby storage" throughout.
--	--	Added alert annunciation color throughout.
Front Matter		
xii	xii	Added <i>GTN Xi Series Pilot's Guide Addendum for GDL 60</i> to list of reference manuals.
		Updated list of reference websites to include: <ul style="list-style-type: none"> • Address to Garmin Aviation Weather Radar 2.0 eLearning Course • Scannable QR codes for all listed websites
Section 1 - System at a Glance		
1-11	1-11	Added optional method for closing slide over menus (i.e., tapping the underlying page).
Section 2 - Get Started		
2-8	2-8	Revised feature limitation to clarify that self-test page availability is dependent upon dealer-installed configuration.
		Rewrote section introduction to clarify instrument panel self-test functionality and applicable external equipment (Non-Garmin EHSI, mechanical HIS/CDI).
2-16	2-16	Added information about database transfer process completion and system restart requirement. Includes updated image of splash page with new "Remain on ground to complete update process" caution message.

REV E PAGE	REV F PAGE	DESCRIPTION
2-22	2-22	Revised first bullet of feature requirements to clarify that avionics must be powered on.
		Added active Garmin Pilot subscription as requirement for enabling Database Concierge.
		Added reference to <i>GTN Xi Series Addendum for GDL 60</i> for GTN Xi installations with GDL 60 Wi-Fi/LTE Datalink.
2-23	2-23	Updated image of Database Concierge transfer screen to show new “Remain on ground to complete update process” caution message.
		Rewrote paragraph to clarify that updates are intended to occur while the aircraft is on-ground.
2-24	2-24	Rewrote fourth bullet of “Database SYNC Transfer Functions” list to clarify when the system prompts a unit restart.
		Rewrote note 1 to include reference to “Database SYNC Compatibility” segment.
	2-25	Added “Database SYNC Compatibility” segment.
2-27	2-28	Added sixth bullet to list of status message conditions in “Synchronized Database List” segment regarding data transfer completion.
2-29	2-30	Added “Chart Database Mismatches” subheading and guidance on how to display details about mismatched databases.
		Added reference to “Database Conflicts” section.

REV E PAGE	REV F PAGE	DESCRIPTION
2-38	2-39	Updated image of System - Setup COM/NAV page in "COM Radio Setup" section. Includes addition of feature callout 2 "Remote Radio Controls."
	2-40	Added "COM Setup Options" segment heading.
		Added information about remote radio tuning indications feature. Includes: <ul style="list-style-type: none"> • Addition of Tuning Indications feature to list of setup options • Addition of fifth bullet regarding remote radio tuning indications Applied note 1 regarding applicability to dual GTN Xi installations to each entry.
2-40	2-42	Added feature limitations regarding availability of the following remote unit radio options. <ul style="list-style-type: none"> • Remote Radio Control (GTN Xi software v20.10 and later) • Tuning Indications (GTN Xi software v20.40 and later)
		Added "Set Knob Function for Remote Radio Control" segment title.
		Rewrote Local and Local & Remote descriptions to clarify knob tuning functionality for each Knob Control Radios setup option.
	2-43	Added "Set Display of Remote Radio Frequency" segment.
2-48	2-51	Added GTN Xi software requirement for Remote Radio Control feature (GTN Xi software v20.10 or later).
		Revised second sentence of introduction to specify "Knob Control Radios setup option."
2-49	2-52	Updated images of Radios page and frequency control key to show cyan selected frequency indication.
2-78	2-81	Added HTAWS/HTerrain voice alerts to list of system audio pilot settings. Applied note 1 regarding feature availability.

REV E PAGE	REV F PAGE	DESCRIPTION
2-90	2-93	Changed section title to "HTAWS/HTerrain Voice Alert Options."
		Revised feature requirement to state "HTAWS or HTerrain alerting."
		Changed all instances of "HTAWS" to "HTAWS/HTerrain."
		Updated voice callouts selection steps to include new Altitude Callouts key.
		Changed topic title to "Configurable Voice Callout Availability" and updated altitude information.
2-93	2-96	<p>Updated list of crossfilled data in "GTN to GTN Data" section as follows:</p> <ul style="list-style-type: none"> • Changed first bullet of "Alerts" information list to "Alert pop-up acknowledgment." • Added "COM Channel Spacing" to "System Setup" information list. • Added "Pilot Data" information list.
2-97	2-99	Revised introduction to "Pop-up Alerts" section. Includes reference to "Pop-up Alert Display Setting" segment.
2-98	2-102	Added "Pop-up Alert Display Setting" segment.
2-106	2-111	Added software requirement for database system ID logging (GTN Xi software v20.40 or later) and made minor edits.
		Added "Database System ID Log Functions" list.
2-111	2-116	Updated image of flyGarmin.com navigation tabs.
2-112	2-117	Updated image of flyGarmin.com website within "Data Logging with Flight Stream 510" diagram.

REV E PAGE	REV F PAGE	DESCRIPTION
Section 3 - Navigation		
3-42	3-42	Revised second sentence in “Wind User Field” topic to specify true airspeed as the wind data display threshold.
		Added information about “Wind Calm” annunciation to “Wind User Field” topic. Includes image of annunciation on Map.
		Revised note 5 to state: “Tuned VOR shows bearing and distance to waypoint.”
3-71	3-71	Made minor edits.
3-73	3-73	Added high/low altitude filter indication to list of Nearest Air Route Traffic Control Center waypoint information. Added and applied note 1 regarding software applicability (GTN Xi software v20.40 and later).
	3-74	Added “ARTCC Filter” segment.
3-74	3-76	Added “Auto Scroll” segment.
3-75	3-77	Added information about potential discrepancies in active flight plan information and indications between GTN Xi and non-GTN Xi Garmin navigators.
3-82	3-84	Reformatted information about VS Target and FPA availability.
		Added information about the display of baro-corrected altitude data in dual PFD installations with Selected Side enabled. Includes information about data priority for installations equipped with a Garmin transponder.
3-88	3-91	Revised first bullet of Temperature Compensated Altitude feature requirements to specify the active flight plan must contain an approach.
		Added information about temperature compensated approach plate altitude restrictions to “Setting Temperature Compensated Altitude” and “Activate Temperature Compensated Altitude” segments.
		Added pilot's note regarding deactivation and reactivation of temperature compensated altitude.

REV E PAGE	REV F PAGE	DESCRIPTION
3-90	3-93	Added third bullet about applicable phases of flight to "Points About Dead Reckoning" topic.
3-99	3-102	Added information to "Along Track Offsets" section regarding new option to keep applicable ATKs through departure or arrival procedure changes. Includes note 1 regarding ATK behavior in GTN Xi software earlier than v20.40.
		Made minor edits for clarity.
3-123	3-127	Added "Common Point Procedures" segment.
3-127	3-131	Added feature limitation regarding the availability of deferred runway selection for SIDs.
		Added and applied note 1 to step 4 regarding new ability to select the common point as the transition point for departures (GTN Xi software v20.40 and later).
		Added and applied note 2 to step 5 regarding differences in the display of parallel runways between GTN Xi software v20.40 and earlier software versions.
3-128	3-133	Added fifth bullet to "Loading an Arrival into Flight Plan" inset regarding runway selection.
		Added and applied note 1 to step 4 regarding new ability to select the common point as the transition point for arrivals (GTN Xi software v20.40 and later).
		Rewrote step 5 to include new NO RWY (deferred runway selection) option.
		Made minor edits.
	3-134	Added "No Runway Option" segment.
Section 4 - Planning		
--	--	Changed all instances of "statistics" to "calculations" or "data" throughout.
4-9	4-9	Changed section title to "Trip Data."
4-10	4-10	Changed segment title to "Compute Trip Data."
4-13	4-13	Changed section title to "Fuel Data."

REV E PAGE	REV F PAGE	DESCRIPTION
4-14	4-14	Changed segment title to "Compute Fuel Data."
4-17	4-17	Changed section title to "DALT/TAS/Wind Calculations."
		Added information about true airspeed calculations to "DALT/TAS/Wind Calculations" section.
Section 5 - Hazard Awareness		
5-38	5-38	Added address to the FAA's Automatic Dependent Surveillance-Broadcast (ADS-B) website.
		Made minor edits.
5-50	5-50	Clarified Stormscope symbol definitions to indicate time since last lightning strike.
5-54	5-54	Updated image of weather radar display to reflect GWX 8000 features. Includes addition of the following feature callouts: <ul style="list-style-type: none"> • 4 "Heading Indication" • 5 "Selected Display Group Indication"
5-56	5-56	Added the following GWX 8000 features to the list of weather radar menu options: <ul style="list-style-type: none"> • Display Group • Hail Prediction • Lightning Prediction
		Added and applied note 4 regarding feature availability to Display Group, Hail Prediction, and Lightning Prediction menu options.
		Added and applied note 5 regarding feature availability during automatic mode to Hail Prediction and Lightning Prediction menu options.
		Revised second paragraph of "Weather Radar Setup" section introduction to include Display Group.

REV E PAGE	REV F PAGE	DESCRIPTION
5-57	5-57	Added GWX 8000 to list of applicable radars for "Ground Clutter Suppression" segment.
		Added feature limitation regarding availability of advanced ground clutter suppression functions with GWX 8000.
		Added information about ground clutter inoperative annunciation. Includes screen depiction.
		Added "Enhanced Ground Clutter Suppression with GWX 8000" topic.
	5-58	Changed "GWX 80" entry in sector scan increments table to "GWX 8000."
		Added feature limitation regarding manual control availability to "Stabilization" segment.
5-58	5-59	Added GWX 8000 to list of applicable radars for "Turbulence Detection" segment.
		Added information regarding turbulence detection on GWX 8000 radar displays. Includes screen depictions of turbulent regions on indications on the GWX 8000 radar display.
		Made minor edits.
5-59	5-61	Revised first sentence of "WATCH" segment introduction for clarity.
		Updated images of radar display to show WATCH on/off status with GWX 8000.
		Changed "red bands" to "multicolored bands" in weather messages feature description.
	5-62	Added "Predictive Hail & Lightning" segment to "Weather Radar Setup" section.
5-64	Added "Display Groups" segment to "Weather Radar Setup" section.	
5-60	5-65	Updated warning to indicate a radar transmission safety distance of 16 feet.
		Updated image of radar display to show standby mode with GWX 8000.

REV E PAGE	REV F PAGE	DESCRIPTION
5-61	5-66	Updated images of radar display to show test and ground modes with GWX 8000.
		Updated GWX radar intensity values for ground map mode colors.
5-62	5-67	Added "GWX 8000" to weather mode color table heading.
		Made minor edits to image captions and table notes.
	5-68	Added "Automatic" segment to "Radar Modes" section.
5-63	5-70	Added "Automatic" to list of weather radar page control options. Added and applied note 2 to indicate radar applicability (GWX 8000 only).
		Added information about GWX 8000 to "Radar Controls" section introduction.
		Made minor edits.
5-65	5-72	Updated image of radar display to show vertical scan with GWX 8000.
5-66	5-73	Updated image of radar display to show horizontal scan with GWX 8000.
5-67	5-74	Updated image of radar display to show radar alert indications with GWX 8000.
		Added pilot's note regarding the absence of the weather radar overlay on Map when heading input is lost.
5-68	5-75	Made minor edits to "Alerts Annunciations" table in "Radar Alerts" section.
5-93	5-101	Added "Traffic Page Orientation" segment (rotorcraft only) to "ADS-B" section.
5-94	5-102	Changed "Voice Message" table heading to "Aural Message" for consistency with other alerts tables.
5-96	5-104	For ease of use, the "Terrain Awareness" section has been included in its entirety.

REV E PAGE	REV F PAGE	DESCRIPTION
5-100	5-108	Added ALT Callouts feature to list of terrain setup menu options (HTerrain Alerting, HTAWS, and TAWS-A only).
		Added and applied note 2 regarding ALT Callouts (H)Terrain Alerting menu option regarding applicability to HTerrain only.
		Added and applied note 4 regarding applicability to TAWS-A and HTAWS only to ALT Callouts (H)TAWS menu option.
		Added and applied note 5 regarding software applicability (GTN Xi software v20.40 and later) to ALT Callouts (H)Terrain Alerting and (H)TAWS menu options.
5-101	5-109	Added ALT Callouts feature definition to "Terrain Setup Selections" table (applicable to HTAWS, HTerrain Alerting, and TAWS-A only).
		Added and applied note 1 regarding GTN Xi software applicability to ALT Callouts HTAWS, (H)Terrain Alerting, and TAWS-A menu options.
		Added and applied note 2 regarding availability with HTAWS and HTerrain only to ALT Callouts HTAWS and (H)Terrain Alerting menu option.
5-102	5-110	Added "Terrain & Obstacle Depictions" section title.
5-105	5-113	Added information identifying Imminent Impact and Reduced Clearance alerts as functions of Forward Looking Terrain Avoidance (FLTA).
5-106	5-114	Added "FLTA" side table heading for Imminent Impact and Reduced Clearance alert types.
		Changed Negative Climb Rate distance from departure airport value to 5 NM. Made minor edits.
5-107	5-115	Added "FLTA Search Volume - Required Terrain Clearance" diagram.
	5-116	Updated "EDR Thresholds" diagram to include applicable caution and warning annunciations. Added "fpm" units to "Descent Rate" label.

REV E PAGE	REV F PAGE	DESCRIPTION
5-108	5-117	Updated "PDA Threshold" diagram to include applicable caution annunciation.
5-109	5-118	Updated "NCR Threshold" diagrams to include applicable caution annunciations.
5-110	5-119	Added captions to "Excessive Closure Rate Alert" diagrams denoting height above terrain (vertical axis) and terrain closure rate (horizontal axis). Added "fpm" units to "Terrain Closure Rate" label.
5-112	5-121	Updated "Overriding Flaps-based Fit Alerting" diagram to include "Caution" label.
5-113	5-122	Updated "Excessive Below Glideslope/Glidepath Deviation Alert" diagram to include "Caution" label.
5-118	5-123	Changed section title to "Alert Inhibit."
5-102	5-124	Relocated "Terrain Proximity" section.
5-115	5-125	Added "Terrain Alerts" section heading.
		Changed table heading to "Terrain Alerting Indications" and made minor table edits.
5-117	5-127	Added "Terrain System Status Indications" table heading.
		Reorganized alerts for consistency with other similar tables and made minor table edits.
5-120	5-129	Changed table heading to "TAWS-B Alert Indications."
		Added pop-up alert indications to "TAWS-B Alert Indications" table.
5-122	5-131	Revised description in "Altitude Voice Call Out Alerts" segment to indicate that the GPS determines advisory alert altitudes.
	5-132	Re-organized segment topics for consistency with layout of other similar sections.
		Added "TAWS-B System Status Indications" table heading. Made minor edits.
5-123	5-133	Updated image of TAWS-A setup menu to show ALT Callouts option.

REV E PAGE	REV F PAGE	DESCRIPTION
5-132	5-134	Relocated the following segments to “TAWS-A Setup Selections” section. Includes multiple edits for clarity. <ul style="list-style-type: none"> • “Enable Flap Override” • “Inhibit Glideslope/Glidepath Deviation Alerts (GSD)” • “Inhibit GPWS Alerts (EDR, ECR, FIT, and NCR” • “Altitude Voice Call Out Alerts”
		Added image depicting Flap Override annunciation.
5-133	5-135	Added image depicting G/S Inhibit annunciation.
	5-136	Updated image depicting GPWS Inhibit annunciation and made minor edits.
5-134	5-137	Added information about new pilot configurable voice call out alerts to “Altitude Voice Call Out Alerts” segment. Includes image depicting Altitude Voice Callouts menu.
5-124	5-138	Changed table heading to “TAWS-A Alert Indications.”
		Added applicable alert type and alert abbreviations to condition descriptions.
5-129	5-140	Applied note 1 to Glideslope Deviation (GSD) alert condition.
5-132	5-141	Added pilot configurable VCOs to list of Altitude Voice Call Out aural messages.
	5-142	Added image depicting TAWS-A self-test on the terrain display.
		Added pilot's note regarding the manual TAWS-A system self-test function. Includes reference to “Terrain Setup” section.
Added “TAWS-A System Status Indications” table. Made minor edits to status alert condition descriptions.		
5-135	5-145	Changed section title to “HTAWS/HTerrain Alerting.” Changed all instances of “HTAWS” to “HTAWS/HTerrain” throughout section.
		Added “Rotorcraft Only” section marker and symbol.
		Made minor edits to section introduction.

REV E PAGE	REV F PAGE	DESCRIPTION
5-136	5-146	Changed section title to “HTAWS/HTerrain Setup Selections.”
		Added HTerrain Inhibit annunciation text (“TER INHB”) to HTAWS/HTerrain Inhibit function description.
		Added “ALT Callouts” feature definition to “HTAWS/HTerrain Setup Selections” table. Added and applied note 1 regarding feature availability (GTN Xi software v20.40 and later).
		Made minor edits.
5-137	5-147	Revised “HTAWS/HTerrain Alerts” section introduction for clarity.
	5-148	Changed segment title to “HTAWS/HTerrain Voice Call Out Alerts.” Added information regarding pilot configurable VCO alert options. Includes limitation regarding feature availability (GTN Xi software v20.40 and later).
		Changed segment title to “HTAWS/HTerrain Alert Response” and made minor edits.
5-139	5-149	Changed table heading to “HTAWS/HTerrain Alert Indications” and made minor edits.

REV E PAGE	REV F PAGE	DESCRIPTION
5-140	5-150	Added new information about altitude voice callouts, including available altitude values when connected to a radar altimeter.
	5-151	Added "HTAWS/HTerrain System Status" segment.
		Re-organized segment topics for consistency with layout of other similar sections.
		Made minor edits to section introduction.
		Added test result and aural message text for HTerrain Alerting to table.
		Added information to pilot's note regarding manual system test option. Includes reference to "HTAWS/HTerrain Setup Selections" section.
		Added HTerrain alert annunciation and aural message text to "HTAWS/HTerrain Failure Alert" segment. Made minor edits.
Added HTerrain alert annunciation text to "HTAWS/HTerrain Not Available Alert" segment.		
5-139	5-152	Added "HTAWS/HTerrain System Status Indications" table.
Section 6 - Abnormal Operations		
6-10	6-10	Updated image of Smart Glide caution alert annunciation banner.
6-11	6-11	Made minor edits.
6-23	6-23	Made minor edits to "Smart Glide Alerting" table.
6-27	6-26	Made minor edits to "System Failure Alerts" table.
Section 8 - Messages		
8-9	8-9	Added "Select Arrival Runway" message and corrective action to list of flight plan advisories.

REV E PAGE	REV F PAGE	DESCRIPTION
Section 11 - Glossary		
11-4	11-4	Added Garmin Weather Radar (GWX) to glossary of terms.
11-7	11-7	Added Standard Instrument Departure (SID) to glossary of terms.
11-9	11-9	Added Voice Call Out (VCO) to glossary of terms.

Reference Manuals

DOCUMENT	P/N
<i>G500(H)/G600/G700 TXi Pilot's Guide</i>	190-01717-10
<i>GDL 69/69A SiriusXM Satellite Radio Activation Instructions</i>	190-00355-04
<i>GDL 84/88 ADS-B Transceiver Pilot's Guide</i>	190-01122-03
<i>GTN Xi Series Pilot's Guide Addendum for GDL 60</i>	190-02327-A0
<i>GTX 335/345 All-In-One ADS-B Transponder Pilot's Guide</i>	190-01499-00
<i>Telligence Voice Command Guide</i>	190-01007-50

Reference Websites

WEBSITE	QR CODE (SCAN/GO)
ADS-B Academy https://www.garmin.com/en-US/aviation/adsb/	
Aviation Limited Warranty https://www.garmin.com/en-US/legal/aviation-limited-warranty	
Connex http://www.garmin.com/connex	
Database Concierge Go to http://www.flygarmin.com/support and select Database Management.	
FAA Dynamic Regulatory System https://drs.faa.gov	
Garmin Aviation Weather Radar 2.0 eLearning Course https://buy.garmin.com/en-US/US/p/pn/AVNE-GMWXOP-A1	
GTN Essentials 2.0 eLearning Course https://www.garmin.com/en-US/p/pn/AVNE-GM765P-B1	

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.

POP-UP MENU



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

Default or Current Setting

SLIDE OVER MENUS

These menus slide out from the bottom or sides of the display when an object or menu item is selected on the underlying page.



Underlying Page Hidden

Tapping the underlying page closes the menu.

LISTS

Scrollable lists group control keys related to a single function (e.g., selectable range options). Toggle keys either enable or disable list items.



Scroll Bar

In some cases, **Settings** or **Range** keys provide access to selectable setting options.

When scrolling, all keys in the list are inactive.

Instrument Panel Self-Test

FEATURE LIMITATIONS

- *Self-test page availability is dependent upon the dealer-installed configuration*

To ensure proper communication with external equipment, specifically non-Garmin EHSI or mechanical HSI/CDI, a continuous built-in test feature exercises the unit's processor, memory, external inputs, and outputs upon power up.



If configured, the results of all external equipment checks performed by the unit display on the Instrument Panel Self-Test page.

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

Tapping **Continue** advances to the next page.

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

SELECT ALL DATABASES

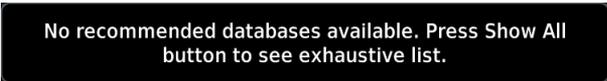


Select individual databases for transfer, or choose **Select All** if all listed databases require updating.

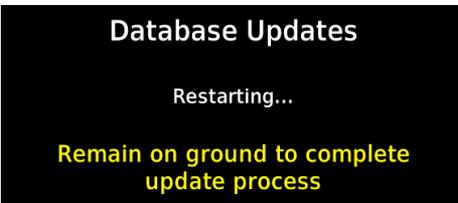


By default, this page displays only the databases recommended for update.

A message notifies you when no such databases are available.



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



Once the transfer process is complete, the unit will automatically restart if the aircraft is still on ground. A system restart is required to complete database installation.

Dual GTN Xi and GTN Xi/GDU TXi Installations

Once database installation is complete, remote confirmation is possible from the primary GTN Xi Series navigator regardless of whether the SD card is present in either the second GTN Xi Series navigator or the GDU TXi unit.¹

¹ GTN Xi software v20.2x and GDU TXi software v3.30: Removal of the SD card from the second GTN Xi Series navigator and/or GDU TXi is required for remote database confirmation.

Transfer Databases Using Database Concierge



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

FEATURE REQUIREMENTS

- *The aircraft is on ground and the avionics are powered on*
- *Garmin Pilot app on a portable electronic device*
- *Active Garmin Pilot subscription (for enabling Database Concierge)*
- *Flight Stream 510 wireless transceiver*

A pilot selects and downloads databases inside the Garmin Pilot app. Transfers occur once the Garmin Connex device establishes a wireless connection inside the aircraft. Prompts to connect to a Wi-Fi network and database transfer indications appear on both Garmin Pilot and GTN Xi.

Database Concierge Transfer Function

- Provides automatic updates for databases with effective dates
- Preloads databases that are not yet effective by placing them in the unit's internal Standby storage
- Displays database type, cycle, effective date, and transfer progress
- Allows you to initiate transfer from the Database Updates page via the **Start** key
- Requires pilot confirmation

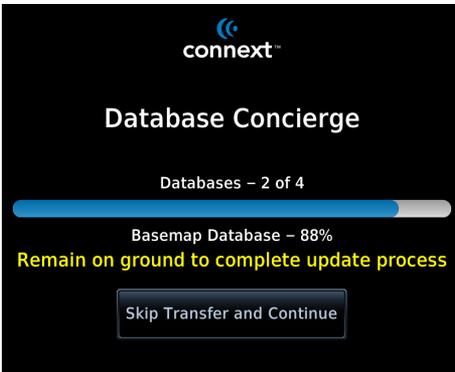
GTN Xi Installations with GDL 60 Wi-Fi/LTE Datalink

For information about transferring databases using Database Concierge, consult *GTN Xi Series Addendum for GDL 60*.

TRANSFER DATABASES VIA FLIGHT STREAM 510



1. Purchase database(s) from flyGarmin.com.
2. Open Garmin Pilot and follow the download instructions.
3. Install wireless transceiver into card slot.
4. Power on the unit.
5. Connect to Wi-Fi.
6. Follow the on-screen prompts.



Database Concierge transfers databases from Garmin Pilot to Flight Stream 510. A progress bar shows when this process is complete.

GTN Xi either updates or preloads databases based on their effective date. A second progress bar indicates upload status.

Once database transfer is complete, the unit prompts a system restart.¹ Updates are intended to occur while the aircraft is on ground.

Skip Database Transfer

Tapping **Skip Transfer and Continue** 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.

¹ Applicable only to GTN Xi software v20.30 and later.

Synchronize Databases Across Multiple Units

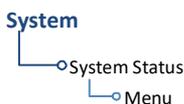


The Database SYNC function minimizes database maintenance by synchronizing active and standby databases across all capable Garmin avionics.

FEATURE REQUIREMENTS

- GTN Xi software v20.30 or later (background updates & coordinated LRU restart)
- Database SYNC function enabled on all participating LRUs

WHERE TO FIND IT



Control for this function resides in the System Status menu.

Home > **System** > **System Status** > **Menu** > **Database SYNC**



A pop-up informs you that enabling Database SYNC may overwrite any databases currently in standby.

Toggling **Database SYNC** off disables the Chart Streaming function (if enabled).

Database SYNC Transfer Function

- Enables automatic database synchronization across all capable Garmin avionics¹
- Background updates allow the use of features without having to wait for individual LRUs to complete the update process²
- Coordinated automatic restart of all capable LRUs to complete installation²
- Prompts unit restart only when you advance beyond the splash page during database transfer²
- Available for all supported databases³
- Includes active and standby databases

¹ For a list of compatible LRUs, read *Database SYNC Compatibility* in this section.

² Applicable only to GTN Xi software v20.30 and later.

³ Terrain database synchronization not available for units with GTN Xi software earlier than v20.30.

Dual GTN Xi Installations

To prevent crossfill errors after installing new databases, be sure to install matching databases on both GTN Xi units and allow Database SYNC to complete before departure.

DATABASE SYNC COMPATIBILITY

GTN Xi provides one-way or two-way database transfers based on software compatibility with the configured LRUs.

- One-way syncing means that GTN Xi can transfer databases to compatible LRUs (it cannot receive database transfers)
- Two-way syncing means that GTN Xi can transfer databases to and from compatible LRUs

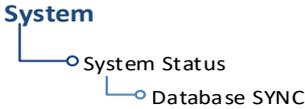
GTN Xi SOFTWARE	SYNC CAPABILITY	COMPATIBLE LRUs
v20.2x and earlier	Two-way	<ul style="list-style-type: none"> • GTN 650/750 v6.30 and later • G500/600 v7.00 and later • GPS 175/GNC 355/GNX 375 v3.10 and later
v20.30 and later	Two-way	<ul style="list-style-type: none"> • G500/600 TXi v3.50 and later • GTN 750/650 v6.73 and later • GI 275 v2.60 and later
	One-way	<ul style="list-style-type: none"> • GTN 650/750 v6.30 through v6.72 • G500/600 v7.00 and later • GPS 175/GNC 355/GNX 375 v3.10 and later

SYNCHRONIZED DATABASE LIST

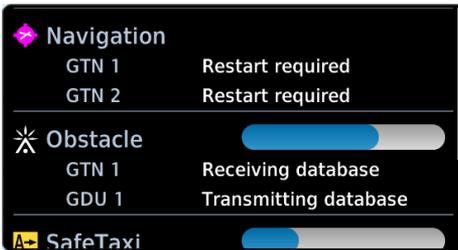
FEATURE LIMITATIONS

- Available only with GTN Xi software v20.30 and later

WHERE TO FIND IT



You can view a list of the databases currently synchronizing with other LRUs from the associated information tab.



A progress bar shows when a database transfer is complete.

Database SYNC inactive

A message informs you when database synchronization is not in progress.

Status messages inform you when:

- The unit is transmitting or receiving databases
- The Database SYNC function is disabled
- The LRU is offline
- A database is not authorized for synchronization
- A unit restart is required
- Database transfer is complete

If a particular LRU is not accepting a database, refer to the Database SYNC tab to determine the possible cause.

CHART STREAMING STATUS ICONS & NOTATIONS

The following indications appear during the update process.



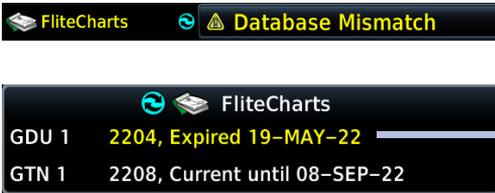
A spinning arrow appears on the Charts Home page icon when a new chart database is streaming.

Getting Newer Charts

Textual announcements at the bottom of the Charts display inform you of update status.

Chart Database Mismatches

Chart database update status annunciates on the start-up page. Spinning arrow icon appears until any mismatches are resolved and synchronization is complete.



Database Mismatch with GDU 1

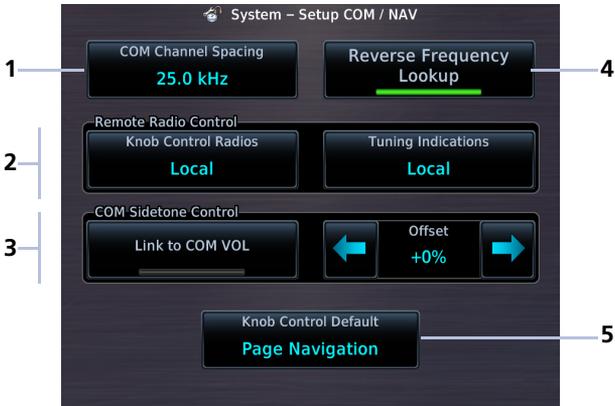
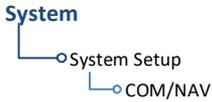
Tapping **Database Mismatch** displays details about mismatched databases and their associated LRUs.

For information about Charts page features, read *Charts* in section 3. For more about database mismatches, read *Database Conflicts* in this section.

COM Radio Setup

WHERE TO FIND IT

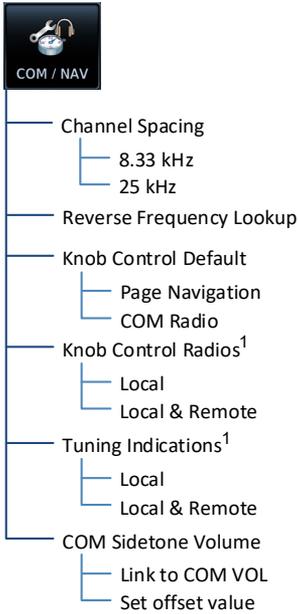
COM radio customization options are accessible via the System Setup app.



1	COM Channel Spacing Key	4	Reverse Frequency Lookup Key
2	Remote Radio Controls ¹	5	Knob Control Default Key
3	COM Sidetone Controls		

¹ Dual GTN Xi installations only.

COM SETUP OPTIONS



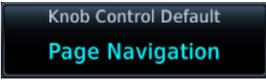
From here you can:

- Set transceiver channel spacing
- Enable reverse frequency look-up functionality
- Select the default knob control function
- Enable remote radio frequency tuning via the control knob¹
- Enable remote radio tuning indications¹
- Adjust sidetone volume offset

¹ Dual GTN Xi installations only.

Revert Knob Function to Radio Control

You may change the default function of the dual concentric knob to accommodate your workflow. Knob control is set to Page Navigation by default.



Tapping **Knob Control Default** changes the default setting to COM Radio for standby frequency control. Page navigation remains accessible via knob push.

From the Home page:

Tap > **System** > **Setup** > **COM/NAV** > **Knob Control Default**.

Default knob function indicators change based on selection.

Page Navigation



COM Radio



Tapping the key again returns the default setting to Page Navigation.

Access Remote Unit Radio Functions

FEATURE LIMITATIONS

- *Knob Control Radios option available for dual GTN Xi installations only*
- *Remote Radio Control option available with GTN Xi software v20.10 and later*
- *Tuning indications option available with GTN Xi software v20.40 and later*

Remote radio frequency tuning is available for dual GTN Xi installations.

SET KNOB FUNCTION FOR REMOTE RADIO CONTROL

The Knob Control Radios option allows you to access remote unit radio functions via the dual concentric control knob.



Tapping **Knob Control Radios** toggles the knob function between two control options.

Local

Limits knob tuning functionality to local unit radios only.

Local & Remote

Sets knob tuning functionality to both local and remote navigators.

SET DISPLAY OF REMOTE RADIO FREQUENCY

The Tuning Indications option allows you to control when the remote unit radio frequency will display in the control bar.



Tapping **Tuning Indications** toggles the remote radio frequency display between two control options.

Local

Limits the display of the remote radio frequency to only when:

- The Radios page is active
- The remote radio is selected via knob and the Knob Control Radios function is set to **Local & Remote**
- The remote radio is deselected via knob when the Radios page is inactive

Local & Remote

Allows the remote radio frequency to display during any of the following:

- The Radios page is active
- The remote radio is selected via knob
- The remote radio is manually tuned from a frequency pop-up

Setting the Tuning Indications option to Local & Remote may be useful in tandem cockpits where the remote GTN Xi unit is out of view or beyond reach.

For information about remote unit radio functions, read *Remote Radio Control* in this section.

Remote Radio Control

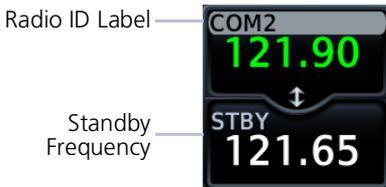
FEATURE REQUIREMENTS

- GTN Xi software v20.10 or later

FEATURE LIMITATIONS

- Dual GTN Xi installations only
- NAV radio options available only on GTN 650Xi/750Xi

Some dual GTN Xi installations allow you to tune radio frequencies on both units from a single navigator. The Knob Control Radios setup option allows you to switch between local control (local navigator only) and remote control (local and remote navigators).



An inverted radio label differentiates COM/NAV 2 from COM/NAV 1.

This label always appears for COM/NAV 2 regardless of whether it is the remote or local radio.



Tapping **STBY** opens the control panel for the indicated radio.

From here you may tune the indicated radio or access controls for all radios by tapping the **Radios** key.



Get Started

Radios are listed according to navigator (local/remote). Cyan denotes the current radio selection. A frequency control key allows you to open the standby control panel for the associated radio.

Tapping **Back** closes the list and returns to the previous view.

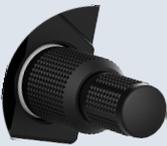
	Radio	Volume	Control	
Local Radios	COM1	40%	128.30 118.00	Selected Radio Indication
	NAV1	41%	117.95 108.00	
Remote Radios	COM2	40%	128.30 118.00	
	NAV2	41%	117.95 108.00	

Turning the volume knob adjusts the volume level for the active radio only.



Changes in radio selection and standby frequency are reflected in the control bar.

Remote Radio Control Knob Access



When remote radio control is active, you may toggle between multiple radios quickly via knob push. Knob focus indications on the control bar and on the Radios page change to reflect the current radio selection.

Available radio options are dependent upon unit type.

- COM only units switch between COM 1 and COM 2
- Units with COM and NAV radios scroll as follows:
local COM > local NAV > remote COM > remote NAV

Direct Tuning from the Radios Page:



Knob tuning adjustments and frequency transfers are reflected in real time on the corresponding control key.

Pilot Settings



Unit customization options are accessible via the System menu. For details about COM/NAV radio settings and Connex Setup options, refer to the respective section.



Setup

- Set CDI scale and capture type
- Specify nearest airport runway criteria
- Set time format & local offset
- Select a new start-up page
- Select a keyboard type
- Enable crossfill functionality
- Access NAV radio settings (GTN 650Xi/750Xi only)
- Access COM radio settings (GTN 635Xi/650Xi/750Xi only)



Alerts

- Set airspace & arrival alerts



Audio

- Adjust click volume
- Select HTAWS/HTerrain voice alerts¹



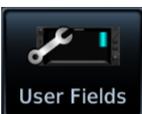
Units

- Set the display units



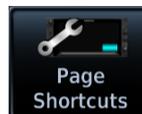
Backlight

- Adjust display brightness



User Fields

- Select user fields¹



Page Shortcuts

- Customize page shortcuts for knob access

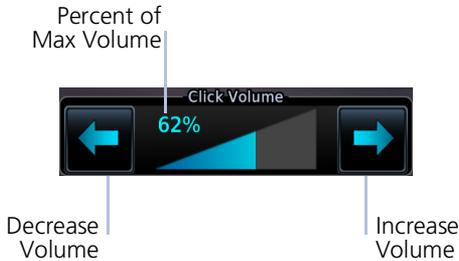
¹ Availability dependent upon unit configuration.

Click Volume



Your GTN Xi is wired for audio output. Set the click volume to the preferred level.

Click Volume Control



Volume displays as a percentage of the maximum volume, with 0% being muted and 100% being maximum volume.

HTAWS/HTerrain Voice Alert Options

FEATURE REQUIREMENTS

- HTAWS or HTerrain alerting

Optional voice callouts may be available for units configured for HTAWS/HTerrain alerting.

From the Home page:

Tap **System** > **Voice Callouts** > **Altitude Callouts**, and select the desired voice callout(s).

Configurable Voice Callout Availability

- From 500 ft down to 100 ft above terrain in 100-foot increments when HTAWS/HTerrain is present and GSL above terrain is used to generate callouts (no radar altimeter necessary)
- From 50 ft down to 10 ft above terrain in 10-foot increments when a radar altimeter is present and supplying the height above terrain to generate callouts

Crossfill

FEATURE REQUIREMENTS

- *Dual GTN or GTN and GNS*

Enable the crossfilling of information between two GTN units or GTN and GNS.

Crossfill Features

- Enabling this function on one GTN automatically enables it on the other.
- Some types of data crossfill regardless of the current setting

GTN to GTN Data

When crossfilling between GTN and GTN Xi, certain annunciations (e.g., turn anticipation) may appear different between navigators.

Alerts:

- Alert pop-up acknowledgment
- Missed approach waypoint popup acknowledgment
- Altitude leg pop-up acknowledgment

External Sensors:

- Synchro heading
- Transponder status and commands

Pilot Data:

- Flight Plan Catalog
- User-defined COM/NAV frequencies
- User waypoints

System Setup:

- Date/Time convention
- Nearest airport criteria
- Units (Nav angle, Fuel, Temperature)
- COM channel spacing
- CDI Scale setting
- ILS CDI Capture setting

Includes active flight plan navigation data if you turn on the crossfill function.

If configured, a system message alerts you when the function is off (i.e., flight plans are not crossfilling).

To enable or disable crossfilling:

Home > **System** > **Setup** > **Crossfill** > **OK**

Alert Annunciations

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

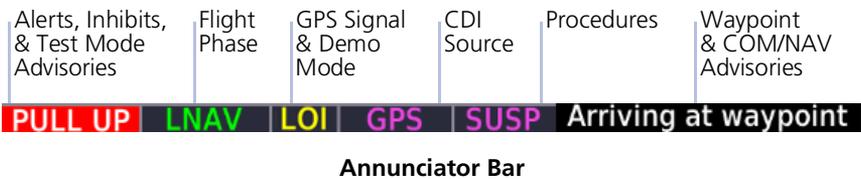
ALERT COLORS
WARNING
CAUTION
ADVISORY

- 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 along the bottom of the screen.



Pop-up Alerts

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

For information on ways to coordinate pop-up alerts on a multiple GTN Xi or GTN Xi/GDU TXi system, read *Pop-up Alert Display Setting*.

POP-UP ALERT DISPLAY SETTING

FEATURE LIMITATIONS

- *Pop-up alert display setting available only with GTN Xi v20.40 and later*

Depending on configuration, pop-up alerts may appear on one pilot display and one copilot display (if present).¹ Display priority is based on the available Garmin LRUs in the cockpit.

1. Pilot/copilot TXi MFD
2. Center TXi MFD
3. Pilot/copilot GTN Xi²

Closing a pop-up window on one display closes it on all configured LRUs.



| You may assign the GTN Xi position (pilot/copilot) for displaying pop-up alerts when the alerted function's associated page is not active.

In dual GTN Xi systems with no TXi MFD:

- Selecting the same Pop-up Priority setting on each GTN Xi unit allows the pop-up alert to display only on GTN Xi 1
- Selecting a different Pop-up Priority setting on each GTN Xi allows the pop-up alert to display on both GTN Xi units

In dual GTN Xi systems with TXi MFD, the Pop-up Priority setting follows the same logic except that the pop-up alert displays on the highest priority LRU.

Pilot is the default Pop-up Priority setting.

To change the pop-up alert display setting:

Home > **System** > **Alerts**, and select the preferred LRU position.

¹ Available only with TXi software v3.60 and later. ² Defined by the Pop-up Priority setting.

Logs



The data logging function is capable of storing approximately 100 hours of flight data in the unit's internal memory. This information is available for export to an SD card for later analysis.

FEATURE REQUIREMENTS

For external data logging:

- SD card

For data streaming:

- A flyGarmin user account
- Garmin Pilot app on a portable electronic device
- Flight Stream 510 wireless transceiver for flight data streaming
- Flight Stream 510 and GDU TXi EIS for engine data streaming

For database system ID logging:

- GTN Xi software v20.40 or later

FEATURE LIMITATIONS

- External data logging stops when the SD card is full

Flight Data Log Functions

- Records log files automatically while the unit is powered up, including various parameters related to aircraft flight instruments
- Overwrites oldest file when the internal log reaches capacity
- Exports to the "logs" folder on the SD card
- Streams logged flight and engine data to Garmin Pilot

WAAS Diagnostic Log Functions

- Records log files automatically while the unit is powered up
- Overwrites oldest file when the internal log reaches capacity
- Exports to the "logs" folder on the SD card

Database System ID Log Functions

- Records System IDs for installed databases
- Exports to the root directory of the SD card

TRANSFER SD CARD DATA TO YOUR ONLINE LOGBOOK

The **Logbook** tab on flyGarmin.com provides functions for creating and viewing multiple logbook entries.

flyGarmin Navigation Tabs

FLYGARMIN

DEALER

DEVICES

SUBSCRIPTIONS

LOGBOOK

TRAINING

To create a logbook:

1. Sign in to your flyGarmin.com account.
2. Select **Logbook > Setup**.
3. Select **Add Aircraft Type**.
4. Provide all necessary aircraft type details, then select **Save Aircraft Type**.
5. Provide all necessary settings and pilot information, then select **Save Settings**.

To upload flight logs to your logbook:

1. Select **Logbook > Entries > Upload Flight Logs**.
2. Select and upload log files according to the onscreen instructions.

Data Logging with Flight Stream 510



The unit automatically streams logged flight and engine data to Garmin Pilot when Flight Stream 510 is present and paired to a supported phone or tablet.



Data logs upload to your flyGarmin user account when your phone or tablet connects to the Internet.



Logged flight and engine data stream to Garmin Pilot.

Your portable device downloads the data upon connecting to Flight Stream 510.



This includes any previous flights not already downloaded.

What happens if I forget to bring my tablet on the flight?

No need to worry. During flight, GTN Xi records log data to the internal storage. The next time you fly with your tablet, the data will stream to Garmin Pilot. This includes all previously recorded flights. The device downloads the data upon connecting to Flight Stream 510.

Data Tab Options:

Available field types and their corresponding labels are as follows:

ACTV WPT	Active waypoint	MSA	Minimum safe altitude
AGL	Above ground level	NAV/COM	Active NAV/COM frequency ^{4, 7}
BRG	Bearing to waypoint	OAT (static)	Outside static air temperature
D/B APT	Distance/bearing from destination airport (i.e., the straight line distance)	OAT (total)	Outside total air temperature
DIS	Distance to waypoint	Position	Current position (lat/lon)
DIS to Dest	Distance to destination (i.e., the distance along the flight plan)	RAD ALT	Height above ground as indicated by the radar altimeter ³
DTK	Desired track	TKE	Track angle error
ESA	En route safe altitude	TRK	Track
ETA	Estimated time of arrival	Time	Current time
ETA at Dest	ETA at destination	Time	Current time with seconds
ETE	Estimated time en route	Time to TOD	Time to top of descent
ETE to Dest	ETE to destination	Trip Timer	Timer display
FLT ID	Flight ID ¹	VOR/LOC	Tuned VOR/LOC information ^{4, 5, 6}
Fuel Flow	Total fuel flow ²	VSR	Vertical speed required
GS	GPS ground speed	Wind	Wind speed and direction ⁸
GSL	GPS Altitude	XTK	Cross track error
Generic Timer	Timer display	OFF	Do not display data field

Wind User Field



Selecting **Wind** displays current wind speed and direction on Map. Wind data display when true airspeed is 30 kts and higher. A white arrow indicates wind direction relative to the map orientation.



“Wind Calm” annunciates in place of wind data when calculated winds are less than or equal to 2.5 kts.

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

¹ Available when a transponder or GDL 88 is present. ² Available when a fuel sensor is present.

³ Available when a radar altimeter is present. ⁴ Label information dependent upon active frequency selection.

⁵ Tuned LOC shows airport and runway. Tuned VOR shows bearing and distance to waypoint.

⁶ GTN 650Xi and GTN 750Xi units only. ⁷ GTN 650Xi only. ⁸ Available only for display on Map.

User Waypoint File Considerations

- Limit one waypoint per row
- Names may be up to six characters in length
- Comments may be up to 25 characters
- All letters must be upper case
- Latitude: two digits left of decimal; up to nine digits right of decimal
- Longitude: three digits left of decimal; up to eight digits right of decimal
- (-) indicates southern latitudes (column C) or western longitudes
- Express latitude and longitude coordinates in decimal degrees

Save the file in the .csv format under the name "user.csv." Change the file extension to ".wpt" before copying the file to a blank SD card.

IMPORT USER WAYPOINTS

1. Ensure that the unit power is off.
2. Insert datacard containing user waypoints.
3. Power on unit.
4. From the Home page, tap **Waypoint Info > Import Waypoints**.
5. Acknowledge the pop-up message.

The import function executes in the background. Once the import is complete, an advisory message informs you of the following:

"User waypoints were imported successfully."

The waypoints are now available for use. You may power down the unit and remove the SD card.

If an imported waypoint is within 0.0001 degree (latitude and longitude) of an existing user waypoint, the existing waypoint and name will remain in use.



Nearest Airspace

- identifier • symbol • proximity



Nearest Air Route Traffic Control Center

- facility name • distance • bearing • frequency
- high/low altitude filter indication¹



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, AWOS, and VOR

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.

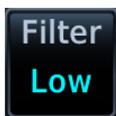
Applicable to functions displaying information only (ARTCC, FSS, and WX FREQ).

¹ Available with GTN Xi software v20.40 and later.

ARTCC FILTER

FEATURE LIMITATIONS

- Available only with GTN Xi software v20.40 and later



Select an altitude filter to display ARTCC frequencies. Tapping **Filter** opens a menu of available filter options.



Low: Show low altitude frequencies only.

High: Show high altitude frequencies only.

All: Show low and high altitude frequencies.

Auto: Switch automatically between high and low based on aircraft altitude.

AUTO SCROLL

FEATURE LIMITATIONS

- *Toggle on/off functionality available only with GTN Xi software v20.40 and later*



When enabled, this function automatically scrolls the flight plan to the active leg after 10 seconds of inactivity. When disabled, the flight plan remains at the last scrolled location. This function is active by default.

You can disable automatic scrolling from the Active Flight Plan menu.

From the Home page:

Tap **Flight Plan** > **Menu** > **Auto Scroll**.

WAYPOINT COLOR

FLIGHT PLAN STATUS	COLOR
Active	Magenta
Past & Future	White
Transition	Gray

A waypoint's color indicates whether it is active, past, future, or a transition.



Transition Waypoints

Certain procedures require a transition waypoint to complete the procedure; however, that waypoint may not be navigable due to the geometry of the procedure. In such cases, the waypoint will be gray to indicate that it is a transition. No special pilot actions are required to navigate these procedures.

GTN Xi Installations with GNS, GPS 175/GNC 355/GNX 375, or GTN

When interfaced with a non-GTN Xi Garmin navigator, differences between the two navigators may result in minor discrepancies in the active flight plan, course depictions, and turn annunciations, even while the Crossfill function is active. In such cases, use GTN Xi as the primary navigator.

If the discrepancy is affecting pilot workload, disable crossfilling and delete the flight plan from the non-GTN Xi navigator.

Define a VNAV Profile



Active vertical navigation profile information displays on the VNAV Profile page. From here you can:

- Enable en route vertical guidance
- Specify a target vertical speed and flight path angle
- View active constraint data
- Set a default FPA (in the VNAV Profile menu)

VS Target and FPA may be unavailable if:

- The selected altitude is set higher than the Active VNAV Constraint

OR

- The aircraft is more than 50 NM from the top of descent

Dual PFD Installations with Selected Side Enabled¹

GTN Xi uses baro-corrected altitude data from the selected TXi PFD (pilot or copilot) to provide VNAV guidance.

If the baro setting is out of sync between the two displays, the non-selected PFD will show incorrect vertical deviation data relative to its baro setting, while GTN Xi continues to provide correct vertical deviation data in reference to the baro setting on the selected PFD.

Transponder Data Priority

If configured with a Garmin transponder, GTN Xi sends data displayed on the crew-selected PFD to the transponder.

In dual PFD installations without Selected Side capability, GTN Xi prioritizes data transfers as follows:

- Data displaying on the Pilot PFD is sent to transponder 1
- Data displaying on the Copilot PFD is sent to transponder 2

For information about Selected Side functionality, consult *G500(H)/G600/G700 TXi Pilot's Guide*.

¹ Selected Side is available only with GTN Xi software v20.40 and later and GDU TXi software v3.60 and later.

Temperature Compensated Altitude



NOTE

GTN and TXi displays use a single destination airport temperature for calculating compensated altitudes. Changing the temperature on one of these units automatically recalculates the value across all connected GTNs and GDUs.

FEATURE REQUIREMENTS

- Active flight plan contains an approach
- GDU 700()/1060 for access via PFD Minimums menu

Calculate loaded approach altitudes based on the pilot-specified destination temperature. Once you enter the destination temperature, GTN increases the approach altitudes accordingly.

SETTING TEMPERATURE COMPENSATED ALTITUDE

Controls for setting temperature compensation are accessible from two places:

- Active Flight Plan menu
- Minimums menu (PFD only)



Temperature compensated approach plate altitude restrictions are shown with a corresponding snowflake icon for each adjusted altitude on the active flight plan.

To toggle function on or off, tap **Temperature Compensation**.

ACTIVATE TEMPERATURE COMPENSATED ALTITUDE

From the active flight plan:

Tap **Menu > Temperature COMP > Temperature Compensation > TEMP at DEST**, and specify the destination airport temperature.

The temperature compensated FAF altitude annunciates in magenta.

Approach plate altitude restrictions update on the active flight plan as indicated by their corresponding snowflake icons.

Changing the flight plan destination turns off and resets active temperature compensation. Flying an approach at a different airport requires you to reactivate the feature and enter a temperature for the new destination.

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
- Allowed only during en route and oceanic phases of flight

When dead reckoning mode is active:

- System flags all external outputs dependent upon GPS position data
- Map reports “No GPS Position”; overlays are not available
- “DR” appears over the ownship icon
- DR mode annunciation replaces phase of flight
- Terrain functionality is not available
- Traffic and Stormscope data display on their respective pages only
- CDI is not available

Dead Reckoning Mode, GTN 650Xi



Dead reckoning mode ends once GPS position is restored.

Potential Import Errors

Pop-up messages alert you when an import problem occurs.

Tapping **Next** advances through multiple error messages. Tapping **OK** acknowledges the error and closes the popup.

The following errors can prevent GTN from successfully importing your flight plans.

Full catalog.

Delete any unnecessary catalog entries and try again.

Flight plan contains errors.

Any airways, procedures, or non-user waypoints not found in the database will result in an error. GTN replaces these with locked (*lockd*) waypoints, which must be resolved prior to activation.

Flight plan exceeds the waypoint limit.

GTN truncates the flight plan to the correct length; however, you should be aware that waypoints are missing from the end of the flight plan, including the destination waypoint.

Along Track Offsets

An along track (ATK) represents a temporary lateral position (or checkpoint) relative to an existing waypoint in the flight plan. Offset distance values range between 1 NM and 200 NM, and may be specified in 1 NM increments.

Unlike database waypoints, ATKs indicate a temporary route fix in the flight plan.

When replacing a loaded departure or arrival, there may be an option to keep an applicable ATK from the original procedure. In such cases, the ATK's lateral position may change when you load the new procedure. Always check the resulting route after loading the new procedure.¹

You may insert multiple ATKs into the flight plan.

ATKs appear in flight plan route depictions on Active Flight Plan and Map.



Inserting an ATK before the selected waypoint results in a negative offset value. Inserting it after results in a positive value.



¹ GTN Xi software earlier than v20.40: Once created, ATK position remains fixed until deleted by the pilot. Changes to the flight plan do not update the ATK's position.

COMMON POINT PROCEDURES

FEATURE LIMITATIONS

- *Common point procedures and deferred runway selection are available with GTN Xi software v20.40 and later*

You can choose the common point as the transition point for departures and arrivals. The common point is generally identified as a transition fix that matches the name of the arrival or departure.

Deferring Runway Selection

The option to defer runway selection is available for arrival procedures only.

When you defer runway selection:

- GTN Xi loads arrival waypoints up to and including the common route segment, omitting the segment of the route that is part of the runway transition
- Common route segments include waypoints and crossing constraints that are common among all runway transitions (i.e., if a waypoint has different altitude or speed constraints when landing north/south or east/west, the fix is not part of a common route segment)

For steps on how to defer runway selection, read *Arrivals* in this section.

Departures

Loading a Departure into 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

- *Deferred runway selection not available for SIDs*
- *Vector-only departures may be excluded from some databases*

PAGE SPECIFIC CONTROLS

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

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** and select a departure from the list.
4. Tap **Transition** and select a transition.¹
5. Tap **Runway** and select a runway.²
6. Tap **Preview**, then review the departure diagram and sequence list.
7. Tap **Load Departure**, then scroll the flight plan to view all departure waypoints.

To change the departure:

Tap the existing flight plan departure and select a different one.

¹ GTN Xi v20.40 and later: The common point may be selected as the transition point for departures.

² GTN Xi software earlier than v20.40: Selected runways may display a "B" to denote parallel runways at the airport (e.g., "RW10B" means the selected runway is both 10L and 10R). GTN Xi software v20.40 and later lists parallel runways individually.

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
- Runway selection

PAGE SPECIFIC CONTROLS

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

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** and select an arrival from the list.
4. Tap **Transition** and select a transition.¹
5. Tap **Runway**. Select a runway or tap **NO RWY** to defer selection until a later time.
6. Tap **Preview** then, review the arrival diagram and sequence list.
7. Tap **Load Arrival**, then scroll the flight plan to view all arrival waypoints.

To change the arrival:

Tap the existing flight plan arrival and select a different one.

For more about deferring runway selection, read *No Runway Option* in this section.

¹ GTN Xi v20.40 and later: The common point may be selected as the transition point for arrivals.

Flight Plan Arrival Options

Arrival Options

- View Charts
- Select Arrival
- Remove Arrival

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

- View chart for selected arrival
- Select a new arrival
- Remove the selected arrival from the flight plan

NO RUNWAY OPTION

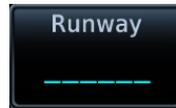
FEATURE LIMITATIONS

- Available with GTN Xi software v20.40 and later



Deferring runway selection displays a series of dashes on the corresponding leg of the active flight plan. Selecting **Runway** re-opens the runway list.

This option is not available for SIDs.



Active Flight Plan provides navigation to the airport waypoint when you defer runway selection.

If no runway is selected by the time the aircraft is within 15 NM of the final waypoint in the loaded arrival:

- Advisory message: “Select appropriate runway for arrival procedure.”
- Pilot acknowledges message and selects a runway.

Trip Data

Calculated trip data include:

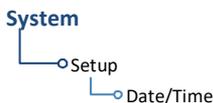
- Desired track (DTK)
- Distance (DIS)
- Destination sunrise/sunset times
- Est. time en route (ETE)
- Est. time of arrival (ETA)
- En route safe altitude (ESA)

Trip data calculations are based on the selected trip planning mode and specified input values.

This information is for planning purposes only.

DESTINATION SUNRISE/SUNSET TIMES

WHERE TO FIND IT



The time zone on which destination sunrise/sunset calculations are based depends on the system Time Format setting. This option resides in the System – Setup Date/Time feature.

Local 12 or 24 hour. Calculations are based on the time zone of the From waypoint. A flight plan originating in the Pacific time zone and ending in the Central time zone would show sunrise/sunset times at the destination in Pacific time.

UTC. Calculations use Universal Time Coordinated (time zones are not considered). There is no potential offset.

ETA CALCULATIONS

The method for calculating ETA varies based on mode selection.

Point-to-Point mode. $ETA = ETE + \text{departure time}$

Flight Plan mode. Calculations depend on flight plan selection:

If	Then
Active Flight Plan	<i>ETA reflects the present position and active leg:</i> $ETA = \text{current time} + ETE \text{ of each leg from the active leg up to and including the selected leg}$
Catalog Route	$ETA = \text{departure time} + ETE \text{ of each leg up to and including the selected leg}$

If you select the entire flight plan, the last leg of the flight plan is treated as the selected leg. This is true whether the selected flight plan is active or inactive.

GTN 650Xi SERIES

Compute Data

To calculate trip data, enter all required input values and then tap **Compute Data**.



Calculations for the selected leg or route display on a dedicated data page.

To return to the data entry page, tap **Edit Input Data**.

Edit Input Data

GTN 750Xi SERIES

Trip data calculates automatically upon entry. Calculations for the selected leg or route display on the lower half of the page.

COMPUTE TRIP DATA

1. Select a trip 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 departure date and time.
4. Specify ground speed or elect to use sensor data.
5. Tap **Compute Data** (GTN 650Xi Series only).
6. Tap **Next** or **Prev** to view calculations for other legs in the flight plan (if applicable).

Fuel Data

Calculated fuel data include:

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

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

This information is for planning purposes only.

GTN 650Xi SERIES

Compute Data

To calculate fuel data, enter all required input values and then tap **Compute Data**.



Calculations for the selected leg or route display on a dedicated data page.

To return to the data entry page, tap **Edit Input Data**.

Edit Input Data

GTN 750Xi SERIES

Fuel data calculates automatically upon entry. Calculations for the selected leg or route display on the lower half of the page.

COMPUTE FUEL DATA

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 Data** (GTN 650Xi Series only).
6. Tap **Next** or **Prev** to view calculations for other legs in the flight plan (if applicable).

If total fuel quantity or fuel flow values are supplied via sensor, GTN uses the data from this app to calculate the Fuel Range Ring overlay on Map. Fuel range rings indicate an estimate of remaining flight distance based on fuel onboard, fuel consumption rates, and current ground speed.

Map depicts two separate rings: one displaying range to reserve fuel, the other displaying total endurance range. Both offer additional situational awareness regarding fuel remaining and endurance.

DALT/TAS/Wind Calculations

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

This information is for planning purposes only.

Density Altitude

- Pressure altitude corrected for nonstandard temperature

True Airspeed

- Calibrated airspeed corrected for altitude and nonstandard temperature

Wind Data

- Wind direction and speed
- Headwind/tailwind component

Density altitude and true airspeed calculations are dependent upon indicated altitude, barometric pressure, and total air temperature. Total air temperature includes temperature and the heating effect of speed, as read on a standard outside temperature gauge.

Wind data calculations are dependent upon aircraft heading and track, true airspeed, and ground speed. Wind direction is dependent upon the NAV Angle system unit setting.

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

GTN 650Xi SERIES

Compute Data

To calculate density altitude, true airspeed, and wind data, enter all required input values and then tap **Compute Data**.



Calculations display on a dedicated data page.

To return to the data entry page, tap **Edit Input Data**.

Edit Input Data

GTN 750Xi SERIES

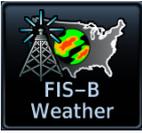
Data calculates automatically upon entry.

INVALID INPUT DATA INDICATION

Density ALT
_____ FT

Dashes indicate when input values are invalid.

FIS-B Weather



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.

FEATURE REQUIREMENTS

- UAT receiver (GDL 88 or GTX 345)

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 coverage information, visit:

https://www.faa.gov/air_traffic/technology/adsb

Data Transmission Limitations

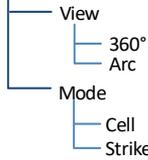
FIS-B broadcasts provide weather data in a repeating cycle which may take several minutes to completely transmit all available weather data. Therefore, not all weather data may be immediately present upon initial FIS-B signal acquisition.

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 ft AGL. Terminal coverage is available at altitudes below 3,000 ft 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.

Stormscope Setup

Stormscope Menu



Tap **Menu** to access Stormscope setup options.

From here, you can change the current display view and mode settings.

Changes in mode selection also reflect on the associated Map overlay.

Stormscope Map Overlay

Stormscope overlay controls reside in the Map menu.

From the Home page, tap **Map > Menu > Stormscope**.

Changes in overlay mode selection also reflect on the Stormscope display. The same is true for clearing strikes on Map.

Stormscope Modes & Symbols

Cell Mode

Identifies clusters of electrical activity, grouping individual strikes together.

When to use:

During heavy storm activity to identify where storm cells are located.

Strike Mode

Displays individual discharge points in relation to where they are detected.

When to use:

During periods of light electrical activity to plot the initial strikes associated with a building thunderstorm.

Symbols denote time since last lightning strike



Less than 6 seconds (initial strike)



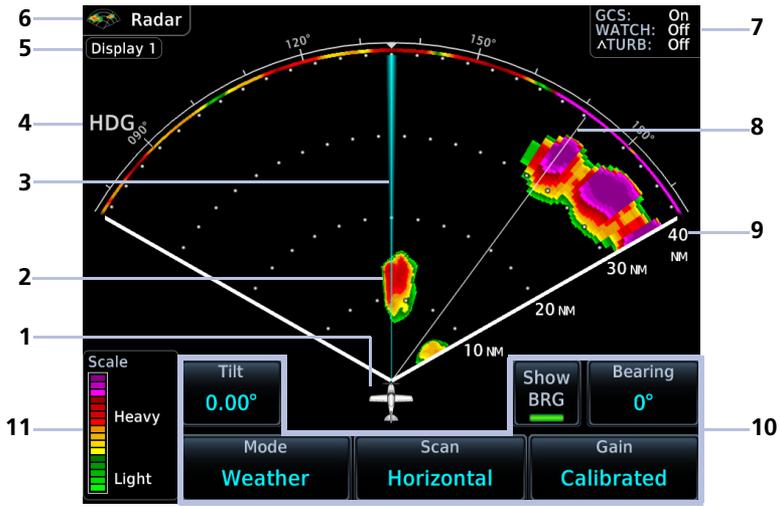
Less than 60 seconds



Less than 120 seconds



Less than 180 seconds



Weather Radar Features

1	Ownship Icon	7	Feature Status Display
2	Weather Depiction	8	Scan
3	Bearing/Tilt Line	9	Radar Display Range
4	Heading Indication	10	Radar Controls
5	Selected Display Group Indication	11	Intensity Scale
6	WX App Label		

Weather Radar Setup

Weather Radar Menu

- Sector Scan ¹
 - Select scan width
- WATCH Shading ¹
- Weather Messages ¹
- Stabilization
- Altitude Compensated Tilt ²
- Ground Clutter Suppression ^{2, 3}
- Turbulence Detection ^{2, 3}
- Display Group ^{3, 4}
- Hail Prediction ^{3, 4, 5}
- Lightning Prediction ^{3, 4, 5}

¹ Not available for third-party radars
² Available with GWX 70/75 only.
³ Requires feature enablement.
⁴ Available with GWX 8000 and GTN Xi software v20.40 or later.
⁵ Available only during automatic mode.

Tap **Menu** to access weather radar setup options. Available features are dependent upon configuration.

With the exception of Sector Scan and Display Group, all selections are on/off only.

Map WX Overlays

The Radar overlay control resides in the Map Setup menu.

From the Home page, tap **Map > Menu > Radar**.

Radar and NEXRAD overlays are mutually exclusive. Selecting one automatically turns the other off.

ALTITUDE COMPENSATED TILT

**AVAILABLE WITH:
GWX 70/75**

FEATURE LIMITATIONS

- *Not available for third-party radars*



This feature adjusts the tilt to compensate for altitude changes as the aircraft climbs and descends.

Status displays above the radar controls.

GROUND CLUTTER SUPPRESSION

**AVAILABLE WITH:
GWX 70/75/8000**

FEATURE REQUIREMENTS

- Purchased GWX Ground Clutter Suppression feature enabled on unit

FEATURE LIMITATIONS

- Not available for third-party radars
- Enhanced functions available only with GWX 8000
- Horizontal scans only

This feature reduces the amount of returns of highly reflective objects on the ground, while maintaining the intensity and size of weather returns.



If ground clutter suppression is inoperative, a yellow “INOP” message annunciates in the feature status display. This occurs when the GWX radar is unable to confirm that radar data meets the criteria for ground clutter suppression due to missing information.

Enhanced Ground Clutter Suppression with GWX 8000

During manual mode, the system uses Doppler radar to suppress most clutter to 40 NM. Ground clutter shows for one sweep following any adjustment to the tilt setting, allowing the pilot to determine the proper tilt angle.

During automatic mode, the system employs the terrain database to provide data for ground clutter reduction.

SECTOR SCAN

FEATURE LIMITATIONS

- *Not available for third-party radars*
- *Horizontal scans only*

The sector scan option focuses the scan on a smaller segment of the radar sweep. This is useful when monitoring priority weather targets.

GWX	INCREMENTS
68	20°, 40°, 60°, Full
70/75/8000	20°, 40°, 60°, 90°, Full
The 90° horizontal scan option is available only for radars with extended scan capabilities (120° sweep).	

Horizontal sector scans center on the bearing line.

Increments vary according to radar.

STABILIZATION

FEATURE LIMITATIONS

- *Manual control not available for GWX 8000*

This feature helps stabilize the antenna so the scan is parallel to the ground when active. When off, the antenna scan is relative to the aircraft lateral axis.

TURBULENCE DETECTION

**AVAILABLE WITH:
GWX 70/75/8000**

FEATURE REQUIREMENTS

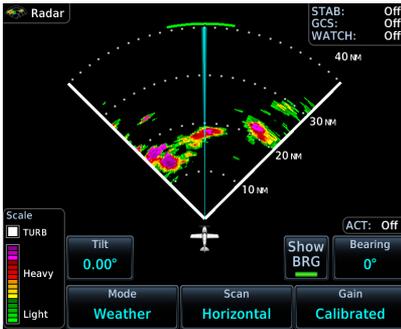
- Purchased GWX Turbulence Detection feature enabled on unit

FEATURE LIMITATIONS

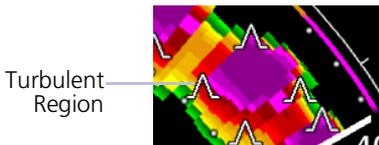
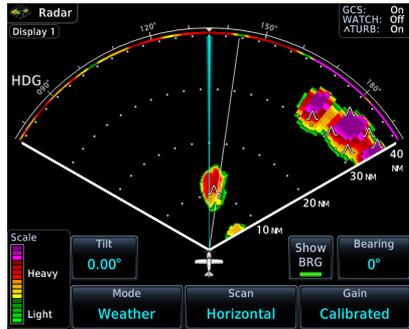
- Not available for third-party radars
- Horizontal scans only

This feature detects and displays severe turbulence.

GWX 70/75 Radar Display



GWX 8000 Radar Display



GWX 8000 uses symbols to denote regions of severe turbulence. These areas appear white on GWX 70 and GWX 75 radar displays.

The decision to fly into an area of radar targets depends on target intensity, spacing between targets, aircraft capabilities, and pilot experience.

Some weather radars detect only precipitation, not clouds or turbulence. While GTN may indicate clear areas between intense returns, this does not mean it is safe to fly between them.

A legend shows when turbulence detection is active.

GWX 70/75



Legend appears above the intensity scale when the feature is on. It is absent when the feature is off.

GWX 8000



On/off status annunciates in the feature status display.

Turbulence Detection reports as "Off" when:

- Current scan range is greater than 160 NM
- Radar is not in weather mode
- Vertical scan is active

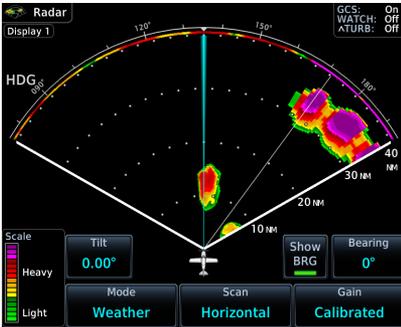
WATCH

FEATURE LIMITATIONS

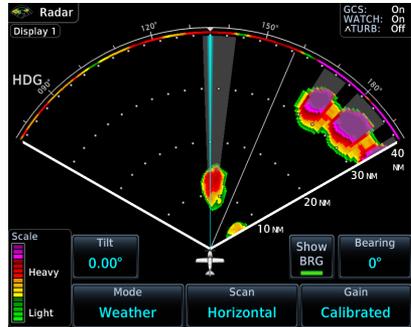
- Not available for third-party radars
- Horizontal scans only

Use WATCH to determine where the displayed intensity may be understated beyond a high-intensity area. Adjust tilt to determine the extent of attenuation in a shaded area. WATCH displays only in horizontal scans.

WATCH Off



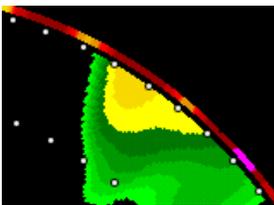
WATCH On



WEATHER MESSAGES

FEATURE LIMITATIONS

- Not available for third-party radars
- Not available during ground mode
- Horizontal scans only



These alerts indicate the presence of heavy precipitation beyond the current display range.

Multicolored bands on the outer range ring display at the approximate azimuth of severe weather targets.

- If the antenna tilt is adjusted too low, a weather alert is generated by ground returns.
- If a weather alert is detected within +10 degrees of the aircraft heading, an advisory displays in the message list.

PREDICTIVE HAIL & LIGHTNING

AVAILABLE WITH: GWX 8000

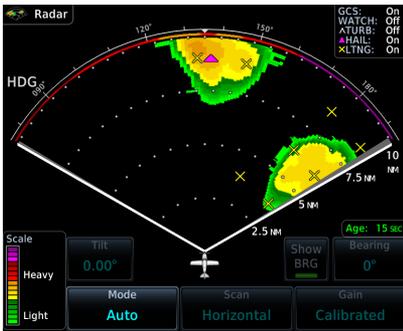
FEATURE REQUIREMENTS

- Purchased GWX 8000 feature enabled on unit
- GTN Xi software v20.40 or later

FEATURE LIMITATIONS

- Available only when automatic scanning mode is active

Predictive Hail & Predictive Lightning On



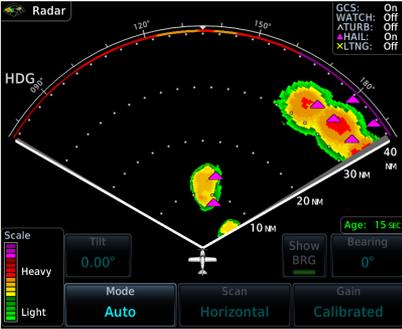
A legend indicates which predictive features are active.

The system searches volumetric data for areas that are conducive to the formation of hail or lightning. GTN Xi depicts these regions using dedicated symbols. The circular footprint of each symbol represents an approximate area of concern.

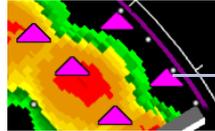
You can enable predictive features while the radar is in automatic mode.

Enable predictive hazard features for initial awareness of possible adverse weather ahead.

Predictive Hail Depiction

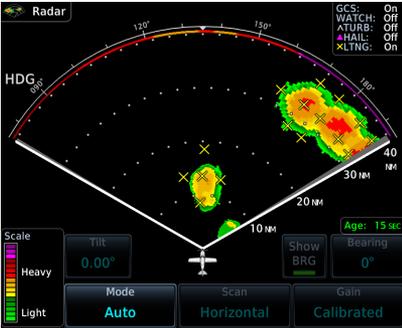


A magenta triangle indicates regions of hail.

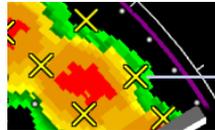


Hail Region

Predictive Lightning Depiction



A yellow "X" indicates regions of lightning.



Lightning Region

DISPLAY GROUPS

AVAILABLE WITH: GWX 8000

FEATURE REQUIREMENTS

- Purchased GWX 8000 feature enabled on unit
- GTN Xi software v20.40 or later

FEATURE LIMITATIONS

- GWX 8000 allows up to two display groups for selection
- Radar display groupings pertain to GWX 8000 only
- Not available when automatic scanning mode is active



Enable modes and features for all configured GTN Xi and/or GDU TXi units within an assigned group.



To select a display group, tap **Display Group** and choose between Group 1 and Group 2.

Group 1 is the default group selection.

The selected display group appears in the upper left of the radar display.

This indication is absent during automatic mode when the display grouping function is inactive.



Radar Modes



WARNING

Do not transmit when personnel or objects are within 16 ft of the antenna.

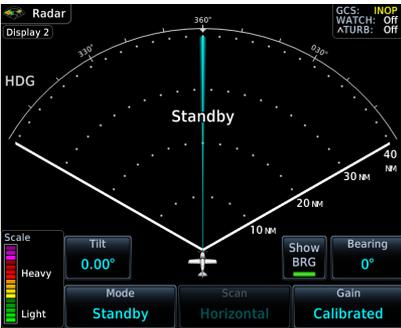


Tapping **Mode** opens a list of available mode options.



A confirmation pop-up alerts you when attempting to scan while on the ground.

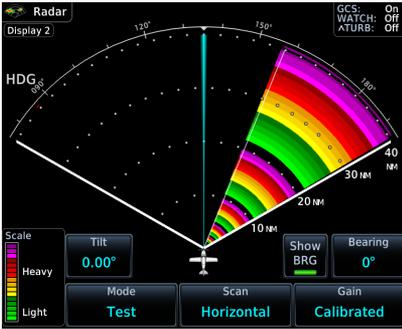
STANDBY



- Parks the antenna at the centerline
- Automatic standby occurs during power up and landing

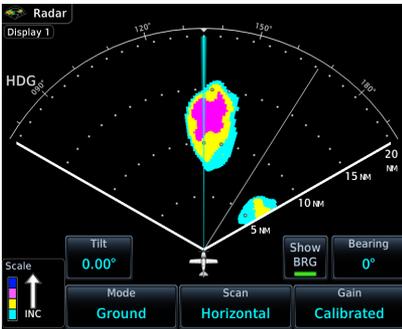
During weather and ground modes, the system automatically switches to standby upon landing.

TEST



- Places transmitter in standby as the display simulates a radar sweep
- Data verifies communication between the weather radar and display
- Radar pulses do not transmit from the antenna during this mode

GROUND



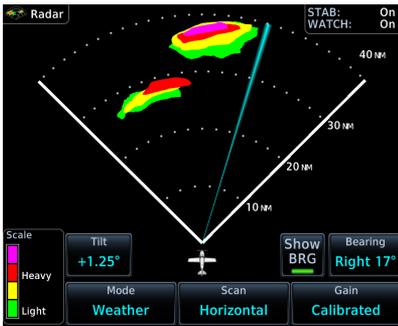
- Presents a depiction of terrain similar to that of a topographical map
- Useful when trying to verify aircraft position

GROUND MAP MODE COLOR	GROUND TARGET INTENSITY LEVELS	
	GWX RADAR INTENSITY	THIRD-PARTY RADAR LEVEL
Black	0 to 2 dB	0
Cyan	3 dB to < 13 dB	1
Yellow	13 dB to < 21 dB	2
Magenta	21 dB to < 29 dB	3 and above
Blue	29 dB and greater	Not used

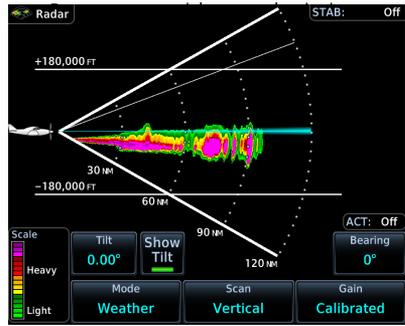
WEATHER

- Presents an airborne depiction of precipitation
- Colors represent approximate rainfall intensity and rates for weather radar targets.

GWX 68 Radar Display



GWX 75 Radar Display



WEATHER MODE COLOR	GWX 68/70/75/8000 RADAR		THIRD-PARTY RADAR
	APPROXIMATE INTENSITY	APPROXIMATE RAINFALL RATE (IN/HR)	RADAR RETURN LEVEL ¹
Black	< 23 dBZ	< .01	0
Green	23 dBZ to < 33 dBZ	.01 to < 0.1	1
Yellow	33 dBZ to < 41 dBZ	0.1 to < 0.5	2
Red	41 dBZ to < 49 dBZ	0.5 to < 2.0	3
Magenta	49 dBZ and greater	2.0 and greater	4
White	Turbulence Detection ²		

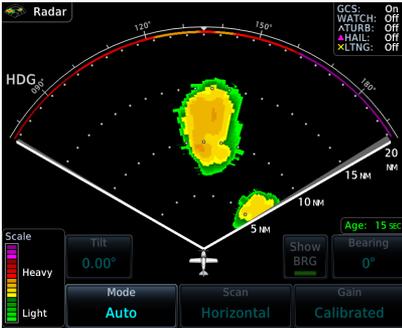
¹ Consult third-party radar documentation. ² GWX 70 and GWX 75 only.

AUTOMATIC

AVAILABLE WITH: GWX 8000

FEATURE REQUIREMENTS

- GTN Xi software v20.40 or later



The age of weather scan data displays (in seconds) once a scan completes.

3D Volumetric Scan Process

During automatic mode, the radar antenna performs multiple scans and tilt angles to update the overall weather solution. The system collects and processes this data to provide a display of the strongest returns in the volume of air ahead. In some ways, this is similar to a NEXRAD composite image.

Acquiring precipitation targets is much easier in this mode.

- Provides automatic 3D volumetric scanning of the area ahead of the aircraft (weather information only)
- Bearing/Tilt, Gain, Scan, and enhanced Ground Clutter Suppression functions occur automatically
- Hail Prediction, Lightning Prediction, and Turbulence features are available in the setup menu
- Manual range adjustments are still available

In addition to automatic mode, GWX 8000 retains the ability to use manual mode for investigating returns. To perform manual scanning, place the radar in Weather or Ground mode. If multiple radar displays are present, ensure that at least one of the radar displays is not in standby.

Automatic Mode Status Indications

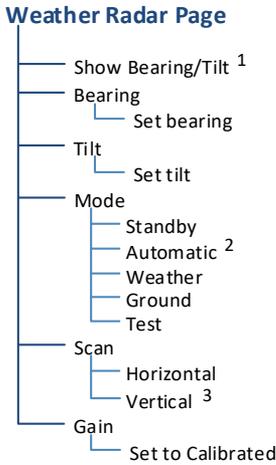


Upon activation, GWX 8000 requires 20 seconds to render its initial image.

“Initializing” annunciates on the radar display to inform you that initialization is in progress (i.e., the radar is functioning but scan depictions are not yet available).

If automatic mode is inoperative, a yellow “Auto INOP” message replaces the “Initializing” annunciation. Select a different scanning mode to resume radar operation.

Radar Controls



Some radars allow independent sweeps when connected to multiple displays.

GWX 68 synchronizes the controls from all connected displays. GWX 70 and GWX 75 receive commands from each display independently and perform a separate sweep for each. GWX 8000 allows control from two display groups.

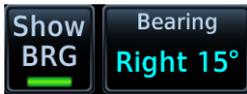
¹ Dependent upon scan type selection. ² GWX 8000 only.

³ Not available for RS 181 and RS 811 radars.

SHOW BEARING/TILT

Display the tilt or bearing line depending on the current scan selection. This feature is useful when making horizontal or vertical scan adjustments.

Horizontal Scan Active



Vertical Scan Active



BEARING

FEATURE LIMITATIONS

- Bearing angle not available on RS 181A and RS 811A radars



Bearing Direction & Value

Directional keys allow fine adjustment of the bearing line angle. This method is optional to tapping and dragging.

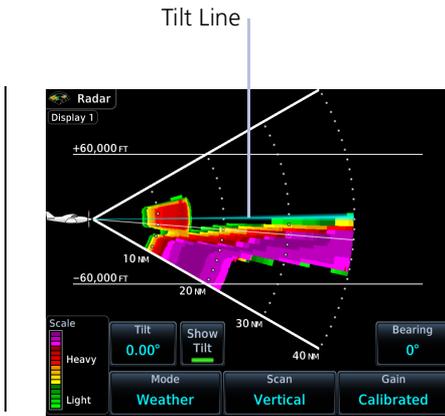
For a more accurate view of target coverage and intensity, center the tilt angle on the strongest return area, aiming below the freezing level of the storm.

In areas of multiple heavy cells, use the vertical scan feature along with antenna tilt to examine the cells. Avoid shadowed areas behind targets.

VERTICAL SCAN

FEATURE LIMITATIONS

- *Vertical scan not available on RS 181A and RS 811A radars*



Vertical scans focus the radar on a particular vertical target.

- *Enable tilt line visibility:* Tap **Show Tilt**.
- *Adjust tilt of vertical scan:* Tap and drag the tilt line up or down. Or tap **Tilt** and adjust angle using the directional keys.
- *Adjust horizontal angle for the vertical scan:* Tap **Bearing** and adjust angle using the directional keys.

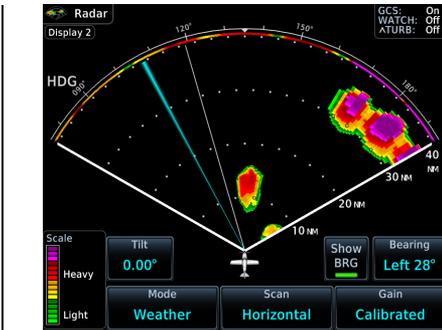
Vertical Scan with Stabilization

When vertically scanning with stabilization on, the physical area that the radar is sweeping may not match the displayed vertical scan. This occurs when the aircraft pitch is not at 0°. To compensate, the GDU does not draw the unscanned portion.

To avoid constant adjustment of the bearing line, ensure that the aircraft wings are level when performing a vertical scan of a storm cell.

HORIZONTAL SCAN

Horizontal scans provide a visual depiction of weather in front of the aircraft.



- *Enable bearing line visibility:* Tap **Show BRG**.
- *Adjust the horizontal scan bearing:* Tap and drag bearing line left or right. Or tap **Bearing** and adjust angle using the directional keys.
- *Adjust vertical angle for the horizontal scan:* Tap **Tilt** and adjust angle using the directional keys.

GAIN



NOTE

Precipitation intensity may not be accurate if the gain is changed.

FEATURE LIMITATIONS

- *Third-party radars: this control is active only during ground mode*

This feature controls the sensitivity of the radar receiver. Adjustments to receiver sensitivity automatically change the intensity of radar targets.

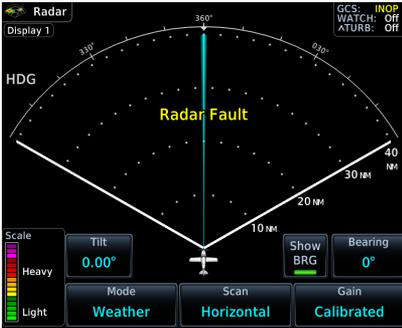
Directional keys allow sensitivity adjustments.



Default
Calibration
Setting

Tapping **Set to Calibrated** restores the calibrated gain setting and returns intensity depictions to their actual colors.

Radar Alerts



Caution messages alert you when there is a weather radar failure. For a list of possible radar alerts, refer to the annunciations table in this segment.



Radar Alert Annunciation

When a radar alert occurs:

- A textual annunciation appears over the radar sweep
- Scan depictions do not display
- Weather radar overlay detail is absent from Map

In addition to radar alerts, the weather radar overlay is absent from Map if heading input is lost.

ALERT ANNUNCIATIONS

ANNUNCIATION	CONDITION
Radar Fault	Condition: Data contains a fault unrelated to attitude
Radar Fail	Condition: Weather radar product status is timed out
Radar Controls Disagree	Condition: <ul style="list-style-type: none"> • Radar's actual state does not match the commanded state • Third-party radars only
Radar Active	Condition: Radar is in standby but remains active due to another interfacing controller
Off	Condition: <ul style="list-style-type: none"> • Radar is off • GWX only
Warm Up XX	Condition: <ul style="list-style-type: none"> • Radar is warming up • Countdown timer displays number of seconds remaining ("XX") • GWX 68 only
Standby	Condition: Radar is in standby mode

TRAFFIC PAGE ORIENTATION



ROTORCRAFT ONLY

While flying the helicopter at low speeds:

- Heading may not closely align with track (up to 180° different)
- The state of the Traffic page is dependent upon whether the unit is receiving valid data from the interfaced heading source

If	Then
GTN Xi is receiving valid heading data	Traffic page remains fixed with the ownship heading pointed up
GTN Xi is not receiving valid heading data	<ul style="list-style-type: none"> • The display of traffic is unavailable • “Display Unavailable” annunciates across the Traffic page • Traffic alerts appear in a non-bearing textual format at the top of the page
Ownship directionality is invalid (no valid heading or track)	
GPS ground speed is less than 15 kts but the ownship heading is not available	

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.

Traffic Alert Annunciation



GTN 750Xi Series



Traffic pop-ups do not display when the aircraft is on ground.

GTN 650Xi Series



Traffic Alert Pop-up

ANNUNCIATION	CONDITION POP-UP AURAL MESSAGE
TRAFFIC	<p>Condition: Traffic reports a traffic advisory</p> <p>Pop-up Alert: Yes</p> <p>Aural Message: Message content depends on current traffic system configuration</p>

For installations with GTX 345 and ADS-B software v3.20 or later, tapping the **Mute Alert** key silences the active traffic alert voice message. This function is applicable only to the active aural alert (does not mute future alerts). For more information, read *Aural Alerts* in section 2.

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 3D 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 Configurations

Available Terrain Modes

- (H)Terrain Proximity
- Terrain Alerting
- TAWS-B¹
- TAWS-A¹
- (H)Terrain Alerting
- HTAWS¹

¹ Optional.

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.

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

GPS Altitude for Terrain

FEATURE REQUIREMENTS

GPS altitude is derived from satellite measurements. To acquire an accurate 3D 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 2D image of surrounding terrain and obstacles relative to the aircraft's position and altitude
- Calculate the aircraft's flight path in relation to surrounding terrain and obstacles
- Predict hazardous terrain conditions and issue alerts

GSL ALTITUDE & INDICATED ALTITUDE

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

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

GSL Altitude

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

Indicated Altitude

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

Database Limitations



NOTE

Garmin cross-validates terrain and obstacle data in accordance with TSO-C151d. 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.

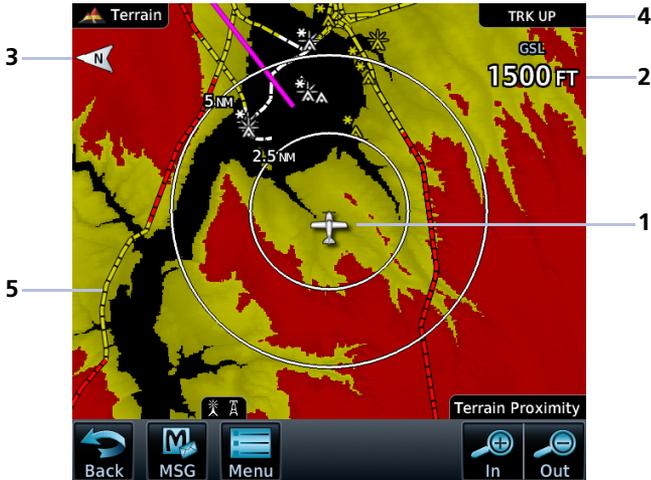
DATABASE	LIMITATION
Terrain	<ul style="list-style-type: none"> • Not available north of 89° N latitude and south of 89° S latitude
Obstacle	<ul style="list-style-type: none"> • Coverage areas vary according to database type • Power line indications for the contiguous United States and small parts of Canada and Mexico • Regional definitions may change without notice • May not contain uncharted obstacles • May include power lines or only HOT lines depending on database type¹

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

Terrain Display



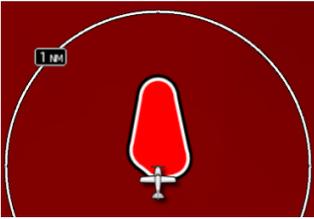
Terrain, obstacle, and wire data display as overlays on the dedicated Terrain page and as overlays on Map.



Terrain Display Features

1	<p>Ownship Icon</p> <p>Depicts current aircraft position.</p>
2	<p>GSL Altitude</p> <p>Displays current GPS height above mean sea level.</p>
3	<p>North Indicator</p> <p>Indicates True north.</p>
4	<p>Page Orientation Label</p> <ul style="list-style-type: none"> • Track Up orients page to current aircraft GPS track • Heading Up orients page to current aircraft heading (requires heading data source interface) <p>Heading Up takes priority over Track Up when both orientation inputs are available.</p>
5	<p>Overlay Icons</p> <p>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.

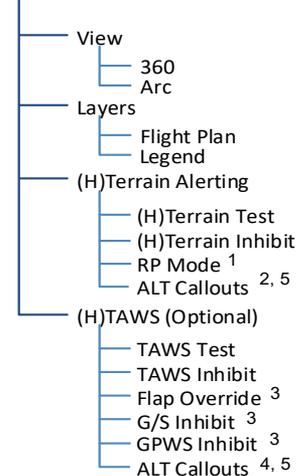
AUTOMATIC DATA REMOVAL



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

Terrain Setup

Terrain Page Menu



Tap **Menu** to access pilot 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**.

(H) designates the function is applicable to rotorcraft.

¹ Helicopter alerting functions only.

² HTerrain only. ³ TAWS-A only.

⁴ TAWS-A and HTAWS only.

⁵ Available only with GTN Xi software v20.40 and later.

TERRAIN SETUP SELECTIONS

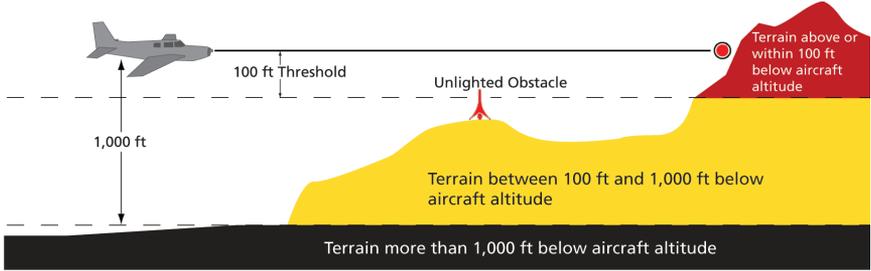
View	360	<ul style="list-style-type: none"> Changes view format to a 360° ring encircling the aircraft (default view)
	Arc	<ul style="list-style-type: none"> Changes view format to a forward-looking 120° arc
Layers	Flight Plan	<ul style="list-style-type: none"> Toggles the active flight plan overlay on or off (Terrain page only)
	Legend	<ul style="list-style-type: none"> Toggles the Terrain and Obstacle/Wire legend on or off
HTAWS & (H)Terrain Alerting	Test [NAME]	<ul style="list-style-type: none"> Performs a system test of the terrain alerting function Verifies the validity of required databases
	[NAME] Inhibit	<ul style="list-style-type: none"> Inhibits visual alerts for terrain, obstacles, and power lines Inhibits the FLTA aural and visual alerts
	RP Mode	<ul style="list-style-type: none"> Reduces alerting thresholds for low-level operations (rotorcraft only)
	ALT Callouts^{1, 2}	<ul style="list-style-type: none"> Provides pop-up controls for configuring individual voice call out alerts
TAWS-A	Flap Override	<ul style="list-style-type: none"> Overrides flap-based FIT alerting while other FIT alert functions remain in effect Inhibits nuisance FIT alerts where flap extension is not desired
	G/S Inhibit	<ul style="list-style-type: none"> Inhibits glideslope or glidepath alerts depending on current state Use to prevent glideslope/glidepath deviation alerts (e.g., when flying a localizer backcourse approach) Active only for a single approach
	GPWS Inhibit	<ul style="list-style-type: none"> Inhibits GPWS audible and visual alerts (i.e., EDR, ECR, FIT, and NCR)
	ALT Callouts¹	<ul style="list-style-type: none"> Provides pop-up controls for configuring individual voice call out alerts
TAWS A & B	TAWS Test	<ul style="list-style-type: none"> Performs TAWS alerting system test Verifies the validity of required databases
	TAWS Inhibit	<ul style="list-style-type: none"> Inhibits PDA/FLTA audible and visual alerts Inhibits EDR/NCR audible and visual alerts for TAWS-B

¹ Available only with GTN Xi software v20.40 and later. ² HTAWS and HTerrain only.

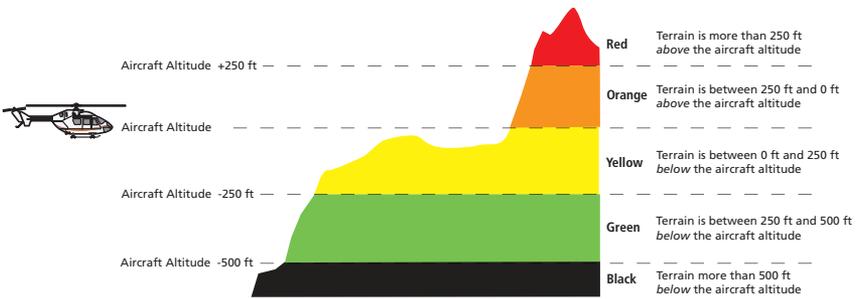
Terrain & Obstacle Depictions

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



Rotorcraft Terrain Shading

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	FIXED WING	ROTORCRAFT
				Red obstacle is above or within 100 ft below current altitude.	Red obstacle is at or above current altitude.
				Yellow obstacle is between 100 ft and 1000 ft below current altitude.	Yellow obstacle is within 250 ft below current altitude.
				White obstacle is between 1,000 ft and 2,000 ft below current altitude.	White obstacle more than 250 ft below current altitude.

WIND TURBINE OBSTACLES

UNLIGHTED WIND TURBINE OBSTACLE	LIGHTED WIND TURBINE OBSTACLE	OBSTACLE LOCATION	
		FIXED WING	ROTORCRAFT
		Red obstacle is above or within 100 ft below current altitude.	Red obstacle is at or above current altitude.
		Yellow obstacle is between 100 ft and 1,000 ft below current altitude.	Yellow obstacle is within 250 ft below current altitude.
		White obstacle is more than 1,000 ft below current altitude.	White obstacle more than 250 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.

Alert Types

The behavior of an alerting function is determined at installation. Installer configurable settings allow:

- Alert suppression for specific runway types
- Gender selection for voice messages
- Volume level

TERRAIN ALERTING

- Imminent Impact
- Required Clearance
- Premature Descent

TAWS-A

- Imminent Impact
- Required Clearance
- Premature Descent
- Excessive Descent Rate
- Excessive Closure Rate
- Negative Climb Rate
- Flight Into Terrain
- Excessive Below
Glideslope/Glidepath Deviation

TAWS-B

- Imminent Impact
- Required Clearance
- Premature Descent
- Excessive Descent Rate
- Negative Climb Rate

Available alerting functions depend on the installed terrain system.

Imminent Impact and Required Clearance alerts are functions of Forward Looking Terrain Avoidance (FLTA).

ALERT TYPE		CONDITION
FLTA	Imminent Impact¹	Aircraft reaches the minimum clearance altitude of any obstacle (IOI), terrain (ITI), or power line (ILI) in the projected flight path.
	Required Clearance¹	Aircraft's vertical flight path is projected to be within the minimum clearance altitude of an obstacle (ROC), terrain (RTC), or power line (RLC).
Premature Descent²		Aircraft is significantly below the normal approach path for the nearest runway. <ul style="list-style-type: none"> Altitude is <700 ft above terrain Distance from destination airport is 15 NM or less
Excessive Descent Rate		Aircraft descends toward terrain at an excessive rate.
Excessive Closure Rate³		Aircraft closes upon terrain at a rate excessive for gear and flaps.
Negative Climb Rate		Aircraft loses altitude following takeoff. <ul style="list-style-type: none"> Altitude is <700 ft above terrain Distance from departure airport is 5 NM or less Deviation from departure heading is <110°
Flight Into Terrain		Aircraft is too low with respect to terrain. Based on landing gear status, flap position, and ground speed.
Excessive Below Glideslope or Glidepath Deviation		Aircraft is significantly below the glidepath for the selected approach. Active only after departure and when the following conditions are met. <ul style="list-style-type: none"> Altitude is <1,000 ft AGL Gear is configured for landing ILS, LPV, or LNAV/VNAV approach is active and the unit is indicating vertical navigation

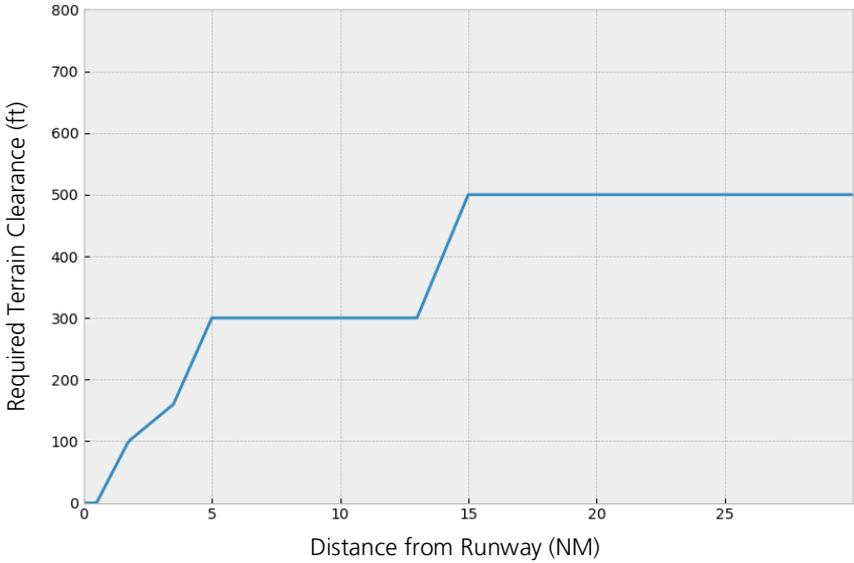
¹ Alerting inhibited <200 ft AGL within 0.5 NM of approach runway or <125 ft AGL within 1.0 NM of runway threshold.

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.

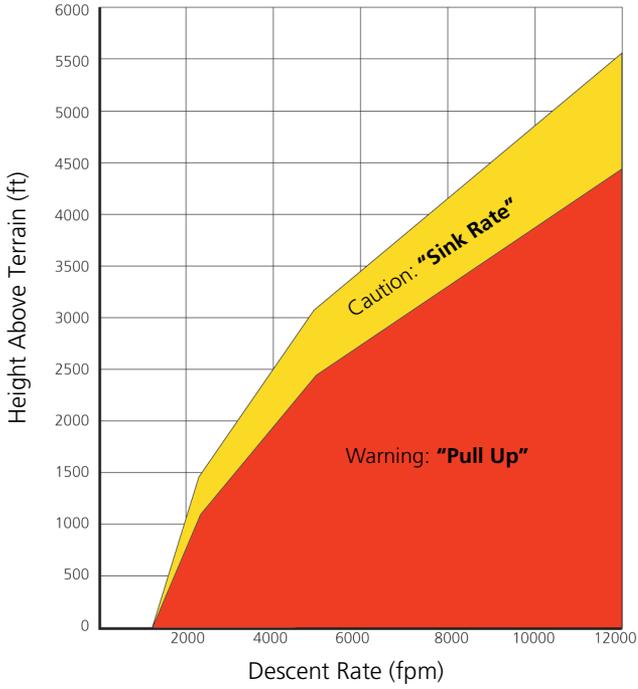
³ Alerting inhibited within 5 NM of nearest airport, except when FLTA is not available. In such cases, "TAWS N/A" or "TAWS FAIL" annunciates and ECR alerting remains active until landing.

Alerting Thresholds

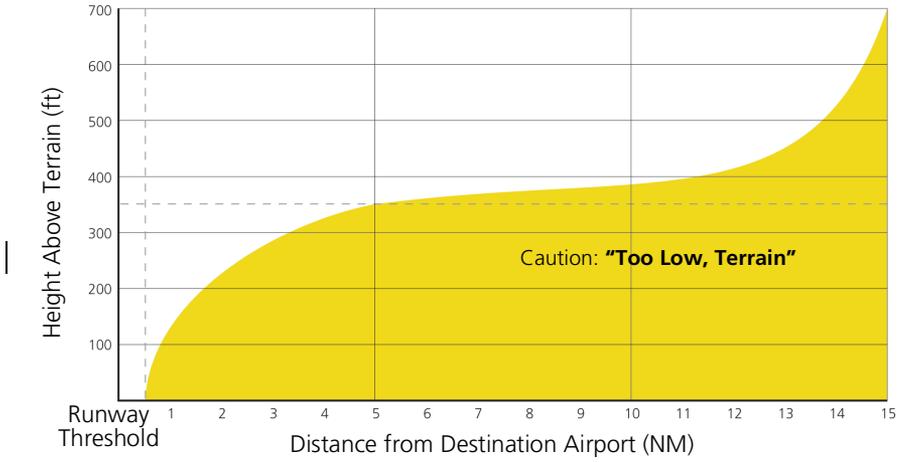
FLTA SEARCH VOLUME - REQUIRED TERRAIN CLEARANCE



EDR THRESHOLDS

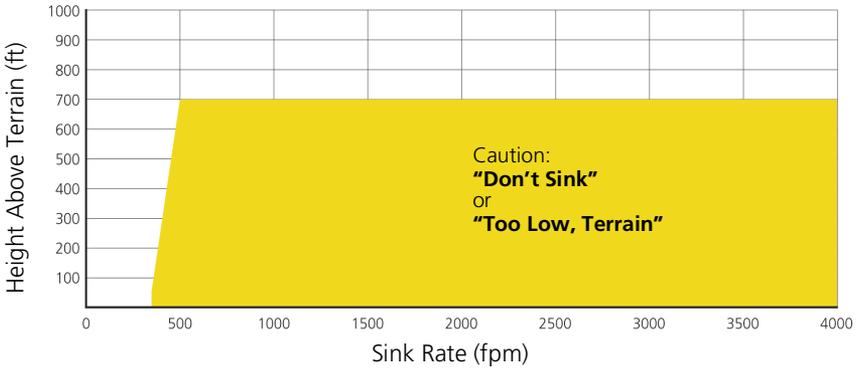
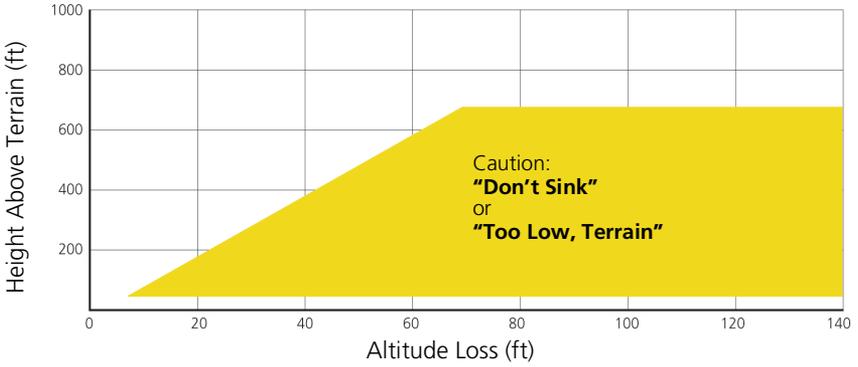


PDA THRESHOLD



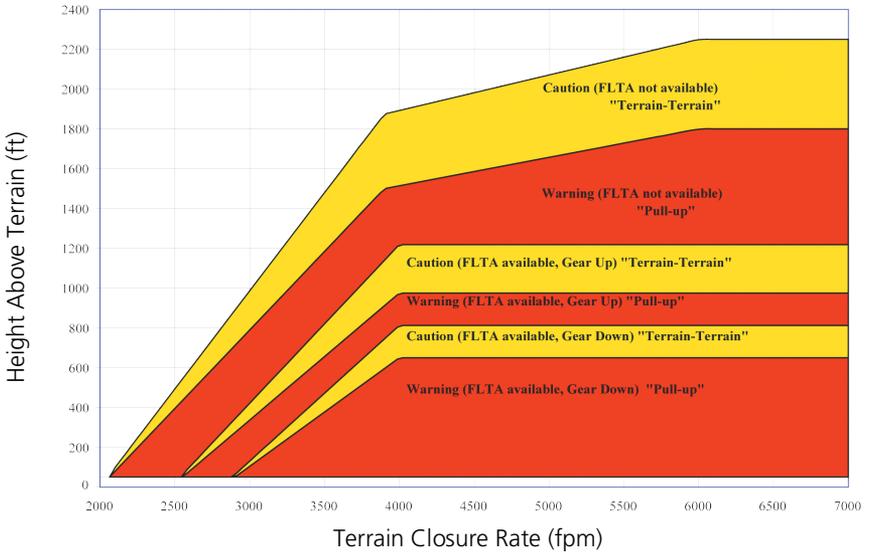
NCR THRESHOLDS

Alert triggers: altitude loss, sink rate

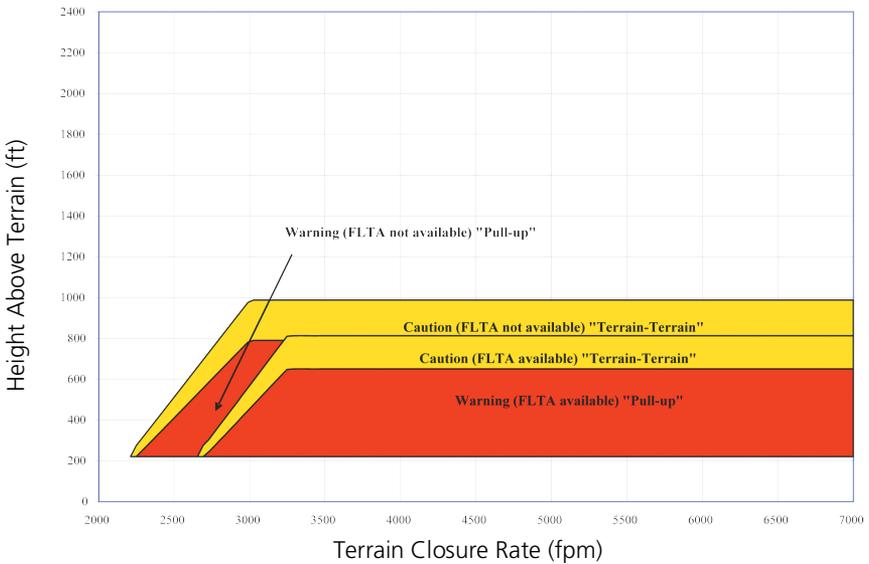


EXCESSIVE CLOSURE RATE ALERT

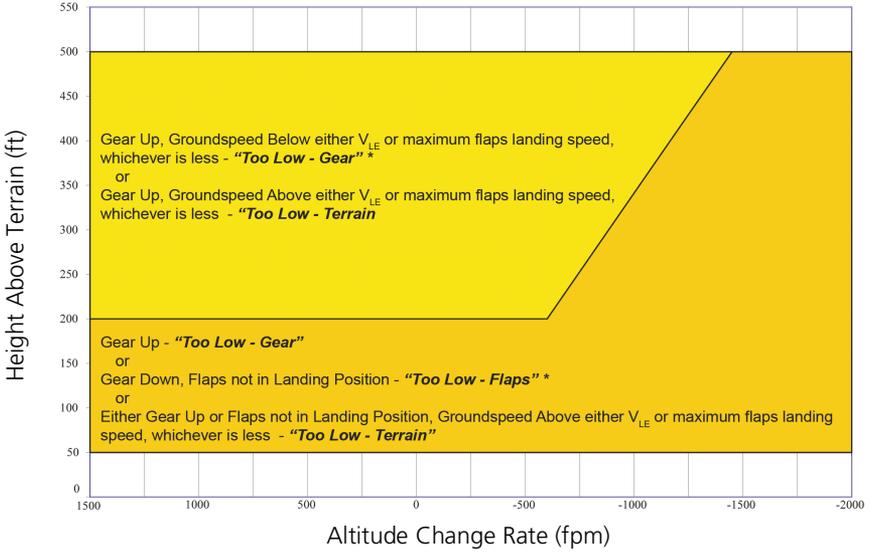
Takeoff Configuration



Landing Configuration



FLIGHT INTO TERRAIN ALERT



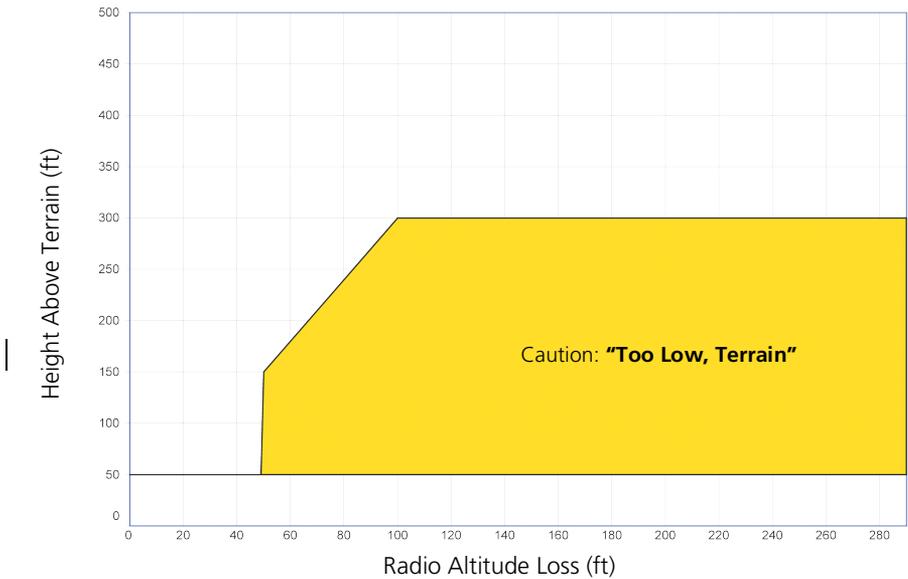
* Flap position will not trigger alert if Flap Override option is enabled. To enable, tap **Menu > Flap Override**.

OVERRIDING FLAPS-BASED FIT ALERTING

The FLAP O/R (Flap Override) should be activated when an approach without flaps is going to be performed.

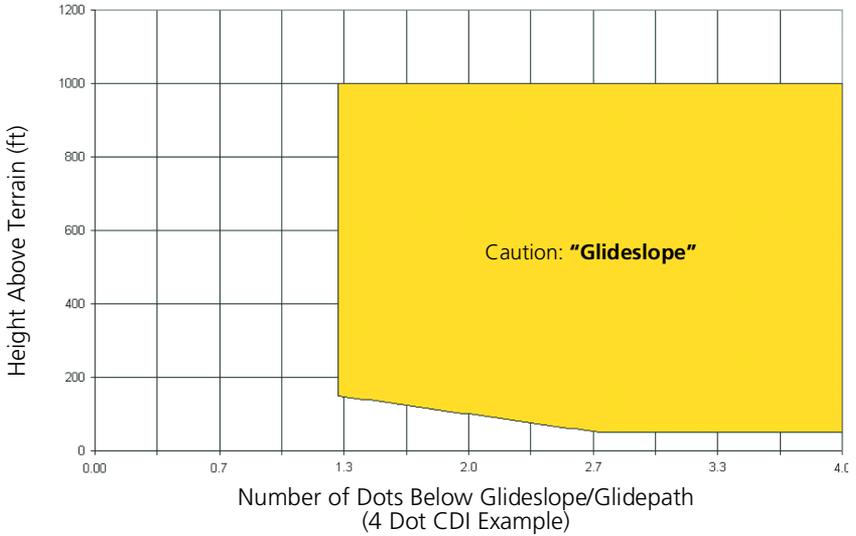
To reduce nuisance FIT alerts on approaches where flap extension is not desired (or is intentionally delayed), you may override FIT alerting based on the flap position, while all other FIT alerting remains in effect.

FIT alerts also occur during takeoff or go-around if the aircraft's height above ground level (as determined by the radar altimeter) is too close to rising terrain. TAWS-A will issue the aural message "Too Low - Terrain" and visual annunciations when conditions enter the caution alert area.



EXCESSIVE BELOW GLIDESLOPE/GLIDEPATH DEVIATION ALERT

A Glideslope Deviation or Glidepath Deviation (GSD) caution alert is issued when the system detects that the aircraft is significantly below the glidepath for the selected approach.



Alert Inhibit



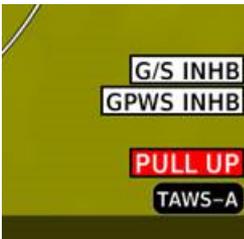
The **Terrain Inhibit** control is accessible via the terrain pop-up alert or the Terrain page menu.

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

TERRAIN INHIBIT FUNCTIONS	
INHIBIT	Manually inhibits TAWS or Terrain Alerting aural and visual alerts for low altitude approaches or rotorcraft operation.
AUTOMATIC INHIBIT	Automatically inhibits TAWS and Terrain Alerting alerts when the aircraft meets the following approach criteria. <ul style="list-style-type: none"> TAWS: <ul style="list-style-type: none"> • GPS/SBAS approach • Position inside FAF TAWS & TERRAIN ALERTING: <ul style="list-style-type: none"> • Altitude <200 ft above runway elevation • Position <0.5 NM of approach end or between each runway end

TAWS-A INHIBIT ANNUNCIATIONS

Terrain Page



TAWS-A alert inhibit annunciations appear at the bottom right of the display.

- “FLAP OVRD” does not annunciate if GPWS Inhibit is already active, as both functions inhibit FIT alerts.
- A plus sign indicates multiple alerts (e.g., “TAWS INHB+”)

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 C151d certified terrain display system
- 2D 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

Terrain Alerting

FEATURE REQUIREMENTS

- Valid terrain/obstacle database
- Valid 3D GPS position solution

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 C151d 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

Terrain Alerts

TERRAIN ALERTING INDICATIONS	
ANNUNCIATION	CONDITION AURAL MESSAGE
PULL UP	<p>Condition: FLTA Terrain Warning (RTC-W, ITI-W)</p> <p>Aural Messages:</p> <ul style="list-style-type: none"> • "Terrain Ahead, Pull Up; Terrain Ahead, Pull Up" <p>or</p> <ul style="list-style-type: none"> • "Terrain, Terrain; Pull Up, Pull Up"
PULL UP	<p>Condition: FLTA Obstacle Warning (ROC-W, IOI-W)</p> <p>Aural Messages:</p> <ul style="list-style-type: none"> • "Obstacle Ahead, Pull Up; Obstacle Ahead, Pull Up" <p>or</p> <ul style="list-style-type: none"> • "Obstacle, Obstacle; Pull Up, Pull Up"

TERRAIN ALERTING INDICATIONS	
ANNUNCIATION	CONDITION AURAL MESSAGE
PULL UP	<p>Condition: FLTA Wire Warning (RLC-W, ILI-W)</p> <p>Aural Messages:</p> <ul style="list-style-type: none"> • “Wire Ahead Pull Up, Wire Ahead Pull Up” <p>or</p> <ul style="list-style-type: none"> • “Wire Wire, Pull Up, Pull Up”
TERRAIN	<p>Condition: FLTA Terrain Caution (RTC-C, ITI-C)</p> <p>Aural Messages:</p> <ul style="list-style-type: none"> • “Terrain Ahead; Terrain Ahead” <p>or</p> <ul style="list-style-type: none"> • “Caution, Terrain; Caution, Terrain”
OBSTACLE	<p>Condition: FLTA Obstacle Caution (ROC-C, IOI-C)</p> <p>Aural Messages:</p> <ul style="list-style-type: none"> • “Obstacle Ahead; Obstacle Ahead” <p>or</p> <ul style="list-style-type: none"> • “Caution, Obstacle; Caution, Obstacle”
WIRE	<p>Condition: FLTA Wire Caution (RLC-C, ILI-C)</p> <p>Aural Messages:</p> <ul style="list-style-type: none"> • “Wire Ahead, Wire Ahead” <p>or</p> <ul style="list-style-type: none"> • “Caution Wire, Caution Wire”
TERRAIN	<p>Condition: Premature Descent Alert Caution (PDA)</p> <p>Aural Messages: “Too Low, Terrain”</p>
None	<p>Condition: Voice Call Out (VCO-500)</p> <p>Aural Messages: “Five-Hundred”</p>

TERRAIN SYSTEM STATUS

During power-up, the terrain system conducts a self-test of its aural and visual annunciations. This test can also be manually initiated. An aural alert is issued upon test completion. Terrain system testing is disabled when ground speed exceeds 30 knots.

TERRAIN SYSTEM STATUS INDICATIONS	
ANNUNCIATION	CONDITION AURAL MESSAGE
None	Condition: Terrain alerting available Aural Message: None
TER TEST	Condition: Terrain system test in progress Aural Message: None
None	Condition: Terrain system test is successful Aural Message: "Terrain System Test OK"
TER INHB	Condition: Terrain alerting is disabled Aural Message: None
TER N/A	Condition: Terrain alerting not available Aural Message: "Terrain Not Available"
TER FAIL	Condition: Terrain system test fails Aural Message: "Terrain System Failure"

TAWS-B

FEATURE REQUIREMENTS

- *Valid 3D GPS position*
- *TAWS-B feature enablement*

TAWS-B Features

- Optional TSO-C151d Class B terrain alerting system
- All Terrain alerting functions plus: premature descent, excessive descent rate, negative climb rate, and altitude voice callout (500 ft) alerts

TAWS-B Setup Selections

View	Selects 360° or Arc view on terrain page.
Layers	Selects to display flight plan and/or legend on the terrain page.
TAWS Inhibit	Prevents TAWS alerts.
Test	Tests the TAWS system. Available only when the aircraft is on-ground.

TAWS-B Alerts

TAWS-B ALERT INDICATIONS	
ANNUNCIATION	CONDITION POP-UP AURAL MESSAGE
PULL UP	<p>Condition: FLTA Terrain Warning (RTC-W, ITI-W)</p> <p>Pop-up Alert:</p> <ul style="list-style-type: none"> • "Terrain Ahead - Pull Up" <p>or</p> <ul style="list-style-type: none"> • "Terrain - Pull Up" <p>Aural Message:</p> <ul style="list-style-type: none"> • "Terrain Ahead, Pull Up; Terrain Ahead, Pull Up" <p>or</p> <ul style="list-style-type: none"> • "Terrain, Terrain; Pull Up, Pull Up"
PULL UP	<p>Condition: FLTA Obstacle Warning (ROC-W, IOI-W)</p> <p>Pop-up Alert:</p> <ul style="list-style-type: none"> • "Obstacle Ahead - Pull Up" <p>or</p> <ul style="list-style-type: none"> • "Obstacle Pull Up" <p>Aural Message:</p> <ul style="list-style-type: none"> • "Obstacle Ahead, Pull Up; Obstacle Ahead, Pull Up" <p>or</p> <ul style="list-style-type: none"> • "Obstacle, Obstacle; Pull Up, Pull Up"
PULL UP	<p>Condition: FLTA Wire Warning (RLC-W, ILI-W)</p> <p>Pop-up Alert: "Wire Ahead - Pull Up"</p> <p>Aural Message:</p> <ul style="list-style-type: none"> • "Wire Ahead Pull Up, Wire Ahead Pull Up" <p>or</p> <ul style="list-style-type: none"> • "Wire, Wire, Pull Up, Pull Up"
PULL UP	<p>Condition: Excessive Descent Rate Warning (EDR-W)</p> <p>Pop-up Alert: "Pull Up"</p> <p>Aural Message: "Pull Up"</p>

TAWS-B ALERT INDICATIONS	
ANNUNCIATION	CONDITION POP-UP AURAL MESSAGE
TERRAIN	<p>Condition: FLTA Terrain Caution (RTC-C, ITI-C)</p> <p>Pop-up Alert:</p> <ul style="list-style-type: none"> • "Terrain Ahead" <p>or</p> <ul style="list-style-type: none"> • "Caution - Terrain" <p>Aural Message:</p> <ul style="list-style-type: none"> • "Terrain Ahead; Terrain Ahead" <p>or</p> <ul style="list-style-type: none"> • "Caution, Terrain; Caution, Terrain"
OBSTACLE	<p>Condition: FLTA Obstacle Caution (ROC-C, IOI-C)</p> <p>Pop-up Alert:</p> <ul style="list-style-type: none"> • "Obstacle Ahead" <p>or</p> <ul style="list-style-type: none"> • "Caution - Obstacle" <p>Aural Message:</p> <ul style="list-style-type: none"> • "Obstacle Ahead; Obstacle Ahead" <p>or</p> <ul style="list-style-type: none"> • "Caution, Obstacle; Caution, Obstacle"
WIRE	<p>Condition: FLTA Wire Caution (RLC-C, ILI-C)</p> <p>Pop-up Alert: "Wire Ahead"</p> <p>Aural Message:</p> <ul style="list-style-type: none"> • "Wire Ahead, Wire Ahead" <p>or</p> <ul style="list-style-type: none"> • "Caution Wire, Caution, Wire"
TERRAIN	<p>Condition: Premature Descent Alert Caution (PDA)</p> <p>Pop-up Alert: "Don't Sink"</p> <p>Aural Message: "Too Low, Terrain"</p>
TERRAIN	<p>Condition: Excessive Descent Rate Caution (EDR-C)</p> <p>Pop-up Alert: "Sink Rate"</p> <p>Aural Message: "Sink Rate"</p>

TAWS-B ALERT INDICATIONS	
ANNUNCIATION	CONDITION POP-UP AURAL MESSAGE
TERRAIN	<p>Condition: Negative Climb Rate Caution (NCR-C)</p> <p>Pop-up Alert:</p> <ul style="list-style-type: none"> • "Don't Sink" <p>or</p> <ul style="list-style-type: none"> • "Too Low - Terrain" <p>Aural Message:</p> <ul style="list-style-type: none"> • "Don't Sink" <p>or</p> <ul style="list-style-type: none"> • "Too Low, Terrain"
None	<p>Condition: Voice Call Out (VCO-500)</p> <p>Aural Message: "Five-Hundred"</p>

ALTITUDE VOICE CALL OUT ALERTS

TAWS-B provides an aural advisory alert as the aircraft descends through 500 ft above the terrain, as determined by the GPS (if greater than 5 NM from the nearest airport) or 500 ft above the nearest runway threshold elevation (if less than 5 NM from the nearest airport). Upon descent to this altitude, TAWS-B issues the aural alert message "Five-hundred."

TAWS-B SYSTEM STATUS

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

TAWS-B Not Available Alert

TAWS-B requires a 3D GPS position solution along with specific vertical accuracy minimums. Should the position solution become degraded or if the aircraft is out of the database coverage area, the annunciation "TAWS N/A" is generated in the annunciation window and on the TAWS-B page. The aural message "TAWS Not Available" is generated. When the GPS signal is re-established and the aircraft is within the database coverage area, the aural message "TAWS Available" is generated (when the aircraft is airborne).

TAWS-B Failure Alert

TAWS-B continually monitors several system-critical items such as database validity, hardware status, and GPS status. If the terrain/obstacle database is not available, the aural message "TAWS System Failure" is generated along with a "TAWS FAIL" annunciation.

TAWS-B SYSTEM STATUS INDICATIONS	
ANNUNCIATION	CONDITION AURAL MESSAGE
None	Condition: TAWS available Aural Message: "TAWS Available"
TAWS TEST	Condition: TAWS system test in progress Aural Message: None
None	Condition: TAWS system test is successful Aural Message: "TAWS System Test OK"
TAWS INHB	Condition: TAWS alerting is disabled Aural Message: None
TAWS N/A	Condition: TAWS not available Aural Message: "TAWS Not Available"
TAWS FAIL	Condition: TAWS system test fails Aural Message: "TAWS System Failure"

TAWS-A

FEATURE REQUIREMENTS

- Valid terrain/obstacle/navigation database
- Valid 3D GPS position
- Valid flap and landing gear status inputs
- Valid radar altimeter
- Valid air data computer

Class A TAWS incorporates radar altimeter input with the GSL altitude to provide a more accurate position reference when at lower altitudes for certain alert types, and to retain a level of ground proximity warning capability in the unlikely event of a navigation, terrain or obstacle database failure.

TAWS-A Features

- Optional TSO-C151d Class A terrain alerting system
- All Terrain-FLTA functions plus: premature descent, excessive descent and closure rate, negative climb rate, flight into terrain, excessive below glideslope/glidepath deviation
- Visual and aural annunciations when terrain and obstacles are within the given altitude threshold from the aircraft

TAWS-A Setup Selections



Tap **Menu** to access setup options. Selections are grouped by function: View, Layers, and TAWS.

INHIBIT

Manually inhibits FLTA or PDA visual alerts for low altitude approaches.

AUTOMATIC INHIBIT

Automatically inhibits FLTA alerts when the aircraft meets the following approach criteria.

- Altitude < 200 ft above runway elevation
- Position < 0.5 NM off approach end or between each runway end

ENABLE FLAP OVERRIDE

When the Flaps Override option is enabled, "FLAP OVRD" annunciates at the bottom of the TAWS-A display. The annunciation is not shown if GPWS alerts (including FIT) are also inhibited.

Tap **Menu > Flap Override** to toggle the override state.



Flap Override
Annunciation

GSD alerting is only active after departure and the following conditions are met:

- An ILS, LPV, or LNAV/VNAV approach is active and vertical navigation indications are being displayed.
- Aircraft is below 1,000 ft AGL.
- Gear is configured for landing.

When a GSD caution alert occurs, the aural and visual annunciation "GLIDESLOPE" is issued. If a GSD caution alert occurs on an LPV, or LNAV/VNAV approach, the aural and visual annunciation "GLIDESLOPE" is issued.

INHIBIT GLIDESLOPE/GLIDEPATH DEVIATION ALERTS (GSD)

When Glideslope (G/S) alerts are inhibited, they are only inhibited for a single approach. To inhibit G/S alerts on the next approach, the G/S Inhibit function must be activated again between the first and second approaches.

Tap **Menu > G/S Inhibit** to inhibit or enable glideslope or glidepath alerts.



G/S Inhibit Function¹

- GSD alerts are inhibited independent from all other FLTA, PDA, and GPWS alerts
- Only active for a single approach; does not remain active for subsequent approaches

¹ GTN Xi software earlier than v20.40: To prevent nuisance GSD alerts, always activate the G/S Inhibit function when flying a localizer backcourse approach.

INHIBIT GPWS ALERTS (EDR, ECR, FIT, AND NCR)

The Inhibit GPWS function only affects GPWS alerts (EDR, ECR, NCR, and FIT). Alerting for FLTA, PDA, and GSD is controlled independently from the GPWS alerts listed below.

EDR, ECR, FIT, and NCR aural and visual alerts can be manually inhibited as a group. Discretion should be used when inhibiting alerts and the GPWS system should be enabled when appropriate. When these alerts are inhibited, "GPWS INHB" annunciates at the bottom of the TAWS-A display.

Tap **Menu > GPWS Inhibit** to inhibit or enable GPWS alerts (choice dependent upon current state).



GPWS Inhibit Annunciation

ALTITUDE VOICE CALL OUT ALERTS

TAWS-A provides aural advisory alerts as the aircraft descends, beginning at 500 ft above the terrain, as determined by the radar altimeter (if greater than 5 NM from the nearest airport) or 500 ft above the nearest runway threshold elevation (if less than 5 NM from the nearest airport). Upon descent to this altitude, TAWS-A issues the aural alert message "Five-hundred."

Pilot Configurable VCOs

Additional voice call out (VCO) alerts may be selected by the flight crew to occur at the following altitudes.

PILOT CONFIGURABLE VCOs

Based on nearest runway threshold when within 5 NM of the airport

• 400 ft • 300 ft • 200 ft • 100 ft

Based on radar altimeter

• 50 ft • 40 ft • 30 ft • 20 ft • 10 ft



Tap **Menu** > **ALT Callouts**, and toggle the desired altitude key(s).

TAWS-A Alerts

TAWS-A ALERT INDICATIONS	
ANNUNCIATION	CONDITION POP-UP AURAL MESSAGE
PULL UP	<p>Condition: FLTA Terrain Warning (RTC-W, ITI-W)</p> <p>Pop-up Alert:</p> <ul style="list-style-type: none"> • "Terrain Ahead - Pull Up" <p>or</p> <ul style="list-style-type: none"> • "Terrain - Pull Up" <p>Aural Message:</p> <ul style="list-style-type: none"> • "Terrain Ahead, Pull Up; Terrain Ahead, Pull Up" <p>or</p> <ul style="list-style-type: none"> • "Terrain, Terrain; Pull Up, Pull Up"
PULL UP	<p>Condition: FLTA Obstacle Warning (ROC-W, IOI-W)</p> <p>Pop-up Alert:</p> <ul style="list-style-type: none"> • "Obstacle Ahead - Pull Up" <p>or</p> <ul style="list-style-type: none"> • "Obstacle Pull Up" <p>Aural Message:</p> <ul style="list-style-type: none"> • "Obstacle Ahead, Pull Up; Obstacle Ahead, Pull Up" <p>or</p> <ul style="list-style-type: none"> • "Obstacle, Obstacle; Pull Up, Pull Up"
PULL UP	<p>Condition: FLTA Wire Warning (RLC-W, ILI-W)</p> <p>Pop-up Alert: "Wire Ahead - Pull Up"</p> <p>Aural Message:</p> <ul style="list-style-type: none"> • "Wire Ahead, Pull Up; Wire Ahead, Pull Up" <p>or</p> <ul style="list-style-type: none"> • "Wire, Wire; Pull Up, Pull Up"
PULL UP	<p>Condition: Excessive Descent Rate Warning (EDR)</p> <p>Pop-up Alert: "Pull Up"</p> <p>Aural Message: "<whoop> <whoop> Pull Up"</p>
PULL UP	<p>Condition: Excessive Closure Rate Warning (ECR)</p> <p>Pop-up Alert: "Pull Up"</p> <p>Aural Message: "<whoop> <whoop> Pull Up"</p>

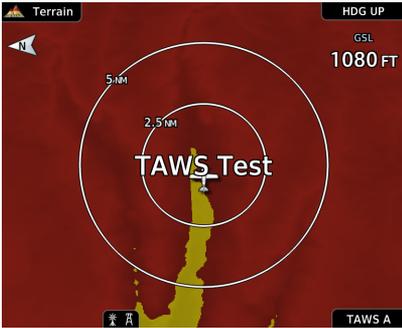
TAWS-A ALERT INDICATIONS	
ANNUNCIATION	CONDITION POP-UP AURAL MESSAGE
TERRAIN	<p>Condition: FLTA Terrain Caution (RTC-C, ITI-C)</p> <p>Pop-up Alert:</p> <ul style="list-style-type: none"> • "Terrain Ahead" <p>or</p> <ul style="list-style-type: none"> • "Caution - Terrain" <p>Aural Message:</p> <ul style="list-style-type: none"> • "Terrain Ahead; Terrain Ahead" <p>or</p> <ul style="list-style-type: none"> • "Caution, Terrain; Caution, Terrain"
OBSTACLE	<p>Condition: FLTA Obstacle Caution (ROC-C, IOI-C)</p> <p>Pop-up Alert:</p> <ul style="list-style-type: none"> • "Obstacle Ahead" <p>or</p> <ul style="list-style-type: none"> • "Caution - Obstacle" <p>Aural Message:</p> <ul style="list-style-type: none"> • "Obstacle Ahead; Obstacle Ahead" <p>or</p> <ul style="list-style-type: none"> • "Caution, Obstacle; Caution, Obstacle"
WIRE	<p>Condition: FLTA Wire Caution (RLC-C, ILI-C)</p> <p>Pop-up Alert: "Wire Ahead"</p> <p>Aural Message:</p> <ul style="list-style-type: none"> • "Wire Ahead; Wire Ahead" <p>or</p> <ul style="list-style-type: none"> • "Caution, Wire; Caution, Wire"
TERRAIN	<p>Condition: Premature Descent Alert Caution (PDA)</p> <p>Pop-up Alert: "Don't Sink"</p> <p>Aural Message: "Too Low, Terrain"</p>
TERRAIN	<p>Condition: Excessive Descent Rate Caution (EDR)</p> <p>Pop-up Alert: "Sink Rate"</p> <p>Aural Message: "Sink Rate"</p>
TERRAIN	<p>Condition: Excessive Closure Rate Caution (ECR)</p> <p>Pop-up Alert: "Terrain"</p> <p>Aural Message: "Terrain, Terrain"</p>

TAWS-A ALERT INDICATIONS	
ANNUNCIATION	CONDITION POP-UP AURAL MESSAGE
TERRAIN	<p>Condition: Negative Climb Rate Caution (NCR)</p> <p>Pop-up Alert:</p> <ul style="list-style-type: none"> • “Don’t Sink” <p>or</p> <ul style="list-style-type: none"> • “Too Low - Terrain” <p>Aural Message:</p> <ul style="list-style-type: none"> • “Don’t Sink” <p>or</p> <ul style="list-style-type: none"> • “Too Low, Terrain”
TERRAIN	<p>Condition: Flight Into Terrain High Speed Caution (FIT)</p> <p>Pop-up Alert: “Too Low, Terrain”</p> <p>Aural Message: “Too Low, Terrain”</p>
TERRAIN	<p>Condition: Flight Into Terrain Gear Caution (FIT)</p> <p>Pop-up Alert: “Too Low, Gear”</p> <p>Aural Message: “Too Low, Gear”</p>
TERRAIN	<p>Condition: Flight Into Terrain Flaps Caution (FIT)</p> <p>Pop-up Alert: “Too Low, Flaps”</p> <p>Aural Message: “Too Low, Flaps”</p>
TERRAIN	<p>Condition: Flight Into Terrain Takeoff Caution (FIT)</p> <p>Pop-up Alert: “Too Low, Terrain”</p> <p>Aural Message: “Too Low, Terrain”</p>
GLIDESLOPE	<p>Condition: Glideslope Deviation Caution (GSD)¹</p> <p>Pop-up Alert: “Glideslope”</p> <p>Aural Message: “Glideslope”</p>

TAWS-A ALERT INDICATIONS	
ANNUNCIATION	CONDITION POP-UP AURAL MESSAGE
None	<p>Condition: Altitude Voice Call Out (VCO)</p> <p>Pop-up Alert: None</p> <p>Aural Messages:</p> <ul style="list-style-type: none"> • “Five-Hundred” <p>Pilot Configurable VCOs:</p> <ul style="list-style-type: none"> • “Four Hundred” • “Three Hundred” • “Two Hundred” • “One Hundred” • “Fifty” • “Forty” • “Thirty” • “Twenty” • “Ten”

¹ GSD alert is available if a valid ILS is being used for navigation, even when no valid GPS signal is being received.

TAWS-A SYSTEM STATUS



During power-up, TAWS-A conducts a self-test of its aural and visual annunciations. An aural alert is issued upon test completion.

TAWS-A System Testing is disabled when ground speed exceeds 30 kts.

You can manually initiate the system test anytime the aircraft is on-ground. Read more about this option in *Terrain Setup*.

TAWS-A SYSTEM STATUS INDICATIONS	
ANNUNCIATION	CONDITION AURAL MESSAGE
None	Condition: TAWS available Aural Message: "TAWS Available"
TAWS TEST	Condition: TAWS system test in progress Aural Message: None
None	Condition: TAWS system test is successful Aural Message: "TAWS System Test OK"
TAWS INHB	Condition: TAWS alerting is disabled Aural Message: None
TAWS N/A	Condition: TAWS is not available due to one of the following: <ul style="list-style-type: none"> • No GPS position • GPS position unavailable/degraded • Outside of terrain database coverage Aural Message: "TAWS Not Available"
TAWS FAIL	Condition: <ul style="list-style-type: none"> • TAWS system test fails • Incorrect TAWS configuration • Invalid/missing terrain, airport, or obstacle database • TAWS audio fault Aural Message: "TAWS System Failure"

TAWS-A SYSTEM STATUS INDICATIONS	
ANNUNCIATION	CONDITION AURAL MESSAGE
None	<p>Condition: Sufficient GPS signal reception restored</p> <p>Aural Message: "TAWS Available" (aural message only in flight)</p>
GPWS INHB	<p>Condition: GPWS Inhibit function active</p> <p>Aural Message: "GPWS System Failure"</p>
GPWS N/A	<p>Condition: GPWS is not available due to one of the following:</p> <ul style="list-style-type: none"> • Incorrect TAWS configuration • Radar altimeter unavailable • GPS position unavailable/degraded • TAWS audio fault <p>Aural Message: "GPWS System Failure"</p>
GPWS FAIL	<p>Condition:</p> <ul style="list-style-type: none"> • Incorrect TAWS configuration • Radar altimeter unavailable • GPS position unavailable/degraded • TAWS audio fault <p>Aural Message: "GPWS System Failure"</p>
G/S INHB	<p>Condition: Glideslope Inhibit function active</p> <p>Aural Message: None</p>
FLAP OVRD	<p>Condition: FLAP Override function active</p> <p>Aural Message: None</p>

TAWS-A ABNORMAL OPERATIONS

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

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

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

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

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



HTAWS/HTerrain Alerting

ROTORCRAFT ONLY



NOTE

HTAWS-enabled units can be identified by going to the Terrain page and checking the lower right-corner for "HTAWS."

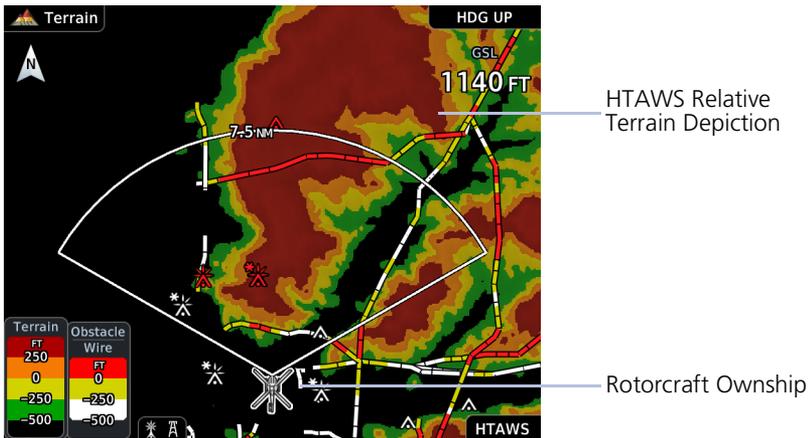
FEATURE REQUIREMENTS

- Valid 3D GPS position
- Valid terrain/obstacle database

Garmin's optional Helicopter Terrain Awareness Warning System (HTAWS) increases situational awareness and assists in reducing controlled flight into terrain. HTAWS is TSO-C194 authorized. HTerrain Alerting provides similar functionality but is *not* TSO-C194 authorized.

HTAWS/HTerrain provides visual and aural indications when terrain and obstacles pose a hazard to the aircraft.

HTAWS Terrain Display



HTAWS/HTerrain Setup Selections

The Terrain setup menu provides options to acknowledge caution alerts, reduce protection, or inhibit alerting.

View	Display 360° or Arc view on the Terrain page.
Layers	Display the flight plan and/or legend on the Terrain page.
RP Mode	<p>Reduce alerting thresholds and suppresses caution alert indications (aural and visual).</p> <ul style="list-style-type: none"> • An external RP Mode switch and an external alert acknowledge switch can be used • “RP Mode” displays in the terrain annunciator field whenever protection is reduced
HTAWS/HTerrain Inhibit	<p>When ground speed is less than 30 knots, “HTAWS INHB” / “TER INHB” automatically annunciates and cannot be removed by menu option selection. Other features include:</p> <ul style="list-style-type: none"> • Inhibit mode deactivates aural and visual alerts (Use discretion when inhibiting the terrain system and remember to enable the system when appropriate) • VCOs are not inhibited in Inhibit mode • All FLTA aural and visual alerting suppressed • HTAWS/HTerrain should only be inhibited when in visual contact with terrain and obstacles • HTAWS/HTerrain configured units will always power up with HTAWS/HTerrain alerts uninhibited
Test HTAWS/HTerrain	Initiate a manual test of the terrain system. Available only when the rotorcraft is on the ground.
ALT Callouts¹	<p>Select altitude for VCOs. Options:</p> <ul style="list-style-type: none"> • 500 ft • 400 ft • 300 ft • 200 ft • 100 ft <p>Additional options available if connected to a radar altimeter: • 50 ft • 40 ft • 30 ft • 20 ft • 10 ft</p>

¹ Available only with GTN Xi software v20.40 and later.

HTAWS/HTerrain Alerts

These alerts employ either a caution or warning alert severity level. Caution alerts display as constant black text on a yellow background. Warning alerts display as constant white text on a red background.

When the system issues an alert:

- An alert annunciation appears in a dedicated field on the annunciator bar
- An aural alert in the form of a voice call out accompanies the visual indication

FORWARD LOOKING TERRAIN AVOIDANCE

Unit issues terrain alerts when the aircraft altitude is below the terrain elevation and when aircraft is projected to come within minimum clearance values of the terrain.

Any threat locations are depicted on the display. There are two levels of severity for FLTA alerts. They are cautionary (amber) and warning (red).

FLTA Caution:

- Estimated potential impact in approximately 30 seconds after a caution pop-up alert and annunciation
- Accompanied by the aural message "Caution Terrain; Caution Terrain"
- The time to an alert can vary with conditions, therefore there is no guarantee of a 30 second caution alert being issued

FLTA Warning:

- Warning pop-up alerts issued 15 seconds prior to estimated potential impact in normal mode and approximately 10 seconds in RP mode
- Accompanied by the aural message "Warning - Terrain, Terrain" or "Warning - Obstacle, Obstacle"
- The time to an alert can vary with conditions, therefore there is no guarantee of a 15/10 second warning alert being issued

HTAWS/HTERRAIN VOICE CALL OUT ALERTS

FEATURE LIMITATIONS

- *Pilot configurable VCO alert options available only with GTN Xi software v20.40 and later*

Pilot configurable aural advisory alerts are available for the following altitudes.

- 500 ft to 100 ft above terrain in 100-foot increments
- 50 ft to 10 ft above terrain in 10-foot increments (with radar altimeter input)

Descending to a selected altitude generates an aural message. No display annunciations or pop-up alerts accompany this message.

HTAWS/HTERRAIN ALERT RESPONSE

Upon receiving a warning alert, immediately maneuver the rotorcraft in response to the alert message unless the terrain or obstacle can be clearly identified visually and determined not to pose an operational safety risk.

A caution alert indicates terrain or obstacle nearby. If possible, visually locate the terrain or obstacle for avoidance. A warning may follow the caution if the rotorcraft's path toward the terrain or obstacle is not changed.

Display of terrain and obstacles on the display is supplemental data only. Maneuvering solely by reference to the terrain and obstacle data is not recommended or authorized.

HTAWS/HTERRAIN ALERT INDICATIONS	
ANNUNCIATION	CONDITION POP-UP AURAL MESSAGE
TERRAIN	<p>Condition: FLTA Terrain Warning</p> <p>Pop-up Alert: "Warning - Terrain"</p> <p>Aural Message: "Warning - Terrain, Terrain"</p>
OBSTACLE	<p>Condition: FLTA Obstacle Warning</p> <p>Pop-up Alert: "Warning - Obstacle"</p> <p>Aural Message: "Warning - Obstacle, Obstacle"</p>
WIRE	<p>Condition: FLTA Wire Warning</p> <p>Pop-up Alert: "Warning - Wire"</p> <p>Aural Message: "Wire Ahead Pull Up, Wire Ahead Pull Up"</p>
TERRAIN	<p>Condition: FLTA Terrain Caution</p> <p>Pop-up Alert: "Caution - Terrain"</p> <p>Aural Message: "Caution -Terrain, Terrain"</p>
OBSTACLE	<p>Condition: FLTA Obstacle Caution</p> <p>Pop-up Alert: "Caution - Obstacle"</p> <p>Aural Message: "Caution - Obstacle, Obstacle"</p>
WIRE	<p>Condition: FLTA Wire Caution</p> <p>Pop-up Alert: "Caution - Wire"</p> <p>Aural Message: "Wire Ahead"</p>

HTAWS/HTERRAIN ALERT INDICATIONS	
ANNUNCIATION	CONDITION POP-UP AURAL MESSAGE
None	<p>Condition: Altitude Voice Call Out (VCO)</p> <ul style="list-style-type: none"> HTAWS/HTerrain provides optional 500 ft through 100 ft (in 100-ft increments) altitude voice call out alerts Additional values of 50 ft, 40 ft, 30 ft, 20 ft, and 10 ft are available if connected to a radar altimeter <p>Pop-up Alert: None</p> <p>Aural Messages:</p> <ul style="list-style-type: none"> “Five Hundred” “Four Hundred” “Three Hundred” “Two Hundred” “One Hundred” “Fifty” “Forty” “Thirty” “Twenty” “Ten”

HTAWS/HTERRAIN SYSTEM STATUS

During unit power up, terrain and obstacle database versions display along with a pilot disclaimer. A terrain system self-test occurs at this time. An aural alert is issued upon test completion.

SYSTEM	TEST RESULT	AURAL MESSAGE
HTAWS	Self-test is successful	"HTAWS Test OK"
	Self-test fails	"HTAWS Failure"
HTerrain Alerting	Self-test is successful	"Terrain System Test OK"
	Self-test fails	"Terrain System Failure"

A textual annunciation accompanies the aural message if the self-test fails. For a list of possible alerts, refer to the annunciations table in this section.

You can manually initiate the system test anytime the rotorcraft is on-ground. Read more about this option in *HTAWS/HTerrain Setup Selections*.

HTAWS/HTerrain Failure Alert

If the terrain/obstacle database is not available, "HTAWS FAIL" / "TER FAIL" annunciates accompanied by the aural message "HTAWS Failure" / "Terrain System Failure."

HTAWS/HTerrain Not Available Alert

- Requires a 3D GPS navigation solution along with specific vertical accuracy minimums.
- "HTAWS N/A" / "TER N/A" annunciates if the solution becomes degraded or the rotorcraft is out of database coverage area.

HTAWS/HTERRAIN SYSTEM STATUS INDICATIONS	
ANNUNCIATION	CONDITION POP-UP AURAL MESSAGE
HTAWS INHB	<p>Condition:</p> <ul style="list-style-type: none"> HTAWS/HTerrain has been inhibited by the crew <p>or</p> <ul style="list-style-type: none"> The aircraft ground speed is below 30 knots (automatic inhibiting)
TER INHB	<p>Pop-up Alert: None</p> <p>Aural Message: None</p>
HTAWS N/A	<p>Condition: HTAWS not available</p> <p>Pop-up Alert: None</p> <p>Aural Message: "HTAWS Not Available"</p>
TER N/A	<p>Condition: HTerrain not available</p> <p>Pop-up Alert: None</p> <p>Aural Message: "Terrain System Not Available"</p>
HTAWS FAIL	<p>Condition: HTAWS system fails</p> <p>Pop-up Alert: None</p> <p>Aural Message: "HTAWS Failure"</p>
TER FAIL	<p>Condition: HTerrain system fails</p> <p>Pop-up Alert: None</p> <p>Aural Message: "Terrain System Failure"</p>
RP MODE	<p>Condition:</p> <ul style="list-style-type: none"> Alerting thresholds are reduced Visual and aural annunciation of caution alerts are suppressed <p>Pop-up Alert: None</p> <p>Aural Message: None</p>



While en route, GTN Xi navigates directly to the center of the airport.

Unless already completed, disengage the autopilot (if equipped) and land the aircraft when you receive the “Maneuver and Land” alert.

Smart Glide does not manage altitude. In order to make a safe landing, you may need to add drag and/or maneuver the aircraft off route before reaching the airport.

Flashing textual annunciations alert the pilot of warning, caution, and advisory conditions. These annunciations appear in a banner on the Emergency page and over the route display on Map. They turn solid or disappear after 5 seconds.

Advisory Alert

APPROACHING AIRPORT

Annunciates when the aircraft is 4 NM from airport.

Caution Alert

AIRPORT OUT OF RANGE

Annunciates when the destination airport is unreachable.

Warning Alert

MANEUVER AND LAND

Annunciates when the aircraft is 2 NM from airport.

Flashing Alert Annunciations

- “AIRPORT OUT OF RANGE”¹
- “APPROACHING AIRPORT”¹
- “MANEUVER AND LAND”¹
- “ALTN APT OUT OF RANGE”²

¹ Turns solid after 5 seconds.

² Disappears after 5 seconds.

For a list of possible Smart Glide alerts, refer to the annunciation tables in *Smart Glide Alerts*.

Enable Smart Glide Activation



Smart Glide Activation
Enabled

Tapping **Smart Glide Activation** toggles activation between Enabled and Disabled. This key resides in the Emergency menu.

Disabling Smart Glide activation inhibits all methods of activation. An advisory message informs you of the following:

“SMART GLIDE Disabled. Activation manually disabled by pilot.”

To enable or disable Smart Glide activation:

From the Home page, tap **Emergency > Menu > Smart Glide Activation**.

Activate Smart Glide



NOTE

Contact a Garmin dealer if your installation does not provide access to emergency features.

FEATURE LIMITATIONS

Activation options are dependent upon installer configuration. If configured for an external switch, activation via the **Direct To** key is not available.

Emergency Page, GTN 650Xi



A message in the Emergency Mode Status window informs you that no emergency modes are active.

You may activate Smart Glide from any configured GTN Xi Series navigator or MFD TXi series display unit. If installed, an external switch allows manual activation without the use of a touchscreen.

SMART GLIDE ALERTING	
ANNUNCIATION	CONDITION AURAL MESSAGE BEHAVIOR
MANEUVER AND LAND	<p>Condition: Aircraft is 2 NM from the destination airport's center. If not already doing so, the pilot should disconnect the autopilot (if equipped) and maneuver to manage altitude for a safe landing.</p> <p>Aural Message: "Maneuver and land. Airport X o'clock. Two miles."</p> <p>Alert Behavior: Flashing annunciation turns solid after 5 seconds.</p>
NO AIRPORT IN RANGE	<p>Condition: Smart Glide activates with wings level and no airport within estimated glide range.</p> <p>Aural Message: "No airports within glide range."</p>
AIRPORT OUT OF RANGE	<p>Condition: Destination airport is out of estimated glide range. May occur due to decreasing glide performance.</p> <p>Aural Message: "Airport out of range." (plays only once)</p> <p>Alert Behavior: Flashing annunciation turns solid after 5 seconds.</p> <p>Note: Estimated arrival AGL not available.</p>
ALTN APT OUT OF RANGE	<p>Condition: The pilot selects an alternate airport via Map or the alternate airport list, but the airport becomes unreachable before Smart Guide can complete route calculation.</p> <p>Duration: 5 seconds</p> <p>Aural Message: None</p> <p>Alert Behavior: Flashing annunciation disappears after 5 seconds.</p>

SMART GLIDE ALERTING	
ANNUNCIATION	CONDITION AURAL MESSAGE BEHAVIOR
None	<p>Condition: Caution - Smart Glide is active within 2 NM of the destination airport, the autopilot is engaged, and there is not enough altitude for the system to safely make a full circle descent with 2,000 ft remaining. Disengage autopilot to manage energy.</p> <p>Aural Message: "Disconnect autopilot." (plays 10 seconds after arriving within 2 NM of destination airport)</p>
CALCULATING ROUTE	<p>Condition: System is calculating the glide route to a suitable destination airport. Occurs during the following:</p> <ul style="list-style-type: none"> • Smart Glide activation • Selection of an alternate destination (pilot override) • When the CDI exceeds half of full-scale deviation <p>Aural Message: None</p> <p>Note: Estimated arrival AGL not available until route calculation is complete.</p>
ACTIVE	<p>Condition: Destination airport within range. Follow the displayed GPS route.</p> <p>Aural Messages:</p> <ul style="list-style-type: none"> • "Airport X o'clock. More than thirty miles." • "Airport X o'clock. X miles." • "Airport X o'clock. X and a half miles." • "Airport X o'clock. One mile." • "Airport X o'clock. Less than one mile."
None	<p>Condition: Pilot attempts to activate Smart Glide via dedicated aircraft switch or Direct To key while the system is experiencing an error. On-screen Smart Glide key not available.</p> <p>Aural Message: "Smart Glide disabled."</p>

SMART GLIDE ALERTING	
ANNUNCIATION	CONDITION AURAL MESSAGE BEHAVIOR
APPROACHING AIRPORT	<p>Condition: Aircraft is 4 NM from the destination airport's center.</p> <p>Aural Message: "Approaching airport. X o'clock. Four miles."</p> <p>Alert Behavior: Flashing annunciation turns solid after 5 seconds.</p>
Smart Glide disabled until aircraft reaches 1,000 ft AGL	<p>Condition: Pilot attempts to activate Smart Glide via dedicated aircraft switch or Direct To key while Smart Glide is disabled on ground or before reaching 1,000 ft AGL.</p> <p>Aural Message: "Smart Glide disabled. Low altitude."</p>
None	<p>Condition: Pilot deactivates Smart Glide by tapping Cancel Glide.</p> <p>Aural Message: "Smart Glide canceled."</p>
None	<p>Condition: Pilot activates Smart Glide.</p> <p>Aural Message: "Smart Glide active."</p>
None	<p>Condition: Smart Glide is active and current AGL reaches 500 ft.</p> <p>Aural Message: "Five hundred."</p> <p>Note: Occurs only if unit is configured for Terrain Proximity.</p>
None	<p>Condition: Smart Glide is active and current AGL reaches 1,000 ft.</p> <p>Aural Message: "One thousand."</p> <p>Note: Occurs only if no airports are within range.</p>
None	<p>Condition: Smart Glide is active and current AGL reaches 2,000 ft.</p> <p>Aural Message: "Two thousand."</p> <p>Note: Occurs only if no airports are within range.</p>
None	<p>Condition: GFC transitions to autopilot engaged.</p> <p>Aural Message: "Engaging autopilot."</p>

System Failure Alerts

In the case of a Smart Glide system failure (e.g., position data failure), discontinue use of Smart Glide for navigation. Use alternate forms of navigation and consider alternate landing areas.

When a Smart Glide system failure occurs, the Emergency page automatically opens if another page is active. In dual GTN Xi installations, this occurs on GTN 2 only.

These alerts do not appear on Map.

SYSTEM FAILURE ALERTING	
ANNUNCIATION	CONDITION AURAL MESSAGE
TERRAIN DB ERROR	<p>Condition: Terrain database has an error.</p> <p>Aural Message: "Smart Glide failure. Consider alternate landing area."</p>
NAVIGATION DB ERROR	<p>Condition: Navigation database has an error.</p> <p>Aural Message: "Smart Glide failure. Consider alternate landing area."</p>
POSITION DATA ERROR	<p>Condition: Position or altitude data has an error.</p> <p>Aural Message: "Smart Glide failure. Consider alternate landing area."</p>
FPL LOAD FAILURE	<p>Condition: Error occurs while attempting to calculate a route.</p> <p>Aural Message: "Smart Glide failure. Consider alternate landing area."</p>

ADVISORY	CONDITION	CORRECTIVE ACTION
<p>OBS</p> <p>OBS is not available due to dead reckoning or no active waypoint.</p>	<p>OBS not supported in dead reckoning mode. Requires an active waypoint.</p>	<p>No action necessary.</p>
<p>PARALLEL TRACK</p> <p>Parallel track not supported for leg type.</p>	<p>Parallel track not supported on active leg type.</p>	
<p>PARALLEL TRACK</p> <p>Parallel track not supported for turns greater than 120 degrees.</p>	<p>Parallel track not supported for turns greater than 120 degrees due to the acute angle.</p>	
<p>PARALLEL TRACK</p> <p>Parallel track not supported past IAF.</p>	<p>Parallel track not supported on approaches.</p>	
<p>SELECT ARRIVAL RUNWAY</p> <p>Select appropriate runway for arrival procedure.</p>	<p>Aircraft is 15 NM from the final arrival waypoint in the flight plan and no runway has been selected.</p>	<p>Select a runway.</p>
<p>STEEP TURN</p> <p>Steep turn. Aircraft may overshoot course during turn.</p>	<p>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.</p>	<p>Slowing the aircraft may shallow the turn.</p>

G

GAGAN GPS-aided GEO Augmented Navigation

GCS Ground Clutter Suppression

GDC Garmin Air Data Computer

GDL Garmin Datalink

GDU Garmin Display Unit

GFC Garmin Flight Controller

GMA Garmin Marker Beacon Audio

GMU Garmin Magnetometer Unit

GP Glidepath

GPS Global Positioning System

GPSS Global Positioning System Steering

GRS Garmin Reference System

GS Glideslope

GSL Geometric Sea Level

GSU Garmin Sensing Unit

GTP Garmin Temperature Probe

GTX Garmin Transponder

| GWX Garmin Weather Radar

H

HDG Heading

HOT Hazardous Obstacle Transmission

HPL Horizontal Protection Level

HSI Horizontal Situation Indicator

HTAWS Helicopter Terrain Awareness and Warning System

R

RA	Resolution Advisory
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
RRC	Remote Radio Control
RTC	Reduced Required Terrain Clearance

S

SAR	Search and Rescue
SAT	Static Air Temperature
SBAS	Satellite Based Augmentation System
SBS	Surveillance and Broadcast Services
SD	Secure Digital
SID	Standard Instrument Departure
SIGMET	Significant Meteorological Information
SSID	Service Set Identifier
STAR	Standard Terminal Arrival
STBY	Standby
SUA	Special Use Airspace
SURF	Surface Situation Awareness
SUSP	Suspend
SVID	Satellite-Vehicle Identification

V

VCALC	Vertical Calculator
VCO	Voice Call Out
VDI	Vertical Deviation Indicator
VFR	Visual Flight Rules
VHF	Very High Frequency
VLOC	VOR/Localizer
VNAV	Vertical Navigation
VOR	Very High Frequency Omnidirectional Range
VORTAC	Very High Frequency Omnidirectional Range Station and Tactical Air Navigation
VPL	Vertical Protection Level
VRP	Visual Reporting Point
VS	Vertical Speed
VSI	Vertical Speed Indicator

W

WAAS	Wide Area Augmentation System
WGS84	World Geodetic System 1984
WPT	Waypoint
WX	Weather

X

XPDR	Transponder
XTK	Cross Track

