

Garmin International, Inc.
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FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT
or
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for the
Garmin GTN 625Xi, 635Xi, 650Xi, 725Xi, or 750Xi
GPS/SBAS Navigation System
as installed in

Make and Model Airplane

Registration Number: _____ Serial Number: _____

This document serves as an Airplane Flight Manual Supplement or as a Supplemental Airplane Flight Manual when the aircraft is equipped in accordance with Supplemental Type Certificate SA02019SE-D for the installation and operation of the Garmin GTN 625Xi, 635Xi, 650Xi, 725Xi, or 750Xi GPS/SBAS Navigation System. This document must be incorporated into the FAA Approved Airplane Flight Manual or provided as an FAA Approved Supplemental Airplane Flight Manual.

The information contained herein supplements the information in the FAA Approved Airplane Flight Manual. For limitations, procedures, loading and performance information not contained in this document, refer to the FAA Approved Airplane Flight Manual, markings, or placards. FAA approved sections of the AFMS are labeled "FAA APPROVED". Sections labeled "NOT FAA APPROVED" are for guidance only.

FAA Approved by:



JR Brownell

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ODA STC Unit Administrator
Garmin International Inc.
ODA-240087-CE

Date: 6/20/2025

LOG OF REVISIONS

	Page			
Revision Number	Date	Number	Description	FAA Approved
1	01/03/2020	All	Complete Supplement	Erik Frisk ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE
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			Section 2.31 • Clarified use of OBS mode	
			Added Section 2.33: Glide Range Ring and Best Glide Airport Indicator	
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			Added Section 7.35: Glide Range Ring and Best Glide Airport Indicator	
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		23	Added Section 3.1.2: Loss of Engine Power or Engine Failure in Flight Added Section 3.1.3: Smart Glide “Maneuver and Land / Disconnect Autopilot”	
		28	Added Section 3.2.16: Smart Glide Failure Added Section 3.2.17: Smart Glide Inadvertent Activation	
		31	Section 4: Added Section Table of Contents	
		38	Section 7.1: Updated Pilot’s Guide Revision	
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5	12/28/2021	6 12 54-63	Section 1.2: Updated Document Reference Section 2.5: Updated GTN Xi software versions and instructions to find software version Section 7.36: Added information about G5 and G3X to smart glide section. Additional corrections and clarifications were made throughout.	Erik Frisk ODA STC Unit Administrator Garmin International, Inc. ODA-240087-CE

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		Section 2	Updated software versions, new limitations, removed systems descriptions, reorganized. RNP limitation update.	
		Section 3	Updated procedures, reorganized.	
		Section 4	Updated procedures, reorganized.	
		Section 7	New systems descriptions, reorganized. GDL 60 systems description.	
		ALL	Added “FAA APPROVED” or “NOT FAA APPROVED” to footers for all pages.	
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		24	Rewrote Section 3.1.2 GTN Xi Smart Glide procedure for clarity. Combined Section 3.1.3 into Section 3.1.2.	
		Various	Section paragraphs and Table of Contents updated per the above changes.	

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		3	Updated software versions in Table 1-2	
		18	Added installer checkboxes for TAWS-A configurations	
		21	Added TAWS-A limitations	
		22	Added limitation for entry of procedures and altitude entry	
		24	Added note for TAWS operation in cold weather	
		28, 29, 32-35	Added GPWS and TAWS-A procedures and information	
		40	Added TAWS-A Flap and Glide slope inhibit procedures	
		47-51	Added TAWS-A and TAWS-B information and alerts	
		55	Added GWX 8000 description	
		76	Added Core Procedure selection description	

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		3	Updated software versions in Table 1-2	
		14	Added CPDLC and GCO to section 1.3	
		16	Added section 1.4, ATC Data Link System (CPDLC)	
		17	Updated definitions to section 1.7	
		20	Added GDR 66 breaker specifications to 1.8	
		21	Added CPDLC as an annunciator to 1.8.1	
		25	Added section 1.8.8 for CPDLC installations	
		27	Added section 1.8.9 for GCO installations	
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		33-34	Updated sections 3.2.13 – 3.2.18 description and procedures	
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		38	Added Carbon Monoxide (CO) Caution to section 3.4	
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		49	Updated section 7.2.5 missed approach note	
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		60	Added CPDLC to table 7-3 in section 7.6	
		65	Updated section 7.17	
		76	Updated section 7.25 description	
		82	Updated section 7.36 description	
		83	Added section 7.37 for ATC Data Link System (CPDLC)	
		86	Added section 7.38 for GCO 14	

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1 General

1.1 Garmin GTN Xi Navigators

The Garmin GTN Xi navigation system is a GPS system with a Satellite Based Augmentation System (SBAS), comprised of one or more Garmin TSO-C146e GTN 625Xi, 635Xi, 650Xi, 725Xi, or 750Xi navigator(s) and one or more Garmin approved GPS/SBAS antenna(s). The GTN navigation system is installed in accordance with AC 20-138D.

	GTN 625Xi	GTN 635Xi	GTN 650Xi	GTN 725Xi	GTN 750Xi
GPS SBAS Navigation:					
• Oceanic, enroute, terminal, and non-precision approach guidance	X	X	X	X	X
• Precision approach guidance (LP, LPV)					
VHF Com Radio, 118.00 to 136.990, MHz, 8.33 or 25 kHz increments		X	X		X
VHF Nav Radio, 108.00 to 117.95 MHz, 50 kHz increments			X		X
LOC and Glideslope non-precision and precision approach guidance for Cat 1 minimums, 328.6 to 335.4 MHz tuning range			X		X
Moving map including topographic, terrain, aviation, and geopolitical data	X	X	X	X	X
Display of datalink weather products, SiriusXM, FIS-B, Connex (all optional)	X	X	X	X	X
Control of GDR 66 FAA Datacomm (optional)				X	X
Control and display of airborne weather radar (optional)				X	X
Display of terminal procedures data (optional)				X	X
Display of traffic data, including ADS-B (optional)	X	X	X	X	X
Display of StormScope® data (optional)	X	X	X	X	X
Display of GCO 14 Carbon Monoxide Data (optional)	X	X	X	X	X
Display of marker beacon annunciators (optional)	X*	X*	X*	X	X
Remote audio panel control (optional)				X	X
Remote transponder control (optional)	X	X	X	X	X
Remote audio entertainment datalink control (optional)	X	X	X	X	X
TSO-C151dClass B TAWS (optional)	X	X	X	X	X
TSO-C151dClass A TAWS (optional)	X	X	X	X	X
Supplemental calculators and timers	X	X	X	X	X
Control of GSR 56 Iridium Satellite Phone and SMS Text	X	X	X	X	X
Control of Flight Stream 210 (optional)	X	X	X	X	X
Control of Flight Stream 510 (optional)	X	X	X	X	X

* Display of marker beacon annunciations on the GTN 6XX is only possible when installed with a Garmin GMA 350 audio panel.

Table 1-1 – GTN Functions

The GPS navigation functions, and optional VHF communication and navigation radio functions are operated by dedicated hard keys, a dual concentric rotary knob, or the touchscreen.

Although intuitive and user friendly, the GTN Xi requires a reasonable degree of familiarity to avoid becoming too engrossed at the expense of basic instrument flying in IMC and basic see-and-avoid procedures in VMC. Pilot workload will be higher for pilots with limited familiarity in using the unit in an IFR environment, particularly without the autopilot engaged. Garmin provides a detailed Pilot's Guide, and a tablet trainer app. Pilots should take full advantage of these tools to enhance their familiarity with the system.

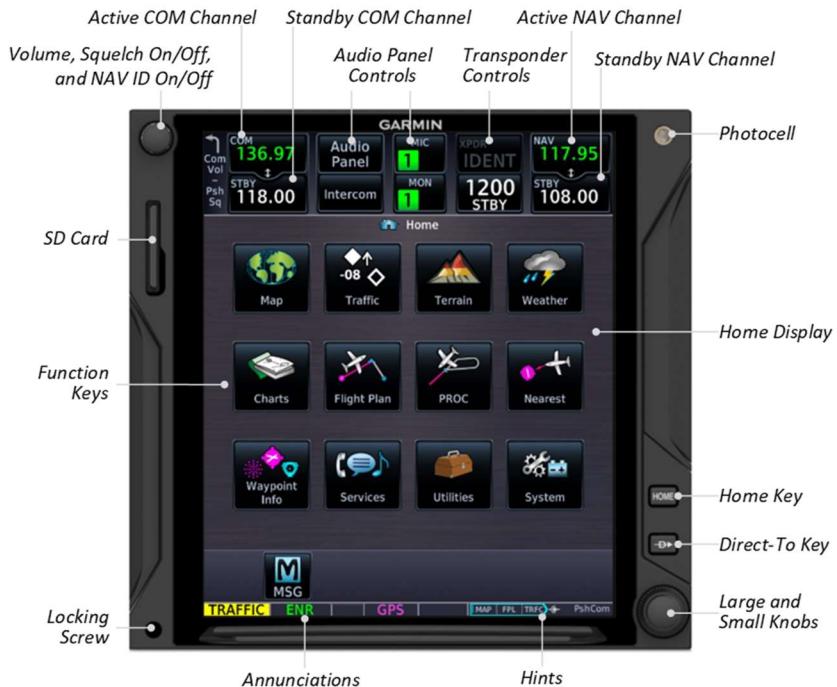


Figure 1 - GTN 750Xi Control and Display Layout

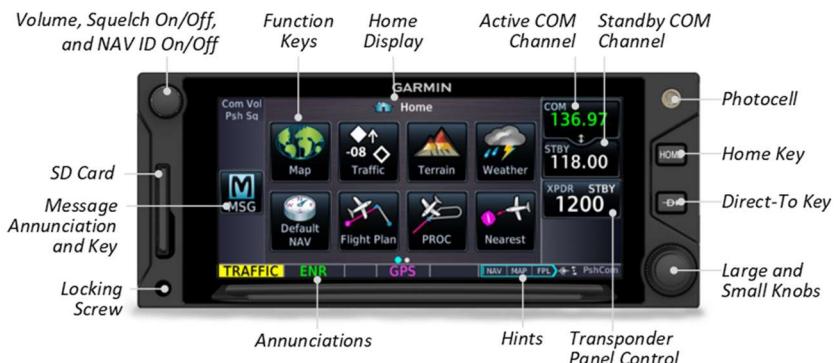


Figure 2 - GTN 635Xi/650Xi Control and Display Layout

1.2 Applicable System Software

All software versions displayed can be viewed on the System – System Status or Connxet Setup pages. The following or later software versions must be installed for this AFMS revision to be applicable to the installation.

Software Item	Software Version
Main SW Version	21.02
GPS SW Version	8.6
Com SW Version	2.11
Nav SW Version	2.04
Flight Stream 210	2.90
Flight Stream 510	2.9X
GDL 60	2.50
GDR 66	2.31

Table 1-2 - Software Versions

1.3 System Capabilities

This Flight Manual Supplement documents the installed capabilities of the GTN Xi specific to the aircraft for which this manual is created.

The GTN Xi system and associated navigation interface in this aircraft may have the following capabilities, in addition to the core multifunction display capability:

- VHF Communication Radio
- Primary VHF Navigation
- Primary GPS Navigation (Enroute) and Approach Capability (LP/LNAV) – See below
- Primary GPS Approach Capability with Vertical Guidance (LNAV/VNAV, LPV) – See below
- TSO-C151d Terrain Awareness and Warning System – See section 2.9
- Enroute Baro-VNAV
- Smart Glide
- ATC Data Link System (CPDLC)
- Cabin Carbon Monoxide Levels

GPS/SBAS TSO-C146e Class 3 Operation

The GTN Xi navigator installed in this aircraft is a TSO-C146e Class 3 approved GPS navigator that complies with AC 20-138D and has airworthiness approval for navigation using GPS and SBAS (within the coverage of a Satellite Based Augmentation System complying with ICAO Annex 10) for IFR enroute, terminal area, and non-precision approach operations (including those approaches titled “GPS”, “or GPS”, and “RNAV (GPS)” approaches). The Garmin GNSS navigation system is composed of the GTN Xi navigator and antenna and is approved for approach procedures with vertical guidance including “LPV” and “LNAV/VNAV” and without vertical guidance including “LP” and “LNAV”.

The Garmin GTN Xi system as installed in this airplane complies with the equipment, performance, and functional requirements to conduct RNAV operations in accordance with the following table. This table is accurate at the time it was published. However, changes to operational rules, FAA advisory circulars, flight plan formats, etc., are possible. The pilot is responsible to ensure compliance with current operational requirements.

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNAV 10	GNSS FDE availability must be verified prior to flight. Maximum predicted FDE unavailability is 34 minutes. ¹	FAA AC 20-138D CHG 2, FAA AC 90-105A,	R	A1	The GPS equipment as installed requires a second GNSS system for Class II navigation in oceanic and remote airspace.
RNP 10	Two GNSS systems required to be operational, (one GNSS system for those routes requiring only one long range navigation system).	FAA AC 91-70B, EASA AMC 20-12			When installed with a second GNSS system, the GTN Xi equipment complies with the requirements for GPS primary means of Class II navigation in oceanic and remote airspace, when used in conjunction with an FDE prediction tool that satisfies the guidance of FAA AC 20-138D and AC 90-105A (or later revision). ¹
Oceanic and Remote Areas of Operation (Class II Navigation)	No time limit using GNSS as the primary navigation sensor. Part 91, Part 91 subpart K, 121, 125, and 135 operators require operational approval.				Additional equipment may be required to obtain operational approval to utilize RNP-10 performance.
B-RNAV / RNAV 5 (Europe)	This does not constitute an operational approval.	FAA AC 90-96A CHG 1, EASA AMC 20-4A	R	B2	
RNP 4	GNSS FDE availability must be verified prior to flight. Maximum predicted FDE unavailability is 25 minutes. ¹	FAA AC 20-138D CHG 2, FAA AC 90-105A, FAA AC 91-70B	R	L1	The GPS equipment as installed requires a second GNSS system for Class II navigation in oceanic and remote airspace.
Oceanic and Remote Areas of Operation (Class II)					Additional equipment may be required to obtain

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
Navigation)	<p>Two operational long-range nav systems required, (or one navigation system and one GNSS sensor for those routes requiring only one long-range navigation sensor).</p> <p>No time limit using GNSS as the primary navigation sensor.</p> <p>Part 91, Part 91 subpart K, 121, 125, and 135 operators require operational approval.</p>				operational approval to utilize RNP-4 performance.
RNAV 2	<p>The GNSS RNAV system is installed and meets the performance and functional requirements of AC 90-100A.</p> <p>In accordance with AC 90-100A, CHG 2, Part 91 operators (except subpart K) following the aircraft and training guidance in AC 90-100A are authorized to fly RNAV 2 procedures.</p> <p>Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>	FAA AC 20-138D CHG 2, FAA AC 90-100A CHG 2	R	C2	Includes RNAV Q and T routes.

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNAV 1	<p>The GNSS RNAV system is installed and meets the performance and functional requirements of AC 90-100A.</p> <p>In accordance with AC 90-100A, Part 91 operators (except subpart K) following the aircraft and training guidance in AC 90-100A are authorized to fly RNAV 1 procedures.</p> <p>Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>	FAA AC 20-138D CHG 2, FAA AC 90-100A CHG 2	R	D2	Includes RNAV terminal departure, arrival procedures, and approach procedures up to the Final Approach Fix.
P-RNAV (Europe)	This does not constitute an operational approval.	FAA AC 90-96A CHG 1, JAA TGL 10 Rev 1	R	D2	ICAO flight plan code for P-RNAV no longer exists. P-RNAV utilizes RNAV 1 flight plan codes.

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP 0.3	<p>Includes RNP terminal departure and arrival procedures. When flying a RNP procedure with a radius-to fix (RF) leg, the AFCS must be operational. At a minimum, the flight director must be displayed and utilized when conducting procedures with RF legs.</p> <p>In accordance with AC 90-105A, Part 91 operators (except subpart K) following the aircraft and training guidance in AC 90-105A are authorized to fly RNP 1 procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>	FAA AC 90-105A	R	TBD	<p>Includes RNP terminal departure and arrival procedures, including procedures with radius-to-fix (RF) legs. Also includes approach procedures to the Final Approach Fix.</p> <p>AC 90-105A states that procedures with RF legs must be flown using either a flight director or coupled to the autopilot.</p> <p>Item 18 PBN flight plan code is still to-be-determined at time of publication of this AFMS.</p> <p>Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in Section 2.6.1 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 4.5 of this manual to determine if this capability is supported in this installation.</p>

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP 1	<p>When flying a RNP procedure containing an RF leg, the AFCS must be operational.</p> <p>At a minimum, the flight director must be displayed and utilized when conducting procedures containing radius-to-fix (RF) legs.</p> <p>In accordance with AC 90-105A, Part 91 operators (except subpart K), following the aircraft and training guidance in AC 90-105A are authorized to fly RNP 1 procedures.</p> <p>Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>	<p>FAA AC 20-138D CHG 2,</p> <p>FAA AC 90-105A</p>	R	O2	<p>Includes RNP terminal departure and arrival procedures, including procedures with radius-to-fix (RF) legs. Also includes approach procedures to the Final Approach Fix.</p> <p>AC 90-105A states that procedures with RF legs must be flown using either a flight director or coupled to the autopilot.</p> <p>Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in Section 2.6.1 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 4.5 of this manual to determine if this capability is supported in this installation.</p>

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP-2 (Oceanic / Remote)	<p>GNSS FDE availability must be verified prior to flight. Maximum predicted FDE unavailability is 5 minutes.¹</p> <p>Two operational long-range nav systems required, (or one navigation system and one GNSS sensor for those routes requiring only one long-range navigation sensor).</p> <p>No time limit using GNSS as the primary navigation sensor.</p> <p>Part 91, Part 91 subpart K, 121, 125, and 135 operators require operational approval.</p>	FAA AC 20-138D CHG2, FAA AC 90-105A FAA AC 91-70B	R	TBD	<p>The GPS equipment as installed requires a second GNSS system for Class II navigation in oceanic and remote airspace.</p> <p>Additional equipment may be required to obtain operational approval to utilize RNP-2 performance.</p> <p>Item 18 PBN flight plan code is still to-be-determined at time of publication of this AFMS.</p>
RNP-2 (Domestic / Offshore En route)	<p>In accordance with AC 90-105A, Part 91 operators (except subpart K) following the aircraft and training guidance in AC 90-105A are authorized to fly RNP-2 domestic and offshore routes.</p> <p>Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>	FAA AC 20-138D CHG 2, FAA AC 90-105A FAA AC 91-70B	R	TBD	<p>Includes RNP-2 domestic and offshore routes.</p> <p>Item 18 PBN flight plan code is still to-be-determined at time of publication of this AFMS.</p>

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP APCH LNAV minima	<p>When flying a RNP procedure with a radius-to-fix (RF) leg, the AFCS must be operational. At a minimum, the flight director must be displayed and utilized when conducting procedures containing RF legs.</p> <p>In accordance with AC 90-105A, Part 91 operators (except subpart K), following the aircraft and training guidance in AC 90-105A are authorized to fly RNP APCH LNAV minima procedures.</p> <p>Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>	<p>FAA AC 20-138D CHG 2, FAA AC 90-105A, EASA AMC 20-27A</p>	R	S1	<p>Includes non-precision approaches based on conventional navigation aids with “or GPS” in the title and area navigation approaches titled “GPS”, “RNAV-(GPS)”, and “RNAV (GNSS)”. This includes procedures with radius-to-fix (RF) legs.</p> <p>Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in Section 2.6.1 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 4.5 of this manual to determine if this capability is supported in this installation.</p>

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
RNP APCH LNAV/VN AV minima	<p>When flying a RNP procedure with a radius-to-fix (RF) leg, the AFCS must be operational. At a minimum, the flight director must be displayed and utilized when conducting procedures containing RF legs.</p> <p>In accordance with AC 90-105A, Part 91 operators (except subpart K), following the aircraft and training guidance in AC 90-105A are authorized to fly RNP APCH LNAV/VNAV minima procedures. Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>	<p>FAA AC 20-138D CHG 2, FAA AC 90-105A,</p> <p>EASA AMC 20-27A with CM-AS-002</p>	R	S2	<p>Includes area navigation approaches titled “RNAV (GPS)” and “RNAV (GNSS).” This includes procedures with radius-to-fix (RF) legs.</p> <p>Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in Section 2.6.1 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 4.5 of this manual to determine if this capability is supported in this installation.</p>
RNP APCH LP minima	<p>When flying a RNP procedure with a radius-to-fix (RF) leg, the AFCS must be operational. At a minimum, the flight director must be displayed and utilized when conducting procedures containing RF legs</p> <p>In accordance with AC 90-107, Part 91 operators (except subpart K),</p>	<p>FAA AC 20-138D CHG 2, FAA AC 90-107</p>	N/A	N/A	<p>Includes area navigation approaches titled “RNAV (GPS)” and “RNAV (GNSS)” including procedures with radius-to-fix (RF) legs.</p> <p>LP minima are available only when within SBAS coverage.</p> <p>Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in</p>

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
	<p>following the aircraft and training guidance in AC 90-107 are authorized to fly RNP APCH LP minima procedures.</p> <p>Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>				Section 2.6.1 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 4.5 of this manual to determine if this capability is supported in this installation.
RNP APCH LPV minima	<p>When flying a RNP procedure with a radius-to-fix (RF) leg, the AFCS must be operational. At a minimum, the flight director must be displayed and utilized when conducting procedures containing RF legs.</p> <p>In accordance with AC 90-107, Part 91 operators (except subpart K), following the aircraft and training guidance in AC 90-107 are authorized to fly RNP APCH LPV minima procedures.</p> <p>Part 91 subpart K, 121, 125, 129, and 135 operators require operational approval.</p>	<p>FAA AC 20-138D CHG 2,</p> <p>FAA AC 90-107,</p> <p>EASA AMC 20-28</p>	B	N/A	<p>Includes area navigation approaches titled “RNAV (GPS)” and “RNAV (GNSS)”, including procedures with radius-to-fix (RF) legs.</p> <p>LPV minima are available only when within SBAS coverage.</p> <p>Garmin has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the installation complies with limitation set forth in Section 2.6.1 of this document. It is recommended to couple the autopilot for RF procedures, if available, but it is not required to do so. See section 4.5 of this manual to determine if this capability is supported in this installation.</p>

Navigation Spec.	Operational Requirements/ Authorization	Reference Documents	ICAO Flight Plan Code		Notes
			Item 10a Code	Item 18 PBN/	
Advanced RNP See Notes for specific Advanced RNP functions.	This does not constitute an operational approval.	FAA AC 20-138D CHG 2, FAA AC 90-105A	N/A	N/A	<ul style="list-style-type: none"> • <u>RNAV Holding:</u> Supported. • <u>RF Legs:</u> Supported. • <u>Parallel Offsets:</u> RNP-4 parallel offsets as defined by AC 20-138D Chapter 10 are supported. <p>Advanced RNP parallel offsets as defined by AC20-138D Appendix 3 are supported.</p> <ul style="list-style-type: none"> • <u>Higher Continuity:</u> Supported only when a second GNSS system is installed and operating. • <u>Scalable RNP:</u> Not supported. • <u>Fixed Radius Transitions (FRT):</u> Not Supported • <u>Time of Arrival Control (TOAC):</u> Not supported.

FDE/RAIM availability worldwide can be determined via the following:

- An FDE prediction tool that satisfies the guidance of FAA AC 20-138D and AC 90-105A (or later revision), such as the Garmin RAIM/FDE Prediction program (<https://fly.garmin.com/fly-garmin/support/raim/>)

Also, within the United States:

- Via the FAA's RAIM Service Availability Prediction Tool (SAPT) website: <http://sapt.faa.gov>.
- Contacting a Flight Service Station (not DUATS) to obtain non-precision approach RAIM.

Within Europe,

- An FDE prediction tool that satisfies the guidance of FAA AC 20-138D and AC 90-105A (or later revision)
- Europe's AUGER GPS RAIM Prediction Tool at <http://augur.ecacnav.com/augur/app/home>.

This requirement is not necessary if SBAS coverage is confirmed to be available along the entire route of flight.

Garmin International holds an FAA Type 2 Letter of Acceptance (LOA) in accordance with AC 20-153A for database integrity, quality, and database management practices for the Navigation database. Flight crews and operators can view the LOA status at FlyGarmin.com then select "Aviation Database Declarations".

1.4 ATC Data Link System (CPDLC) (Optional)

The FAA has approved the optional aircraft data link system meeting the criteria in AC 20-140C for the following datalink capabilities:

FAA Data Comm	
Interoperability Designators	FANS 1/A – CPDLC (with automation)*
Subnetworks	VDL M2 (TSO-C160a)
Aircraft-Allocated Performance	CPDLC: RCP 130, RCP 240, RCP 400

* Push to load is supported

This design approval does not constitute operational authorization.

When filing ICAO flight plans, use the following equipment codes for FAA Data Comm enroute enabled installations:

Field 10a: J4Z

Field 18: DAT/1FANSE¹

REG/XXXXXX²

CODE/YYYYYY³

1. DAT/1FANSE2PDC can be used to specify PDC is secondary
2. XXXXXX is the aircraft registration number
3. YYYYYY is the 24 bit HEX ICAO address

1.5 Electronic Flight Bag

The GTN 750Xi/725Xi are operationally suitable as installed equipment, Type B EFB applications in accordance with AC 120-76D when using current FliteChart or ChartView data.

Use of the Flight Stream interface and data for the purpose of Electronic Flight Bag applications is not approved as part of this STC. Additional approval may be required to obtain operational approval for use of the Flight Stream and supplied data to supplement EFB systems.

1.6 Electronic Checklists

The GTN Xi checklist functions are designed to DO-178B software design assurance level B and support a minor failure classification. While this STC does not grant operational approval for operators requiring such approval, there are no limitations precluding operators from obtaining their own operational approval for the checklist function.

1.7 Definitions

The following terminology is used within this document:

ACARS	Aircraft Communications Addressing and Reporting System	LOC	Localizer
ADF	Automatic Direction Finder	LOC-BC	Localizer Backcourse
ADS-B	Automatic Dependent Surveillance Broadcast	LP	Localizer Performance
AEG	Aircraft Evaluation Group (FAA)	LPV	Localizer Performance with Vertical Guidance
APR	Approach	LP+V	Localizer Performance with Advisory Vertical Guidance
ASR	Automated Speech Recognition	MLS	Microwave Landing System
ATK	<u>Along TracK</u>	MMC	Multi-Media Card
ATN	Aeronautical Telecommunication Network	NOTAM	Notice to Air Missions
ATS	Air Traffic Services	OBS	Omni Bearing Selector
CDI	Course Deviation Indicator	PDC	Pre-Departure Clearance
CPDLC	Controller Pilot Datalink Communications	PED	Portable Electronic Device
DCL	Departure Clearance	PTC	Push-To-Command
DEST	Destination	RAIM	Receiver Autonomous Integrity Monitoring
DME	Distance Measuring Equipment	RF Leg	Radius-To-Fix Leg of a Charted Instrument Procedure
ECAC	European Civil Aviation Conference	RFL	Reverse Frequency Lookup
EFB	Electronic Flight Bag	RMT	Remote
EHSI	Electronic Horizontal Situation Indicator	RNAV	Area Navigation
FANS	Future Air Navigation System	RNP	Required Navigational Performance
FPA	Flight Path Angle	SAR	Search and Rescue
FIS-B	Flight Information Services Broadcast	SBAS	Satellite Based Augmentation System
GCO	Garmin Carbon Monoxide	SD	Secure Digital
GDU	Garmin Display Unit	SDF	Simplified Directional Facility
GMA	Garmin Multimedia Audio	SUSP	Suspend
GNSS	Global Navigation Satellite System	TACAN	Tactical Air Navigation System
GPA	Glidepath Angle	TAS	Traffic Awareness System
GPS	Global Positioning System	TAWS	Terrain Awareness and Warning System
GPSS	GPS Roll Steering	TCAS	Traffic Collision Avoidance System
GPWS	Ground Proximity Warning System	TCH	Threshold Crossing Height
GTN	Garmin Touchscreen Navigator	TFR	Temporary Flight Restriction
HOT	Hazardous Obstacle Transmission wires	TIS	Traffic Information Service
HSI	Horizontal Situation Indicator	VHF	Very High Frequency
IFR	Instrument Flight Rules	VFR	Visual Flight Rules
ILS	Instrument Landing System	VGSI	Visual Glide-Slope Indicator
IMC	Instrument Meteorological Conditions	VLOC	VOR/Localizer
LDA	Localizer Directional Aid	VMC	Visual Meteorological Conditions
LNAV	Lateral Navigation	VNAV	Vertical Navigation
LNAV+V	LNAV with advisory Vertical Guidance	VOR	VHF Omnidirectional Range
L/VNAV	Lateral/Vertical Navigation	VRP	Visual Reporting Point
		WAAS	Wide Area Augmentation System
		XFR	Transfer

1.8 Installation Description

The following describes the GTN installation and configuration for this aircraft. Reference this section when using the Normal or Emergency Procedures in Sections 3 and 4. A function or installed feature is applicable to this aircraft only when the corresponding box is checked.

The major components are protected with resettable circuit breakers available to the pilot. The breakers installed in the aircraft are checked below.

	Description	Derivative	Circuit Breaker Label(s)
<input type="checkbox"/>	GTN #1	<input type="checkbox"/> 750 (GPS/COM/NAV) <input type="checkbox"/> 735 (GPS/COM) <input type="checkbox"/> 725 (GPS Only) <input type="checkbox"/> 650 (GPS/COM/NAV) <input type="checkbox"/> 635 (GPS/COM) <input type="checkbox"/> 625 (GPS Only)	<input type="checkbox"/> GPS 1 <input type="checkbox"/> NAV/GPS 1 <input type="checkbox"/> COM <input type="checkbox"/> COM 1
<input type="checkbox"/>	GTN #2	<input type="checkbox"/> 750 (GPS/COM/NAV) <input type="checkbox"/> 735 (GPS/COM) <input type="checkbox"/> 725 (GPS Only) <input type="checkbox"/> 650 (GPS/COM/NAV) <input type="checkbox"/> 635 (GPS/COM) <input type="checkbox"/> 625 (GPS Only)	<input type="checkbox"/> GPS 2 <input type="checkbox"/> NAV/GPS 2 <input type="checkbox"/> COM <input type="checkbox"/> COM 2
<input type="checkbox"/>	Integrated Audio Panel	GMA 35	AUDIO
<input type="checkbox"/>	Streaming Device	Flight Stream 210	BT LINK
<input type="checkbox"/>	Wireless Access	GDL 60	CNXT CNXT BATT
<input type="checkbox"/>	ATC Data Link (CPDLC)	GDR 66	DATACOMM

1.8.1 Installed Controllers and Annunciators

	Description
<input type="checkbox"/>	Remote TAWS Annunciator
<input type="checkbox"/>	Remote GPS Annunciator
<input type="checkbox"/>	Remote CPDLC Annunciator

1.8.2 Interfaces and Connections

The following describes the functionality present in the aircraft based on the external interfaces to the GTN Xi.

1.8.2.1 Heading

- This installation *has* a heading source. The GTN Xi will provide roll steering on heading legs for the autopilot.
- This installation *does not have* a heading source. The crew cannot use the GTN Xi roll steering to fly heading legs with the autopilot.

1.8.2.2 Altitude

- This installation *has* a barometric corrected altitude source. The GTN Xi will automatically sequence altitude legs.
- This installation *does not have* a barometric corrected altitude source. The flight crew will be prompted to manually sequence altitude legs.

1.8.2.3 Autopilot

- This installation prompts the flight crew and requires the pilot to enable the approach outputs just prior to engaging the autopilot in APR mode.
- This installation supports coupling to the autopilot in approach mode once vertical guidance is available.
- The installation *does not* support any vertical capture or vertical tracking.
- This installation is equipped and configured to provide VNAV display and autopilot coupling.
- This installation is equipped and configured to provide VNAV *display only*.
- This installation *does not* support VNAV display or coupling.
- This installation is configured with VNAV Transition to Approach.

1.8.2.4 Traffic Systems

- No traffic system is interfaced to the GTN Xi.
- A TAS/TCAS I traffic system is interfaced to the GTN Xi.
- A TIS traffic system is interfaced to the GTN Xi.
- A TCAD traffic system is interfaced to the GTN Xi.
- A Garmin ADS-B traffic system is interfaced to the GTN Xi.
- A Garmin ADS-B traffic system is interfaced to the GTN Xi. The ADS-B traffic system is also interfaced to an on-board traffic system.

1.8.3 Navigation Capabilities

- This installation is equipped to support autopilot coupled RF leg navigation up to RNP 1.0.
- This installation is equipped to support hand-flown RF leg navigation at RNP 1.0.
- This installation is equipped to support autopilot coupled RF leg navigation at RNP 0.3 and has received required installer approval for such procedures.
- This installation *does not* support RF leg navigation.

1.8.4 Cold Weather Compensation

- This installation supports cold weather compensated intermediate approach and minimums altitudes.
- This installation supports cold weather compensated *intermediate approach altitudes and missed approach altitudes only*.
- This installation does not support cold weather compensation.

1.8.5 Terrain Awareness

- This installation supports *Terrain Proximity. No aural or visual alerts* for terrain or obstacles are provided. Terrain Proximity *does not* satisfy the TAWS requirement of 91.223.
- This installation supports *Terrain Alerting*. Aural and visual alerts are provided. Terrain Alerting *does not* satisfy the TAWS requirement of 91.223.
- This installation supports *TAWS B*. Aural and visual alerts *will be* provided. This installation *does* support the TAWS requirement of 91.223.
- This installation supports TAWS A on GTN 1. Aural and visual alerts *will be* provided. This installation *does* support the TAWS requirement of 91.223.
- This installation supports TAWS A on GTN 1 *and* GTN 2. Aural and visual alerts *will be* provided. This installation *does* support the TAWS requirement of 91.223.

1.8.6 Go-Around Functionality

- This installation *will* autoswitch from VLOC to GPS when the “Activate GPS Missed Approach” button is pressed.
- This installation *will not* autoswitch from VLOC to GPS when the “Activate GPS Missed Approach” button is pressed.

1.8.7 Smart Glide Configuration

Smart Glide is configured in this installation with the following parameters:

MAX Desired Gust Speed _____ KT

Desired Effective Runway Length _____ ft

Supported Runway Surface Type:

- HARD
- HARD & SOFT
- AMPHIBIOUS (ANY)
- WATER ONLY

Smart Glide is not configured in this installation

1.8.8 ATC Data Link (CPDLC)

- CPDLC is configured in this installation.
- CPDLC is not configured in this installation.

1.8.9 GCO

- This installation *has* a GCO unit.
- This installation *does not have* a GCO unit.

2 LIMITATIONS

2.1 Kinds of Operation

Unless placarded as limited to VFR only operations, equipment installed in a certified aircraft is approved for Day and Night / VFR and IFR operations in accordance with 14 CFR Part 91, Part 121, and Part 135 when appropriately maintained. Minimum flight crew is unchanged by this STC.

2.2 Minimum Equipment

The GTN Xi must have the following system interfaces fully functional to be used for primary navigation during IFR operations:

Interfaced Equipment	Number installed	VFR	IFR
External HSI/CDI/EHSI	1 or more	1*	1
External GPS Annunciator	1	1**	1**
GMA 35(c)	0 or 1	0	0
Flight Stream 510	0 or 1	0	0
Flight Stream 210	0 or 1	0	0
GDL 60	0 or 1	0	0
GDR 66	0 or 1	0	0
GCO 14	0 or 1	0	0

Table 2-1 – Required Equipment

* An external CDI is required for installations using the VOR navigation and glideslope information.

** Certain installations require an external GPS annunciator panel. If installed, this annunciator must be fully functional to use the GTN Xi GPS navigation for VFR or IFR operations.

GTN 625Xi/635Xi/725Xi installations:

Required Equipment for IFR operations utilizing GPS navigation: Single GTN Xi Navigator plus a second source of GPS navigation or a separate source of VHF navigation. The separate source of VHF navigation must not be the primary GTN Xi, but it may be a secondary GTN

GTN 650Xi/750Xi installations:

Single engine piston aircraft under 6,000 lbs. maximum takeoff weight:

Required Equipment for IFR operations utilizing GPS navigation: Single GTN Xi Navigator

All other aircraft:

Required Equipment for IFR operations utilizing GPS navigation: Single GTN Xi Navigator plus a second source of GPS navigation or a separate source of VHF navigation. The separate source of VHF navigation must not be the primary GTN Xi, but it may be a secondary GTN.

Operation in remote or oceanic operation requires two sources of GPS navigation.

2.3 System Use

The moving map and CDI depiction on the GTN Xi display must not be used for primary course guidance.

2.4 Navigation Database

GPS/SBAS based IFR operations are prohibited unless the flight crew verifies and uses a valid, compatible, and current navigation database or verifies each waypoint for accuracy by reference to current approved data.

2.5 Ground Operations

Using SafeTaxi, FliteCharts, and ChartView functions as the sole basis for ground maneuvering is prohibited.

2.6 RNAV Procedures

Instrument flight procedures must be loaded from the GTN Xi navigation database.

When conducting instrument approaches referenced to true North, the NAV Angle on the System -Units page must be set to **True**.

When using advisory vertical guidance, the flight crew must use the primary barometric altimeter to ensure compliance with all altitude restrictions.

Pilots are prohibited from flying any approach path that contains manually entered waypoints.

IFR approaches are prohibited whenever any physical or visual obstruction (such as a throw-over yoke) restricts pilot view or access to the GTN Xi and/or the CDI.

2.6.1 RF Legs

The following limitations apply to RNP 1 procedures with RF legs:

- Aircraft is limited to 180 KIAS while on the RF leg
- Hand-flown RF legs are limited to RNP 1 procedures. RNP AR is not approved
- Primary navigation guidance on RF legs must be shown on an EHSI indicator with auto-slew capability turned ON
- GTN Xi Moving Map, EHSI Map, or Distance to Next Waypoint information must be displayed to the pilot during the RF leg when flying without the aid of the autopilot or flight director.
- The active waypoint must be displayed in the pilot's primary field of view.

The following limitations apply to RNP 0.3 procedures with RF legs:

- Two RF leg RNP 0.3 capable navigators are required and must be crossfilled
- Two installed ADAHRS (or ADC/AHRS combination) sources are required

- The aircraft must have a Garmin GFC 500 or GFC 600 autopilot installed and in use during RNP 0.3 operations
- CDI scaling must be manually set to 0.3NM during RNP 0.3 operations
- Primary navigation guidance on RF legs must be shown on an EHSI indicator with auto-slew capability turned ON
- RNP 0.3 is only approved on RF legs prior to the FAF
- Operational approval is limited to FAA AC 90-105 A-RNP NavSpec only. RNP-AR not allowed.
- Installation must be approved for coupled RF capability by installer
- The operator must obtain the necessary LOA or OpSpec approval from the appropriate regulatory agency

2.7 QFE Barometric Setting

When flying procedures requiring the use of QFE barometric settings, the pilot must ensure that the barometric setting for the source interfaced with the GTN Xi is set to QFE as appropriate. GTN Xi does not support barometric VNAV for QFE operations.

2.8 Terrain Alerting Function (All Units)

Maneuvers and navigation must not be based solely on the display of terrain, obstacles, or wires on the moving map terrain displays.

2.9 TAWS Function (Optional)

For TAWS-A operations, one of the following documents must be immediately available to the flight crew during all phases of flight:

- For installations in the Textron Aviation (Cessna) Model 525A with the Garmin G600 TXi PFD installed under Garmin STC #SA02571SE, Garmin CE525A Cockpit Reference Guide, P/N 190-01717-BF, revision 1 (or later revision).
- For all other installations, Garmin GTN 6XX Xi/7XX Xi TAWS-A Cockpit Reference Guide, P/N 190-01007-C5, revision 1 (or later revision).

Flight crews are authorized to deviate from their current ATC clearance to the extent necessary to comply with TAWS warnings. Navigation must not be predicated upon the use of TAWS.

TAWS must be inhibited when landing at an airport that is not included in the airport database or is not designated as a User Airport in the GTN Xi.

If an external TAWS annunciator panel is installed in the aircraft, this annunciator panel must be fully functional to use the TAWS system.

The use of the terrain awareness warning and terrain display functions is prohibited during QFE (atmospheric pressure at airport elevation) operations.

Terrain, and Obstacle databases must be current for TAWS-B functionality. Terrain, Obstacle, and Navigation databases must be current for TAWS-A functionality.

2.10 Polar Operations

Use of the GTN Xi for primary navigation or TAWS-A functionality for latitudes above 89.00° N and below 89.00° S is prohibited.

2.11 Datalink Weather Display (Optional)

Use of datalink weather information as the sole means for maneuvering in, near, or around areas of hazardous weather is prohibited. Use of datalink services as the primary means to provide Temporary Flight Restriction (TFR) or Notice to Air Missions (NOTAM) information is prohibited.

2.12 Traffic Display (Optional)

Use of traffic display as the sole basis for maneuvering to avoid traffic is prohibited.

2.13 Demo Mode

Demo mode is prohibited in flight.

2.14 Wire Obstacle Database

Use of the “Obstacle/Wire” database is prohibited.

2.15 Database Updates

In-flight database transfers or updates are prohibited.

2.16 OBS Mode

Use of OBS mode for flight plan segments greater than 250_{NM} is prohibited.

2.17 Advisory Visual Approaches

Use of advisory visual approaches in IMC is prohibited.

2.18 Smart Glide

Engaging Smart Glide is prohibited for One-Engine Inoperative operations in multi-engine aircraft. Smart Glide usage for multi-engine aircraft is limited to dual engine failure situations.

2.19 Procedure Routes, Altitudes, and Speeds

Procedures loaded into the GTN default to turbojet routes, altitudes, and speeds. The crew must verify the route, altitudes, and speeds when any procedure is loaded into the GTN.

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3.1 Emergency Procedures

3.1.1 TAWS Alerting

PULL UP			
2 X "Terrain Ahead, Pull Up"	OR	"Terrain, Terrain; Pull Up, Pull Up"	OR
2 X "Obstacle Ahead, Pull Up"	OR	"Obstacle, Obstacle; Pull Up, Pull Up"	OR
2 X "Wire Ahead, Pull Up"	OR	"Wire, Wire; Pull Up, Pull Up"	OR
"[Whoop Whoop]; Pull-Up"			

Red annunciator and aural:

Autopilot..... DISCONNECT
Aircraft Controls..... INITIATE MAXIMUM POWER CLIMB
Airspeed..... BEST ANGLE OF CLIMB SPEED

After Warning Ceases:

Altitude CLIMB AND MAINTAIN SAFE ALTITUDE
Advise ATC of Altitude Deviation, if appropriate.

NOTE

TAWS annunciators external to the GTN Xi may not indicate the exact threat causing the alert. Example: WIRE alerts may be annunciated as TERR or OBSTACLE on external devices.

NOTE

Operations in extreme cold temperatures, for example, -30 degrees Celsius, will result in a significant reduction in terrain clearance provided by TAWS alerts.

3.1.2 LOSS OF ENGINE POWER or ENGINE FAILURE IN-FLIGHT

NOTE

This procedure only applies if SMART GLIDE is enabled on the GTN Xi. If it is not, refer to the aircraft POH or AFM for emergency procedures.

If the aircraft cannot maintain altitude:

Smart Glide..... ACTIVATE IF DESIRED
If smart glide is activated:

Autopilot AS DESIRED
Aircraft Emergency Procedures ACCOMPLISH

NOTE

Some autopilots may be unable to hold best glide speed. Failure to fly at best glide speed may affect glide performance.

Red annunciator and aural “Disconnect Autopilot”:

Autopilot **DISENGAGE**

NOTE

When Smart Glide alerts “Maneuver and Land, Disconnect Autopilot” the GTN will no longer provide course guidance to the glide airport.

3.2 Abnormal Procedures

3.2.1 LOSS OF GPS/SBAS NAVIGATION DATA

LOI

GPS/SBAS Receiver..... INOP, NOT AVAILABLE, OR INVALID

If Alternate Navigation Sources (ILS, LOC, VOR, DME, ADF) Are Available:

Navigation **USE ALTERNATE SOURCES**

If No Alternate Navigation Sources Are Available:

DEAD RECKONING (DR) MODE:

Navigation **USE GTN Xi**

NOTE

All information normally derived from GPS will become less accurate over time.

LOSS OF INTEGRITY (LOI) MODE (no DR annunciated on the GTN Xi):

Navigation **FLY TOWARDS KNOWN VISUAL CONDITIONS**

NOTE

All information derived from GPS will be removed.

NOTE

The airplane symbol is removed from all maps. The map will remain centered at the last known position. “NO GPS POSITION” will be annunciated in the center of the map.

3.2.2 GPS APPROACH DOWNGRADE

If GPS Receiver has Reduced Accuracy:

During an LPV, LP +V, LNAV/VNAV, or LNAV +V approach:

Approach **DOWNGRADED**

Vertical Deviation Indication..... **REMOVED**

Approach **MAY BE CONTINUED WITH LNAV MINIMUMS**

During a VISUAL approach:
Vertical Deviation Indication REMOVED

If GPS Receiver has Loss of Accuracy:

During any GPS or VISUAL approach:
CDI Guidance FLAGGED
System Message ABORT APPROACH
CDI TERMINAL NAVIGATION MODE LIMITS

If GPS Receiver Accuracy is Within Terminal Limits:
Missed Approach EXECUTE USING GPS

If GPS Receiver Accuracy is Not Restored:
Missed Approach....EXECUTE USING ALTERNATE NAVIGATION

3.2.3 LOSS OF COM RADIO TUNING FUNCTIONS

If alternate COM is available:
Communications USE ALTERNATE COM

If no alternate COM is available:
COM RMT XFR key (if installed).....PRESS AND HOLD FOR 2 SECONDS

NOTE

This procedure will tune the active COM radio the emergency frequency 121.5, regardless of what frequency is displayed on the GTN Xi. Certain failures of the tuning system will automatically tune 121.5 without flight crew action.

3.2.4 LOSS OF AUDIO PANEL FUNCTIONS (GMA 35 Only)*

Audio Panel Circuit Breaker PULL

* Includes GMA 35 and GMA 35c Audio Panels

NOTE

This procedure will force the audio panel into fail safe mode which provides only the pilot with communications and only on a single COM radio. If any non GTN 750Xi COM is installed, communication will be only on that radio. If only a GTN 750Xi is installed in the aircraft, then the pilot will have only the GTN 750Xi COM available. No other audio panel functions including aural alerting and the crew and passenger intercom will function.

3.2.5 LOSS OF ATC DATA LINK (CPDLC)



Communications USE VOICE
DATACOMM Breaker PULL

3.2.6 TAWS CAUTION

TERRAIN	OBSTCL	WIRE	GLIDESLOPE	
2 X "Terrain Ahead"	OR	2 X "Caution, Terrain"	OR	
2 X "Obstacle Ahead"	OR	2 X "Caution, Obstacle"	OR	
2 X "Wire Ahead"	OR	2 X "Caution, Wire"	OR	
"Too Low, Terrain"	OR	"Terrain, Terrain"	OR	
"Don't Sink"	OR	"Too Low, Gear"	OR	
"Too Low, Flaps"				

Pilot Action INITIATE CLIMB OR TURN OR BOTH

TERRAIN

"Sink Rate"

Vertical Speed ARREST DESCENT

GLIDESLOPE

"Glideslope"

Pilot Action RE-INTERCEPT GLIDESLOPE

NOTE

TAWS annunciators external to the GTN Xi may not indicate the exact threat causing the alert. Example: WIRE alerts may be annunciated as TERR or OBSTACLE on external devices.

3.2.7 TAWS INHIBIT

The TAWS Forward Looking Terrain Avoidance (FLTA) and Premature Descent Alerts (PDA) functions may be inhibited to prevent alerting, if desired. Refer to GTN Xi Series Pilot's Guide for additional information.

To Inhibit TAWS:

Home Hard Key	PRESS
Terrain Button	PRESS
Menu Button	PRESS
TAWS Inhibit Button	PRESS TO ACTIVATE

CAUTION

Inhibiting TAWS function(s) outside those required by limitation in this document is discouraged.

3.2.8 GPWS INHIBIT (TAWS-A Only)

For airplanes equipped with TAWS-A, some GPWS functions may be inhibited to stop alerting if desired. Refer to GTN Xi Series Pilot's Guide for additional information.

To Inhibit GPWS:

Home Hard Key	PRESS
Terrain Button	PRESS
Menu Button	PRESS
GPWS Inhibit Button	PRESS TO ACTIVATE

CAUTION

Inhibiting GPWS function(s) outside those required by limitation in this document is discouraged.

NOTE

The GPWS INHIBIT feature will not inhibit Altitude Voice Callouts (VCO) or Glideslope Deviation (GSD) alerting.

3.2.9 TER N/A, TER FAIL, TAWS N/A, TAWS FAIL, GPWS N/A, GPWS FAIL

If the amber **TER N/A, TER FAIL, TAWS N/A, TAWS FAIL, GPWS N/A, GPWS FAIL** status annunciator is displayed, the system will no longer provide TAWS alerting or display relative terrain and obstacle elevations. The crew must maintain compliance with procedures that ensure minimum terrain and obstacle separation.

3.2.10 DATA SOURCE - HEADING SOURCE INOPERATIVE OR CONNECTION TO GTN LOST MESSAGE

Autopilot:

Autopilot Roll Steering	UNAVAILABLE
Autopilot	ACTIVATE HDG MODE FOR HEADING LEGS

Main Map Page:

Map – Heading Up View	UNAVAILABLE
TAS/TCAS I or Garmin ADS-B-IN Traffic Data Overlay	UNAVAILABLE
StormScope® Data Overlay	UNAVAILABLE
Onboard Weather Radar Data Overlay	UNAVAILABLE

NOTE

Utilize the dedicated Traffic, StormScope®, and Weather Radar pages when map overlays are unavailable. StormScope® must be operated in accordance with Section 7.26 when no heading is available.

3.2.11 ASR (VOICE COMMAND) SYSTEM FAILURES

In the event the ASR system fails and there is a need to disable the voice command inputs to the GTN Xi:

To Disable ASR:

Home Hardkey	PRESS
System Button.....	PRESS
Voice Commands Button.....	PRESS
Voice Commands Enable Button.....	TOGGLE OFF

3.2.12 LOSS OF GTN TOUCH CONTROL

In the event the GTN Xi becomes unusable due to uncommanded page changes, the ASR function may be the source.

To Disable ASR:

Audio Panel Circuit Breaker.....	PULL
Home Hardkey	PRESS
System Button.....	PRESS
Voice Commands Button.....	PRESS
Voice Commands Enable Button.....	TOGGLE OFF

Audio Panel Circuit Breaker..... PUSH

3.2.13 DATA SOURCE – PRESSURE ALTITUDE SOURCE INOPERATIVE OR CONNECTION TO GTN LOST MESSAGE

If GTN Xi Is Forwarding Pressure Altitude Data to Transponder:

Pressure Altitude Source	INOPERATIVE OR NOT CONNECTED
Transponder	NO RECEIVED PRESSURE ALTITUDE DATA

3.2.14 UNRECOVERABLE LOSS OF ALL ELECTRICAL GENERATORS OR ALTERNATORS

GTN #2 (NAV/GPS 2, COM 2) (if installed).....	REMOVE POWER
Flight Stream 210 (BT LINK) (if installed).....	REMOVE POWER
All Other Non-Essential Flight Equipment.....	REMOVE POWER

3.2.15 IN-AIR RESTART OF GTN

Database Update Screen PRESS CANCEL BUTTON

3.2.16 BARO-ALT INPUT FAILURE

Enroute Barometric VNAV	UNAVAILABLE
Altitude Terminated Legs	MANUALLY SEQUENCE

3.2.17 TEMPERATURE INPUT FAILURE

VNAV Transition Approach.....	DISREGARD
Vertical Guidance from Descent VNAV to Approach Guidance.....	VERIFY
If Autopilot Is in Use:	
Intercept Approach Vertical Guidance from Below.....	VERIFY

3.2.18 SMART GLIDE FAILURE

If AHRS, ADC, Terrain Database, Navigation Database or GPS failure:	
Smart Glide	UNAVAILABLE

If Smart Glide is Active:

System Message.....	SMART GLIDE FAILURE
Alternate Landing Site	CONSIDER

3.2.19 SMART GLIDE INADVERTANT ACTIVATION

If Smart Glide activates without pilot action:

Autopilot (GFC 500 or GFC 600 only).....	DISCONNECT
Smart Glide	CANCEL
Smart Glide Activation	DISABLE
<i>Go to the GTN Emergency Page, press the MENU button and select DISABLE.</i>	

If Smart Glide does not disable:

GTN #1 Circuit Breaker.....	PULL
<i>If GTN#1 is providing audio panel control, the audio panel will revert to reversionary functionality when the GTN power is removed.</i>	

Once Smart Glide is disabled:

Autopilot	AS DESIRED
GTN Flight Plan.....	ACTIVATE DESIRED LEG
Altitude Preselector (PFD).....	SET

3.2.20 BLANK SCREEN

Panel Lighting Dimmer.....	INCREASE BRIGHTNESS
----------------------------	----------------------------

If the installed equipment in the aircraft includes a GDL 60 Wireless Access unit:

Screen.....	PRESS
Knobs	ROTATE ONE CLICK EACH

If the display returns:

CNXT and CNXT BATT circuit breakers	PULL
---	-------------

If the display is still blank, consider the GTN and remote transponder and audio panel input inoperative.

If audio panel functions are lost, consider Section 3.2.4.

3.2.21 CARBON MONOXIDE (CO) CAUTION

CO LEVEL
“Carbon Monoxide”

The carbon monoxide level within the aircraft is unsafe.

Possible Sources of CO.....	OFF
Cabin Ventilation.....	MAXIMIZE AIRFLOW
Oxygen Mask (if equipped).....	DON

3.3 Warning Messages

Alert Type	Alert Annunciation	Aural Message	Pilot Action
FLTA Terrain Warning or Reduced Required Terrain Clearance (RTC) Warning or Imminent Terrain Impact (ITI) Warning	PULL UP	“Terrain Ahead, Pull Up; Terrain Ahead, Pull Up”* or “Terrain, Terrain; Pull Up, Pull Up”	Immediately execute a climb at obstacle clearance speed
FLTA Obstacle Warning or Reduced Required Obstacle Clearance (ROC) Warning or Imminent Obstacle Impact (IOI) Caution	PULL UP	“Obstacle Ahead, Pull Up; Obstacle Ahead, Pull Up”* or “Obstacle, Obstacle; Pull Up, Pull Up”	Immediately execute a climb at obstacle clearance speed
FLTA Wire Warning or Reduced Required Line Clearance (RLC) Warning or Imminent Line Impact (ILI) Warning	PULL UP	“Wire Ahead, Pull Up; Wire Ahead, Pull Up”* or “Wire, Wire; Pull Up, Pull Up”	Immediately execute a climb at obstacle clearance speed
Excessive Descent Rate (EDR) Warning	PULL UP	“[Whoop Whoop]; Pull-Up”	Immediately arrest the descent rate.
Excessive Closure Rate (ECR) Warning	PULL UP	“[Whoop Whoop]; Pull-Up”	Immediately execute a climb at obstacle clearance speed

3.4 Caution Messages

Alert Type	Alert Annunciation	Aural Message	Pilot Action
FLTA Terrain Caution or Reduced Required Terrain Clearance (RTC) Caution or Imminent Terrain Impact (ITI) Caution	TERRAIN	“Terrain Ahead; Terrain Ahead”* or “Caution, Terrain; Caution, Terrain”	Execute a climb at obstacle clearance speed
FLTA Obstacle Caution or Reduced Required Obstacle Clearance (ROC) Caution or Imminent Obstacle Impact (IOI) Caution	OBSTCL	Obstacle Ahead; Obstacle Ahead”* or “Caution, Obstacle; Caution, Obstacle”	Execute a climb at obstacle clearance speed
FLTA Wire Caution or Reduced Required Line Clearance (RLC) Caution or Imminent Line Impact (ILI) Caution	WIRE	“Wire Ahead; Wire Ahead”* or “Caution, Wire; Caution, Wire”	Execute a climb at obstacle clearance speed
Premature Descent Alert (PDA) Caution	TERRAIN	“Too Low, Terrain”	Execute a climb at obstacle clearance speed
Excessive Descent Rate (EDR) Caution	TERRAIN	“Sink Rate”	Arrest the descent rate.
Excessive Closure Rate (ECR) Caution	TERRAIN	“Terrain-Terrain”	Execute a climb at obstacle clearance speed
Negative Climb Rate (NCR) Caution	TERRAIN	“Don’t Sink” or “Too Low Terrain”	Execute a climb at obstacle clearance speed

Alert Type	Alert Annunciation	Aural Message	Pilot Action
Flight Into Terrain (FIT) Caution	TERRAIN	“Too Low Terrain” or “Too Low – Gear” or “Too Low – Flaps”	Execute a climb at obstacle clearance speed
Glide Slope Deviation (GSD) Caution	GLIDESLOPE	“Glideslope”	Climb to re-intercept glideslope, or execute missed approach.
Traffic Caution	TRAFFIC	“Traffic”	Visually acquire the traffic to see and avoid.
Carbon Monoxide Caution	CO LEVEL	“Carbon Monoxide”	Turn off possible sources of CO, increase cabin ventilation, don oxygen mask if equipped.

* Alerts with multiple messages are configurable at installation and are installation dependent. Alerts for the default configuration are indicated with asterisks.

NOTE

The GTN Xi TAWS-A system does not differentiate between a Glideslope associated with a ILS approach or a Glidepath associated with a GPS approach. Both types of approach vertical guidance are referred to as Glideslope for TAWS-A annunciations and aural alerts.

3.5 Failure Messages

Failure Message	Alert Location	Cause	Pilot Action
“No GPS Position”	Displayed on all pages with a moving map	Loss of GPS position	Use other sources of navigation
Dead Reckoning	Displayed on all pages with a moving map	Loss of GPS position	Use other sources of navigation
LOI	Status Bar	Loss of GPS position	Use other sources of navigation
Red “X”	Over affected equipment interface	Loss of data from equipment	Use inoperative equipment procedures
TAWS N/A TAWS FAIL GPWS N/A GPWS FAIL TER N/A TER FAIL	Status Bar	Loss of GPS Position Or Terrain Database Error	Use vigilance, Terrain Alerts no longer provided.

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Refer to the GTN Xi Pilot's Guide defined in Section 7.1 for additional procedures and a complete list of system messages and associated flight crew actions. This includes all GPS operations, VHF communication and navigation, traffic, data linked weather, StormScope®, TAWS, and Multi-Function Display information.

4.1 Unit Power On

Databases	REVIEW DATES AND REGIONS
Self-Test.....	VERIFY OUTPUTS TO NAV INDICATORS
Self-Test - TAWS Remote Annunciator (if installed):	
PULL UP	ILLUMINATED
TERR	ILLUMINATED
TERR N/A	ILLUMINATED
TERR INHB	ILLUMINATED
Self-Test - GPS Remote Annunciator (if installed):	
VLOC	ILLUMINATED
GPS.....	ILLUMINATED
LOI or INTG.....	ILLUMINATED
TERM.....	ILLUMINATED
WPT.....	ILLUMINATED
APR	ILLUMINATED
MSG	ILLUMINATED
SUSP or OBS	ILLUMINATED

4.2 Before Takeoff

System Messages and Annunciators.....	CONSIDERED
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4.3 HSI and EHSI Operation

HSI:

Course Pointer	SET
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EHSI GPS Navigation:

Course Pointer	AUTOSLEW VERIFY
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EHSI VLOC Navigation:

Course Pointer	SET
----------------------	------------

For detailed information about the functionality of the EHSI system, refer to the FAA approved Flight Manual or Flight Manual Supplement for that system.

CAUTION

The pilot must verify the active course and waypoint for each flight plan leg. The pilot must verify proper course selection each time the CDI source is changed from GPS to VLOC.

4.4 Autopilot Operation

For autopilot operating instructions, refer to the FAA approved Flight Manual or Flight Manual Supplement for the autopilot.

Autopilot NAV Mode Coupling:

CDI	SELECT SOURCE
Autopilot.....	NAV / APR SELECT

Autopilot GPSS or GPS Roll Steering:

CDI	SELECT GPS
Flight Plan.....	Activate
Autopilot.....	NAV / APR SELECT

Supported autopilots for GPSS or GPS Roll Steering:

- Garmin
 - GFC 500
 - GFC 600
- Bendix
 - KFC 225
 - KFC 275
 - KFC 325
- S-TEC
 - System 55X

CAUTION

The GTN Xi does not provide course deviation to the autopilot for heading legs. Some autopilots do not allow the use of roll steering when course deviation is not provided.

4.5 Coupling the Autopilot During Approaches

CAUTION

When the CDI source is changed on the GTN, autopilot mode may change. Confirm autopilot mode selection after CDI source change on the GTN. Refer to the FAA approved Flight Manual or Flight Manual Supplement for the autopilot.

Analog only autopilots should use APR mode for coupling to LNAV approaches. Autopilots which support digital roll steering commands (GPSS) may utilize NAV mode and take advantage of the digital tracking during LNAV only approaches.

To couple an approach using manual APR outputs:

Once established on the final approach course with the final approach fix as the active waypoint, the GTN will issue a flashing message indication.

Flashing Message Button PRESS
“Enable APR Output” Button..... PRESS

If coupled, Autopilot will revert to ROL mode at this time.

Autopilot..... **ENGAGE APPROACH MODE**

To couple an approach using autopilot approach mode:

Once established on the final approach course with the final approach fix as the active waypoint, the GTN will enable vertical guidance.

Vertical Guidance.....**CONFIRM AVAILABLE**
Autopilot..... **ENGAGE APPROACH MODE**

Supported autopilots for Approach Coupling:

- Garmin
 - GFC 500
 - GFC 600
- Bendix
 - M4C
 - M4D
- Century
 - III
 - IV
 - 31/41
 - 2000
 - Trident
- Cessna
 - 300B / 400B / 800B
 - 300 / 400 / 800
 - IFCS
 - 1000 IFCS
- Collins
 - APC 65 (A / B / C / E / F / G / H / J)
 - FGC-65 / FYD-65
 - APC 65A / 65G
- Honeywell
 - KAP 140
 - KAP150
 - KFC 150
 - KFC 200
 - KFC 225
 - KFC 300
 - KFC 250
 - KFC 275
 - KFC 325
- Sperry
 - SPZ-200A / 500
- S-TEC
 - 55
 - 55X
 - 60 PSS
 - 60-2 / 65

4.6 Coupling the Autopilot for Descent VNAV

Vertical Navigation Setup:

VNAV Altitude Profile	LOAD INTO FLIGHT PLAN
Flight Plan.....	ACTIVATE LEG
Flight Plan → Menu → VNAV:	
VNAV Enabled.....	ACTIVATE
VS Target or Flight Path Angle	SET DESIRED
PFD Altitude Preselect.....	SET TO ATC CLEARED ALTITUDE
GFC 500:	
VNAV Key	PRESS
GFC 600:	
VNV Key	PRESS

4.7 Coupling the Autopilot during Search and Rescue Operations

Flight Plan SAR Pattern.....	ACTIVATE
CDI.....	GPS
Autopilot NAV Mode	ACTIVATE

4.8 Cold Weather Compensation

The GTN Xi can compute altitudes for cold weather compensation for applicable IFR approaches. Approach altitudes provided on the map and flight plan are adjusted based on the pilot entered temperature and the altitudes on the flight plan page are appended with a snowflake icon.

Flight Plan Menu → TEMP COMP:

Temp at Dest.....	ENTER DEST TEMP
-------------------	------------------------

Flight Plan.....	LOAD or ACTIVATE APPROACH
------------------	----------------------------------

Flight Plan Menu → TEMP COMP:

Temperature Compensation.....	ACTIVATE
-------------------------------	-----------------

Destination / FAF / FAF ALT.....	VERIFY
----------------------------------	---------------

NOTE

Pilots must coordinate with ATC when flying temperature compensated procedures. If equipped with a TXi PFD, ensure the TXi “TEMP COMP” minimums are selected.

4.9 TAWS-A Flap Inhibit

For TAWS-A installations and intentional landings with flaps not in landing position, the flight crew must use the flap override function.

Terrain → Menu:

Flap Override **ACTIVATE**

4.10 TAWS-A Glideslope Inhibit

Terrain → Menu:

G/S Inhibit **ACTIVATE**

NOTE

The GTN Xi TAWS-A system does not differentiate between a Glideslope associated with an ILS approach or a Glidepath associated with a GPS approach. Both types of approach vertical guidance are referred to as Glideslope for TAWS-A annunciations and aural alerts.

4.11 ATC Data Link (CPDLC) Log-On

IFR Flight Plan **FILE**
Flight Plan **MATCH FILED ROUTE**
Transponder **MATCH FILED FLIGHT ID**
ATC Datalink Page:
 Flight ID **MATCH FILED FLIGHT ID**
 Facility **KUSA**
 Logon Button **PRESS**

CAUTION

Establishing a CPDLC session with ATC can take a few minutes. Do not cycle the Logon/Logoff button.

4.12 ATC Data Link Responding to Messages

ATC Datalink Page:

New Message **OPEN**
If an importable route is included:
 Proposed Route **PREVIEW**
Response **SELECT**
Send Button **PRESS**

NOTE

A pilot response is expected within 60 seconds. If more time is needed, send STANDBY before the final response.

4.13 GCO Inhibit

Utilities → CO Monitor:

Inhibit CO Alerts **ACTIVATE**

5 PERFORMANCE

No change.

6 WEIGHT AND BALANCE

See current weight and balance data.

7 SYSTEM DESCRIPTIONS

7.1 Pilot's Guide

The Garmin GTN Xi Series Pilot's Guide, part number and revision listed below, contain additional information regarding GTN system description, control, and function.

- GTN Xi Series Pilot's Guide P/N 190-02327-03 Rev G or later

The GTN Xi requires a reasonable degree of familiarity to avoid becoming too engrossed at the expense of basic instrument flying in IMC and basic see-and-avoid in VMC. Garmin provides training tools with the Pilot's Guide and PC based simulator. Pilots should take full advantage of these training tools to enhance system familiarization.

7.2 Navigation

The following section describes some of the GTN navigation functionality and provides details on the expected use and limits of the features.

7.2.1 Flight Plan Leg Sequencing

If a barometric corrected altitude source is not interfaced to the GTN Xi, a popup will appear prompting the flight crew to manually sequence the leg once the altitude prescribed in the procedure is reached.

7.2.2 Auto ILS CDI Capture

Auto ILS CDI Capture can automatically switch the CDI from GPS to VLOC before the Final Approach fix. This feature is only available on installations that meet any of the following conditions:

- Equipped with GFC 500 or 600
- GTN CDI key enabled

On these installations the auto-switching will only occur if the following conditions are met:

- ILS Autoswitch setting enabled on GTN
- ILS/LOC approach loaded and activated
- Correct nav frequency tuned on GTN NAV radio
- Aircraft established on the final approach course

Auto ILS CDI Capture will not automatically switch from GPS to VLOC for LOC-BC or VOR approaches.

7.2.3 User Defined Waypoints

When a User Defined Waypoint is created, a default name will automatically be provided, and the pilot is given the option to enter a different name for the waypoint. Pages which have the autofill function will prevent some waypoint names from being used. If it is desired to name the waypoint with a subset of the name of an existing waypoint in the database then this must be accomplished on the Waypoint Info / User Waypoints page.

Waypoints which are created when a Search and Rescue pattern is created are not considered User Waypoints and therefore functions associated with User Waypoints are not provided for these waypoints.

7.2.4 Direct-To Operations

When conducting Direct-To operations the Flight Plan tab provides a list of waypoints in the flight plan for which Direct-To is available. Some entries in the flight plan such as holds, and course reversals are not eligible for Direct-To and the pilot must instead select the associated waypoint if Direct-To operation is desired.

7.2.5 Holding Patterns

The GTN can provide holding guidance for user holds or procedure-based holds. For each hold there are two associated waypoints. If there is more than one published altitude for an approach hold, there will be three waypoints associated with the hold. The pilot can edit or activate the hold as needed for user holds. Holds on the initial, intermediate, or final approach cannot be edited except for the hold altitude constraints. Missed approach holds can be edited.

NOTE

If the aircraft position is outside of the depicted GTN hold, the system may not allow lateral NAV captures with certain autopilots. In this case, the pilot should fly the hold manually or with the HDG mode of the autopilot until they are inside the depicted holding pattern in which case normal NAV captures should be available.

NOTE

If the GTN is in the missed approach segment (including the hold), the pilot can change, remove, or replace the approach procedure and the original missed approach will remain the active navigation. If the GTN active navigation is a missed approach segment and the flight plan is deleted, the missed approach will also be removed, removing active navigation. If a new approach is loaded while on a missed approach segment, reverify the missed approach altitude constraints.

7.2.6 Descent BARO VNAV

The GTN can provide multi-waypoint descent baro-VNAV guidance for the enroute and initial approach phases of flight. The GTN Xi outputs VNAV deviations to properly configured Garmin G500/600 GDU, G500/600/700TXi GDU, GI275, or G5 displays. To provide autopilot coupling to the baro VNAV guidance, the interface must also include either a Garmin GFC500 or GFC600 with VNAV capability. If VNAV is enabled on the GTN Xi in these installations, VNAV guidance may be coupled to the autopilot using the VNAV function of the GFC.

Turbojet altitudes associated with instrument procedures are retrieved from the navigation database when the procedure is added to the flight plan.

Altitudes in cyan on the GTN Xi are valid VNAV guidance waypoints and the GTN Xi will provide vertical guidance based on the displayed altitude constraints and default flight path angle (FPA). Altitudes in magenta on the GTN Xi are active VNAV guidance waypoints. Altitudes colored white are advisory only (unpublished/interpolated) or published and not used in VNAV calculations.

The following are recommendations for using descent VNAV:

- The pilot should verify all altitudes for procedures after loading the procedure into the flight plan.
- When the GTN Xi is installed with multiple TXi PFDs, it is highly recommended that GDU BARO SYNC be enabled and used during all VNAV operations.

For aircraft with multiple GDUs (TXi software v3.61 or later), a GFC 600, and the Selected Side function enabled, VNAV will use the barometer setting for the selected GDU. For aircraft with multiple GDUs (without Selected Side enabled) and two GTNs, VNAV will use the barometer setting from the pilot's side GDU for both GTNs. In the event the pilot's side GDU has failed, the GTNs will use the co-pilot's GDU barometer setting.

Descent VNAV is limited to flight path angles (FPA) between -1° and -5°, and a vertical speed required (VSR) descending at less than 4000 fpm. If a flight plan change is made during a VNAV descent, VNAV will be recalculated and could result in active VNAV path changes. If the current VNAV FPA is less than -1°, a new VNAV path may be computed during a flight plan change and result in a new Top of Descent point. This can also occur during VNAV Direct-To operations.

VNAV constraints are not allowed inside the FAF. VNAV altitudes are not saved in the flight plan catalog.

When VNAV is disabled by the pilot, it will be automatically re-enabled when the pilot initiates a lateral Direct-To to a waypoint.

7.2.7 Along Track Waypoints

The GTN Xi allows for the creation of flight plan waypoints that are based off an offset distance from a waypoint in the flight and places the new along track waypoint (ATK) in the flight plan. Once placed in the flight plan, the pilot may navigate using that waypoint in the same manner as other flight plan waypoints.

Along track waypoints cannot be created on a Vectors to Final (VTF) approach and are limited to the lateral constraints of the flight plan. This means that the pilot cannot place an ATK before the first waypoint of a flight plan or after the last waypoint of a flight plan.

ATKs are fixed once placed and will not move if the referenced waypoint is changed or removed from the flight plan. ATKs are not saved in the flight plan catalog. ATKs cannot reference another ATK in the flight plan.

7.2.8 Advisory Visual Approaches

The GTN Xi will provide advisory visual approaches to many runways in the aviation database. Lateral guidance for the visual approach is aligned with the runway bearing. Vertical guidance is provided for those runways with VGSI information for distances up to 4.0NM from the runway. If a terrain database is installed in the GTN Xi, the GTN Xi provides vertical guidance up to 28NM from the runway end unless the computed glideslope would impact terrain or obstacles from the database. If the projected impact point is under 28NM and greater than 4NM, the flight plan line for the approach is shortened to indicate where vertical guidance is active for the approach. If the terrain impact point is less than 4NM from the runway and there is no VGSI data available, vertical guidance is not provided for that approach. Lateral guidance is still available when vertical guidance is removed.

CDI and VDI indications are equivalent to those of other GPS-based approaches (e.g.- LPV or LNAV+V). The GTN Xi annunciates “VISUAL” in the annunciator bar to indicate a visual approach is active.

When loading, or activating the approach, the GPA and TCH information for that approach will be displayed on a popup. If there is no vertical guidance available, the popup will display “(NO VERTICAL GUIDANCE)”.

All advisory visual approaches shall be conducted in VMC. Visual approaches are intended to be used as an aid to situational awareness. Visual approaches are advisory in nature and do not guarantee terrain and obstacle clearance for the approach runway.

7.2.9 GPS Approach Downgrade

During a LPV, LP +V, LNAV/VNAV, or LNAV +V approach, if GPS accuracy requirements cannot be met by the GPS receiver, the GTN Xi will downgrade the approach. The downgrade will remove vertical deviation indication from the VDI and change the approach annunciation to LNAV. The approach may be continued using the LNAV only minimums. If the VISUAL approach is downgraded, the GTN Xi will remove the vertical deviation indication from the VDI but continue to annunciate VISUAL in amber.

During a GPS approach in which GPS accuracy requirements cannot be met by the GPS receiver for any GPS approach type, the GTN Xi will flag all CDI guidance and display a system message “ABORT APPROACH-GPS approach no longer available”. Immediately upon viewing the message, the unit will revert to Terminal navigation mode alarm limits. If the position integrity is within these limits lateral guidance will be restored and the GPS may be used to execute the missed approach, otherwise alternate means of navigation must be utilized.

7.2.10 Loss of GPS/SBAS Navigation Data

When the GPS/SBAS receiver is inoperative or GPS navigation information is not available or invalid, the GTN Xi will enter one of two modes: Dead Reckoning mode (DR) or Loss Of Integrity mode (LOI). The mode is indicated on the GTN by an amber “DR” and/or “LOI”.

If the LOI annunciation is displayed, revert to an alternate means of navigation appropriate to the route and phase of flight. If GPS position is lost, the GTN may display DR depending on flight plan and phase of flight conditions.

If the DR annunciation is displayed, the map will continue to be displayed with an amber “DR” overwriting the ownship icon. Course guidance will be removed on the CDI. Aircraft position will be based upon the last valid GPS position, then estimated by Dead Reckoning methods such as heading and airspeed inputs and the last known winds. Changes in true airspeed, altitude, heading, or winds aloft can affect the estimated position substantially.

7.3 Terrain Proximity, Terrain Alerting, and TAWS

CAUTION

Not all obstacles and wires are contained in the Obstacle/HOT Line database. The system provides depiction (and alerts if TAWS is installed) only for obstacles and wires contained in the database.

NOTE

The area of coverage may be modified as additional terrain data sources become available.

Terrain on the dedicated terrain page or main map overlay is depicted in the following manner:

- Terrain more than 1,000 feet below the aircraft is not depicted or depicted as black.
- Terrain between 1,000 feet and 100 feet below the aircraft is depicted as amber.
- Terrain within 100 feet below the aircraft, or above the aircraft, is depicted as red.

Obstacles and wires on the dedicated terrain page or main map are depicted in the following manner:

- Obstacles and wires more than 2,000 feet below the aircraft are not depicted.
- Obstacles and wires between 2,000 feet and 1,000 feet below the aircraft are depicted as white.
- Obstacles and wires between 1,000 feet and 100 feet below the aircraft are depicted as amber.
- Obstacles and wires within 100 feet below the aircraft, or above the aircraft, are depicted as red.

Multiple obstacles may be depicted using a single obstacle icon and an asterisk to indicate obstacle grouping is occurring. The color of the asterisk indicates the relative altitude of the tallest obstacle in the group. The asterisk does not indicate any information about the relative altitude or number of obstacles not being displayed in the obstacle group.

The Garmin GTN Xi Series Pilot's Guide provides additional information regarding terrain and obstacle colors and grouped obstacle icons.

In installations of more than one GTN Xi with TAWS-B or TAWS-A, TAWS should be enabled on both GTN Xi units. If both GTN Xi units are configured for TAWS-B, then failure of a single GTN results in TAWS-B still being available within the cockpit from the other GTN. If TAWS-A is configured and installed for both GTN Xi units, loss of one GTN Xi will result in TAWS-A still being available from the second GTN Xi unit. If TAWS-A is configured on both GTN Xi units, but only installed to one unit, then failure of the TAWS-A unit will result in a downgrade to TAWS-B from the second GTN Xi.

7.3.1 TAWS-A

TAWS-A can be broken down into two types of alerting categories, FLTA and GPWS alerts. The GTN Xi TAWS-A system provides the following functionality:

- a) Forward Looking Terrain Avoidance (FLTA)
 - a. Required Terrain Clearance (RTC) / Required Obstacle Clearance (ROC) / Required Line Clearance (RLC)
 - b. Imminent Terrain Impact (ITI) / Imminent Obstacle Impact (IOI) / Imminent Line Impact (ILI)
- b) Premature Descent Alert (PDA)
- c) GPWS Mode 1 – Excessive Descent Rate (EDR)
- d) GPWS Mode 2 – Excessive Closure Rate (ECR)
- e) GPWS Mode 3 – Negative Climb Rate (NCR)
- f) GPWS Mode 4 – Flight Into Terrain (FIT)
- g) GPWS Mode 5 – Glide Slope Deviation (GSD)

- h) GPWS Mode 6 – Voice Call Out (VCO)
- i) GPWS Inhibit
- j) Glideslope Inhibit
- k) Flap Override

TAWS-A installations will provide glideslope warnings for ILS, LPV, or LNAV/VNAV approaches. The GTN Xi TAWS-A system does not differentiate between a Glideslope associated with an ILS approach or a Glidepath associated with a GPS approach. Both types of approach vertical guidance are referred to as Glideslope for TAWS-A annunciations and aural alerts.

With TAWS-A, Voice Callouts are available from 500 ft down through 10 ft. Individual callouts may be turned on and off in the Terrain page menu, under Voice Callouts.

ALERT TYPE	ALERT SEVERITY	AURAL ALERT (TEXT MESSAGE SIMILAR)
RTC Reduced Required Terrain Clearance (FLTA Alert) (TAWS)	Caution	“Caution, Terrain; Caution, Terrain” or “Terrain Ahead; Terrain Ahead” (Optional)
	Warning	“Terrain, Terrain; Pull-Up, Pull-Up” or “Terrain Ahead, Pull-Up; Terrain Ahead, Pull-Up” (Optional)
ITI Imminent Terrain Impact (FLTA Alert) (TAWS)	Caution	“Caution, Terrain; Caution, Terrain” or “Terrain Ahead; Terrain Ahead” (Optional)
	Warning	“Terrain, Terrain; Pull-Up, Pull-Up” or “Terrain Ahead, Pull-Up; Terrain Ahead, Pull-Up” (Optional)
ROC Reduced Required Obstacle Clearance (FLTA Alert) (TAWS)	Caution	“Caution, Obstacle; Caution, Obstacle” or “Obstacle Ahead; Obstacle Ahead” (Optional)
	Warning	“Obstacle, Obstacle; Pull-Up, Pull-Up” or “Obstacle Ahead, Pull-Up; Obstacle Ahead, Pull-Up” (Optional)

ALERT TYPE	ALERT SEVERITY	AURAL ALERT (TEXT MESSAGE SIMILAR)
IOI Imminent Obstacle Impact (FLTA Alert) (TAWS)	Caution	“Caution, Obstacle; Caution, Obstacle” or “Obstacle Ahead; Obstacle Ahead” (Optional)
	Warning	“Obstacle, Obstacle; Pull-Up, Pull-Up” or “Obstacle Ahead, Pull-Up; Obstacle Ahead, Pull-Up” (Optional)
RLC Reduced Required Line Clearance (FLTA Alert) (TAWS)	Caution	“Caution, Wire; Caution, Wire” or “Wire Ahead; Wire Ahead” (Optional)
	Warning	“Wire, Wire; Pull-Up, Pull-Up” or “Wire Ahead, Pull-Up; Wire Ahead, Pull-Up” (Optional)
ILI Imminent Line Impact (FLTA Alert) (TAWS)	Caution	“Caution, Wire; Caution, Wire” or “Wire Ahead; Wire Ahead” (Optional)
	Warning	“Wire, Wire; Pull-Up, Pull-Up” or “Wire Ahead, Pull-Up; Wire Ahead, Pull-Up” (Optional)
PDA Premature Descent Alert (TAWS)	Caution	“Too Low Terrain”
	Warning	N/A
EDR Excessive Descent Rate (GPWS Alert)	Caution	“Sink Rate”
	Warning	“[Whoop Whoop], Pull-Up”
ECR (GPWS Alert)	Caution	“Terrain-Terrain”
	Warning	“[Whoop Whoop], Pull-Up”
NCR Negative Climb Rate (GPWS Alert)	Caution	“Don’t Sink” or “Too Low Terrain”
	Warning	N/A
FIT (GPWS Alert)	Caution	“Too Low Terrain” Or “Too Low – Gear” Or “Too Low – Flaps”
	Warning	N/A
GSD (GPWS Alert)	Caution	“Glideslope”
	Warning	N/A

ALERT TYPE	ALERT SEVERITY	AURAL ALERT (TEXT MESSAGE SIMILAR)
500' 500' Voice Call Out (GPWS Alert)	Advisory	“Five Hundred”
400' 400' Voice Call Out (GPWS Alert)	Advisory	“Four Hundred”
300' 300' Voice Call Out (GPWS Alert)	Advisory	“Three Hundred”
200' 200' Voice Call Out (GPWS Alert)	Advisory	“Two Hundred”
100' 100' Voice Call Out (GPWS Alert)	Advisory	“One Hundred”
50' 50' Voice Fall Out (GPWS Alert)	Advisory	“Fifty”
40' 40' Voice Fall Out (GPWS Alert)	Advisory	“Forty”
30' 30' Voice Fall Out (GPWS Alert)	Advisory	“Thirty”
20' 20' Voice Fall Out (GPWS Alert)	Advisory	“Twenty”
10' 10' Voice Fall Out (GPWS Alert)	Advisory	“Ten”

Table 7-1: TAWS-A Alerts

7.3.2 TAWS-B

The GTN Xi TAWS-B system provides the following functionality:

- a) Forward Looking Terrain Avoidance (FLTA)
 - a. Required Terrain Clearance (RTC) / Required Obstacle Clearance (ROC)
 - b. Imminent Terrain Impact (ITI) / Imminent Obstacle Impact (IOI)
- b) Premature Descent Alert (PDA)
- c) GPWS Mode 1 – Excessive Descent Rate (EDR)
- d) GPWS Mode 3 – Negative Climb Rate (NCR)

ALERT TYPE	ALERT SEVERITY	AURAL ALERT (TEXT MESSAGE SIMILAR)
RTC Reduced Required Terrain Clearance (FLTA Alert) (TAWS)	Caution	“Caution, Terrain; Caution, Terrain” or “Terrain Ahead; Terrain Ahead” (Optional)
	Warning	“Terrain, Terrain; Pull-Up, Pull-Up” or “Terrain Ahead, Pull-Up; Terrain Ahead, Pull-Up” (Optional)
ITI Imminent Terrain Impact (FLTA Alert) (TAWS)	Caution	“Caution, Terrain; Caution, Terrain” or “Terrain Ahead; Terrain Ahead” (Optional)
	Warning	“Terrain, Terrain; Pull-Up, Pull-Up” or “Terrain Ahead, Pull-Up; Terrain Ahead, Pull-Up” (Optional)
ROC Reduced Required Obstacle Clearance (FLTA Alert) (TAWS)	Caution	“Caution, Obstacle; Caution, Obstacle” or “Obstacle Ahead; Obstacle Ahead” (Optional)
	Warning	“Obstacle, Obstacle; Pull-Up, Pull-Up” or “Obstacle Ahead, Pull-Up; Obstacle Ahead, Pull-Up” (Optional)
IOI Imminent Obstacle Impact (FLTA Alert) (TAWS)	Caution	“Caution, Obstacle; Caution, Obstacle” or “Obstacle Ahead; Obstacle Ahead” (Optional)
	Warning	“Obstacle, Obstacle; Pull-Up, Pull-Up” or “Obstacle Ahead, Pull-Up; Obstacle Ahead, Pull-Up” (Optional)
RLC Reduced Required Line Clearance (FLTA Alert) (TAWS)	Caution	“Caution, Wire; Caution, Wire” or “Wire Ahead; Wire Ahead” (Optional)
	Warning	“Wire, Wire; Pull-Up, Pull-Up” or “Wire Ahead, Pull-Up; Wire Ahead, Pull-Up” (Optional)

ALERT TYPE	ALERT SEVERITY	AURAL ALERT (TEXT MESSAGE SIMILAR)
ILI Imminent Line Impact (FLTA Alert) (TAWS)	Caution	“Caution, Wire; Caution, Wire” or “Wire Ahead; Wire Ahead” (Optional)
	Warning	“Wire, Wire; Pull-Up, Pull-Up” or “Wire Ahead, Pull-Up; Wire Ahead, Pull-Up” (Optional)
PDA Premature Descent Alert (TAWS)	Caution	“Too Low Terrain”
	Warning	N/A
EDR Excessive Descent Rate (GPWS Alert)	Caution	“Sink Rate”
	Warning	“[Whoop Whoop], Pull-Up”
NCR Negative Climb Rate (GPWS Alert)	Caution	“Don’t Sink” or “Too Low Terrain”
	Warning	N/A
500' 500' Voice Call Out (GPWS Alert)	Advisory	“Five Hundred”

Table 7-2: TAWS-B Alerts

7.4 GMA 35/35c Audio Panel (Optional)

The GTN 725Xi and 750Xi can interface to a GMA 35/35c remotely mounted audio panel and marker beacon receiver. Controls for listening to various radios, activating the cabin speaker, clearance playback control, and marker beacon are accessed by pressing the “Audio Panel” button on the GTN display screen. Optional Bluetooth pairing functionality can be accessed from the associated System /Connexx Setup page (GMA 35c only). Volume controls for the audio panel are accessed by pressing the “Intercom” button on the GTN Xi display screen.

Aircraft alerting audio may be routed through the GMA 35/35c audio panel. There are no pilot controls for alert audio volumes. In the event of a loss of GMA35/35c function alert audio routed through the audio panel may not be heard.

7.5 StormScope® (Optional)

When optionally interfaced to a StormScope® weather detection system, the GTN Xi may be used to display the StormScope® information. Weather information supplied by the StormScope® will be displayed on the StormScope® page of the GTN Xi system. For detailed information about the capabilities and limitations of the StormScope® system, refer to the documentation provided with that system.

Heading Up mode:

If the GTN Xi system is receiving valid heading information, the StormScope® page will operate in the heading up mode as indicated by the label “HDG UP” presented at the upper right corner of the display. In this mode, information provided by the StormScope® system is displayed relative to the nose of the aircraft and *is* automatically rotated to the correct relative position as the aircraft turns.

Heading Not Available mode:

If the GTN Xi system is not receiving valid heading information, either because a compatible heading system is not installed, or the interfaced heading system has malfunctioned, the StormScope® page will continue to operate without a heading source and indicate “HDG N/A” in the upper right corner of the GTN Xi display. In this mode, information provided by the StormScope® system is displayed relative to the nose of the aircraft but *is not* automatically rotated to the correct relative position as the aircraft turns. When operating in this mode, StormScope® strikes must be cleared after each turn the aircraft performs.

7.6 External Switches

External switches may be installed and interfaced to the GTN Xi. These switches may be stand alone or integrated with a TAWS or GPS annunciator. Table 7-3 lists the switches and function they perform:

Switch Label	Function
CDI	Toggles between GPS / VLOC sources. This switch may be part of an external annunciator panel.
COM CHAN DN	Toggles down through the preset com frequencies.
COM CHAN UP	Toggles up through the preset com frequencies.
COM RMT XFR	Transfers the COM active / standby frequencies.
NAV RMT XFR	Transfers the NAV active / standby frequencies.
OBS	Performs an OBS or SUSP function. This switch is part of an external annunciator panel and is placarded with the following: “Green OBS indicates OBS or SUSP mode – GTN Xi annunciator bar indicates which is active. Push OBS button to change OBS or SUSP mode.”
OBS/SUSP	Performs an OBS or SUSP function.
TERR INHB	Toggles the TAWS Inhibit function on/off. This switch is part of an external annunciator panel. The terrain display is still presented if TAWS is Inhibited.
PTC	Push-to-Command switch for Voice Command input to the GMA and the GTN Xi.
SMART GLIDE	Optional toggle switch used to activate and cancel Smart Glide.

Switch Label	Function
CPDLC	Provides visual annunciations for CPDLC and opens the ATC Datalink page on the GTN Xi it's connected to when pressed.

Table 7-3 – External Switches

7.7 Airspace Depiction and Alerts

The GTN Xi aides the flight crew in avoiding certain airspaces with Smart Airspace and airspace alerts. Smart Airspace de-emphasizes depicted airspace that is not near the aircraft's current altitude. Airspace Alerts provide a message indication to the flight crew when the aircraft's current ground track will intercept an airspace type that has been selected for alerting.

NOTE

Smart Airspace and Airspace Alerts are separate features. Turning on/off Smart Airspace does not affect Airspace Alerts, and vice versa.

7.8 Garmin ADS-B Traffic System Interface (Optional)

A Garmin ADS-B traffic system may be interfaced to the GTN Xi. The *nose* of the ownship symbol on both the GTN Xi main map page and dedicated traffic page serves as the actual location of your aircraft. The *center* of the traffic target icon serves as the reported location for the target aircraft. Motion vectors for traffic may be displayed in either absolute or relative motion. The location of the traffic targets relative to the ownship are the same, regardless of the selected motion vector.

Traffic targets displayed on the dedicated traffic page may be selected to obtain additional information about a traffic target or to view all targets in a grouped target. When a grouped target is selected, the “Next” button on the dedicated traffic page will cycle through all targets located near where the screen has been touched.

Traffic may be displayed on the GTN Xi when connected to an approved optional TCAS I, TAS, TIS, or ADS-B traffic device. These systems can provide traffic monitoring and alerting to the flight crew. Traffic shown on the display may or may not have traffic alerting available. The display of traffic is an aid to visual acquisition and may not be utilized for aircraft maneuvering.

Absolute motion vectors are colored either cyan or white, depending on unit configuration. Absolute motion vectors depict the reported track of the traffic target referenced to the ground. An absolute motion vector pointed towards your ownship symbol *does not* necessarily mean the traffic target is getting closer to your aircraft.

Relative motion vectors are always colored green and depict the motion of the traffic target relative to your ownship symbol. The direction the traffic target is

pointed may vary greatly from the motion vector and a target may be getting closer to your aircraft independent of the direction the target is pointed. A green relative motion vector pointed towards your ownship indicates that the traffic target *is* converging on your aircraft.

If more than one target is occupying the same area of the screen, the GTN Xi will combine the two or more traffic targets into one traffic group. The presence of an asterisk to the left of a target indicates that traffic has been grouped. The highest priority traffic target in the group is displayed to the pilot. When applied to airborne targets the asterisk will be displayed in white or cyan depending on the traffic depiction color used in the installation. The asterisk will be brown for grouped ground targets. The asterisk will not turn amber, even if an alerted target is included in the group.

An alerted target may be placed in the same group as non-alerted targets. In this case, the alerted target will be displayed. Two alerted targets will not be placed in the same group. All alerted targets will be displayed on the screen.

Traffic is displayed in feet regardless of the unit settings for altitude. If the units for altitude are different than feet, a “FT” label will appear on the traffic icon on and main map page, and the dedicated traffic page will include an “ALT IN FT” notification.

7.9 GWX 70/75 Weather Radar (Optional)

The GWX 70/75 Weather Radar uses Doppler technology to optionally provide advanced features to the flight crew such as turbulence detection and ground clutter suppression. Turbulence detection can detect turbulence up to 40nm from the aircraft and will be displayed at radar ranges of 160nm or less.

NOTE

Turbulence detection does not detect all turbulence especially that which is occurring in clear air. The display of turbulence indicates the possibility of severe or greater turbulence, as defined in the Aeronautical Information Manual.

7.10 GWX 8000 Weather Radar (Optional)

The GWX 8000 Weather Radar contains the same features as the GWX 70/75, as well as supports predictive lightning and hail detection. Predictive lightning and hail are available out to 100 nm.

The GWX 8000 also contains an Auto mode. Auto mode is a volumetric scanning mode that will process several radar sweeps internally of varying tilts to analyze and compile the data to build a 3D model of the precipitation. The model then displays the system on the radar display as a 2D image. This removes the pilot UI for tilt, bearing, and radar gain.

7.11 Charts (Optional)

The GTN 750Xi/725Xi can display both procedure charts and weather data on the main map page at the same time. When datalink NEXRAD or Precipitation is overlaid on the main map page, the weather data is displayed *below* an overlaid procedure chart. When airborne weather radar is overlaid on the main map page, the radar data is displayed *above* an overlaid procedure chart. SafeTaxi and ChartView functions do not comply with the requirements of AC 20-159 and are not qualified to be used as an airport moving map display (AMMD).

7.12 Transponder Control (Optional)

The GTN Xi can be interfaced to a Garmin transponder for control and display of squawk code, mode, and additional transponder functions. The activation of the “Enable ES” button on the transponder page does not indicate the aircraft is in full compliance with an ADS-B Out solution in accordance with TSO-C166b (1090ES). Consult your transponder documentation for additional information.

7.13 Telephone Audio (Optional)

Telephone audio distribution to the crew defaults to OFF on each power cycle of the GTN Xi. Prior to utilizing the telephone function, the crew must distribute telephone audio to the desired recipients. If the crew is utilizing the telephone function it is required that the telephone audio be turned off upon completing telephone usage.

7.14 Terrain, Wires, and Obstacles

Terrain, point obstacle, and wire obstacle information appears on the map and terrain display pages as red and amber terrain, obstacles, or wires and is depicted for advisory use only. Aircraft maneuvers and navigation must not be predicated upon the use of the terrain display. Terrain, obstacle, and wire information is advisory only and is not equivalent to warnings provided by TAWS.

The terrain display is intended to serve as a situational awareness tool only. By itself, it may not provide either the accuracy or the fidelity on which to base decisions and plan maneuvers to avoid terrain or obstacles.

7.14.1 Dedicated Terrain Page

The dedicated Terrain page will always depict point obstacles at zoom scales of 10 nm or less and depict wire obstacles at zoom scales of 5 nm or less. The obstacle or wire overlay icon (see Figure 3) will be shown near the bottom of the display when the obstacle or wire depiction is active based on the zoom scale.

NOTE

Only obstacles and wires within 2,000 feet vertically of the aircraft will be drawn on the Terrain page. It is therefore possible to have an obstacle or wire overlay icon displayed with no obstacles or wires being depicted on the display.



Figure 3 – Obstacle Overlay Icon (Left), Wire Overlay Icon (Right)

7.14.2 Map Page

The Map page may be configured to depict point obstacles and wire obstacles at various zoom scales by the pilot by using the Map page menu. The obstacle or wire overlay icon (see Figure 4) will be shown near the bottom of the display when the obstacle or wire overlay is active based on the current zoom scale and setting selected by the pilot.

The settings chosen by the pilot on the Map page menu (including obstacle and wire display ranges) are saved over a power cycle.

NOTE

Only obstacles and wires within 2,000 feet vertically of the aircraft will be drawn on the Map page. It is therefore possible to have an obstacle or wire overlay icon displayed with no obstacles or wires being depicted on the display.

NOTE

The Map page may be configured by the pilot to not show any obstacles or wires at any zoom scale.



Figure 4 – Obstacle Overlay Icon (Left), Wire Overlay Icon (Right)

7.15 Map Page

7.15.1 Configuration

The moving map and weather pages can display a large quantity and variety of data. Map data is layered to ensure that data which is typically more critical is drawn above less critical data, however at some zoom scales and configurations the map may be cluttered with large amounts of data. Controls are provided on the Map and Weather pages for the pilot to select which data displayed, the declutter level, and the zoom scales at which data is added to or removed from the display. It is the responsibility of the pilot to select settings for the map page that will provide the display of data most appropriate to the operation being conducted.

7.15.2 Flight Plan Depiction

The map page depicts the current active flight plan. When an off-route Direct To is active the flight plan will no longer be depicted on the map.

7.15.3 Fuel Range Ring

The distance between the segmented green reserve ring and the yellow zero fuel ring is 45 minutes at the current aircraft groundspeed by default. The pilot may change the fuel reserve time value on the map setup menu. Changes to the fuel reserve time are persisted over GTN Xi power cycles.

Visibility of the fuel range ring may be affected by the underlying map data selectable by the pilot. The pilot may make changes to the topographic or terrain data in order to more clearly observe the fuel range ring at any time.

Fuel range data is derived from the interfaced fuel totalizer data. Data entered in the Fuel Planning pages will not update the fuel range ring.

7.16 Times and Distances

Time and Distance data to the next waypoint is always calculated from the present position to that waypoint and does not account for the path which may be flown (such as intercepting a course) to reach the waypoint.

When navigating using GPS guidance most legs are TO type legs where distance to the next waypoint decreases along the route. However, some procedures include FROM type legs. When navigating on a leg that is a FROM leg indications that it is a FROM leg include the TO/FROM flag indicating FROM and distances increasing in distance fields.

7.17 GTN Xi-GTN (Xi) Crossfill

Specific data will sync between GTNs when installed in a dual GTN configuration. If data is not included in this list, it is not crossfilled. The following data will crossfill between the two GTNs with CROSSFILL ON or OFF:

- User Waypoints
- FPL Catalog
- Traffic Alerts
- Missed Approach Popups
- Altitude Leg Popups
- Heading
- Date/Time Conventions
- CDI Scale
- Default FPA
- CPDLC Messages

The following unit changes will crossfill:

- Temperature
- NAV Angle
- Fuel

The following items are crossfilled only when the GTNs are set to CROSSFILL ON:

- User Holds
- Approaches
- Flight Plan Changes
- Direct-To
- Selected OBS Course Changes

When the GTN is interfaced with other non-GTN Xi Garmin navigators, there will likely be minor discrepancies in the flight plan, course depictions, and turn annunciations based on the differences in the two navigators, even when crossfill is enabled. In such cases it is advisable to utilize the GTN Xi navigator as the primary navigator and if the discrepancy is such that the pilot workload is affected, crossfill should be turned off, and the flight plan on the non-GTN Xi navigator removed.

7.18 Automatic Speech Recognition (ASR)

ASR allows the pilot to interact with the GMA and GTN Xi via voice commands. Commands are constructed around the “Verb – Noun – (Suffix)” syntax for most ASR commands.

- “**SHOW**” Commands – Used to show pages or data fields on the GTN Xi
- “**SAY**” Commands – Used to instruct the ASR engine to say certain phrases related to the flight
- “**TUNE**” Commands – Used to tune certain frequencies into the standby position of the ASR GTN Xi (usually GTN #1)

The “Page” suffix is used in conjunction with the “Show” phrase to command pages to be displayed on the GTN. (e.g.- “Show Main Map Page”)

Audio Panel commands are available to switch audio sources.

- “**SELECT**” to choose which radio the MIC will be selected
- “**TOGGLE**” to toggle the monitor of a specific NAV/COM radio
- “**DISTRIBUTE**” to change the source of audio for the respective seat positions
- “**MUTE**” to mute audio inputs on the audio panel for the respective seat positions

Supplemental commands that allow map zooming, and page navigation are also available.

- “**BACK**”
- “**CANCEL**”
- “**ZOOM IN**”
- “**ZOOM OUT**”

Each command is initiated via the Push-to-Command (PTC) switch. Aural tones will indicate to the pilot the status of the command. A positive tone (low to high) will indicate the system executed a command. A negative tone (high to low) will indicate the system did not understand the command or could not execute due to system state or configuration. “SAY” commands do not provide aural tones as feedback.

The pilot must maintain vigilance regarding ASR command information. Due to the nature of voice recognition, there are times when ASR will interpret a command differently than the pilot intended. The pilot should always cross check the ASR response to the information contained within the GTN Xi as appropriate to ensure in-flight information is accurately understood. If a conflict exists between information gathered via ASR and that available in the GTN Xi system, the pilot should defer to the GTN Xi system information.

Prior to using ASR, the pilot must complete the ASR Qualification Procedure from the GTN Xi Series Pilot’s Guide.

The Command History Page details the commands received by ASR for that power cycle. A full list of commands and guidance for using ASR can be found in the *GTN 6XX/7XX Telligence Voice Command Guide*, 190-01007-50.

When using ASR for “TUNE” commands, it is recommended that the pilot enable Reverse Frequency Lookup (RFL) on the associated GTN Xi.

7.19 European Visual Reporting Points

If the GTN Xi is interfaced with a G500/600 PFD/MFD, and a flight plan in the GTN Xi contains a VRP, the G500/600 must have a database that contains the VRP to appropriately display the VRP on the MFD map. If the database on the PFD/MFD does not contain the VRP, the VRP will display on the MFD map as an intersection.

7.20 Screenshots

The GTN Xi can save screenshots to the removable SD card. To take a screenshot, press and hold the dual concentric knob while pressing the home key. A small camera icon will briefly appear in the bottom right corner of the screen indicating that the screenshot was successful.

7.21 Knob Page Navigation

Knob page navigation is a feature which allows quick navigation to select pages using the dual concentric knob. This feature is similar to the page navigation on Garmin G500/G600 TXi displays. Pages shown in the knob control menu can be customized from the “Page Shortcuts” menu found on the System page.

Switching between Knob Control and radio tuning is accomplished by pressing the dual concentric knob.

The default knob behavior can be changed from Page Navigation to COM Radio based on pilot preference. Navigate to the System > Setup > COM/NAV menu and change the “Knob Control Default” setting as desired. After 30 seconds of inactivity, the knob function will return to the selected default behavior.

7.22 Remote Radio Control (Optional)

Remote radio control is a feature which allows each GTN in a dual-GTN installation to control all GTN communication and navigation radios. The feature adds a radios page which can be accessed via a user field or via the menu bar when a radio frequency keyboard is selected. If the user selects “Local and Remote” for Knob Control Radios in the System > Setup > COM/NAV menu, all radios can be accessed by pressing the dual concentric knob.

The pilot can send frequencies from Airport and waypoint information pages directly to either the communication or navigation radios.

7.23 Emergency Page (Optional)

The GTN Xi has an emergency page that will only appear if Smart Glide is enabled for the installation or when interfaced with a G500TXi or G600TXi with an emergency page. The emergency page allows emergency modes to be activated from the GTN Xi. Current supported emergency functions are Smart Glide and Emergency Descent Mode.

7.24 Smart Glide (Optional)

Smart Glide is an emergency assistance feature that quickly configures Garmin avionics to assist during an emergency loss of power with a single pilot action.

Overview

The purpose of Smart Glide is to reduce the workload and increase the situational awareness of a pilot during an emergency. The GTN Xi does this by constantly computing the aircraft glide range and best glide airport in the background.

When activated, the system will provide the following functionality:

Aircraft Equipment	Suitable Airport in Glide Range	No Glide Airport
GTN Xi	<p>Provide navigation guidance and information to the nearest suitable airport within the glide range.</p> <p>Declutter the map display.</p> <p>Provide aural alerts upon activation, the airport distance and clock direction.</p> <p>Switch the CDI to GPS for navigator #1.</p> <p>Tune the airport CTAF or TOWER frequency in the standby for COM #1. (if equipped)</p> <p>CDI scale is set to 0.3NM.</p>	<p>Declutter the map display.</p> <p>Provide aural alerts indicating there are no glide airports within range.</p> <p>Tune the emergency frequency 121.5 in the standby for COM #1. (if equipped)</p>
G500/600 TXi - or - GI 275	Annunciate “GLIDE” Altitude preselector is cleared.	Annunciate “GLIDE” Altitude preselector is cleared.
G3X	Annunciate “GLIDE”	Annunciate “GLIDE”

Aircraft Equipment	Suitable Airport in Glide Range	No Glide Airport
	CDI switches to GPS 1	CDI switches to GPS 1
G5	CDI switches to GPS 1	CDI switches to GPS 1
(optional) GFC 500 - or - GFC 600	IAS to greater of published best glide speed or minimum engagement speed GPS lateral mode. Selected altitude capture is disabled If the aircraft is >2NM from the glide airport and autopilot is not engaged an aural alert will announce “Engaging Autopilot” and the AP will engage.	IAS to greater of published best glide speed or minimum engagement speed ROL lateral mode with level attitude reference. Selected altitude capture is disabled If the autopilot is not engaged an aural alert will announce “Engaging Autopilot” and the AP will engage.

Table 7-4: Smart Glide Functional Description

Smart Glide Usage

Smart Glide is intended to be used both in emergency situations and during training. To get the most out of Smart Glide, it is recommended to practice for an emergency using Smart Glide so that the pilot can understand the benefits and limitations of the system prior to an actual emergency.

It is important to remember that Smart Glide is just a tool and the pilot in command is the final authority with respect to the safety of the flight. Therefore, it is the pilot in command’s responsibility to decide whether Smart Glide should be used in a given emergency and to deviate from the route suggested by Smart Glide if a better landing area is available.

Smart Glide is designed to be most helpful at altitudes where the pilot has enough time to complete an emergency checklist before landing. Smart Glide is not suggested for use during takeoff or landing phases of flight or for use in the traffic pattern. Smart Glide is disabled on the ground and after takeoff until the aircraft reaches 1000ft AGL.

If at any time the “Maneuver and Land” aural and visual annunciation is presented, the pilot should truncate the emergency procedures and focus on making a safe landing.

If at any time the “Airport out of range” aural and visual annunciation is presented, the pilot should determine the best course of action, whether to divert to an alternate landing field or continue to the suggested glide airport.

Alternate Airport Selection

Alternate glide destination selection for Smart Glide may be done by selecting an airport on the map page and pressing the “Glide to Airport” button. A secondary method is to use the “Alternate Airport” button on the Emergency Glide page. This page displays available airports in a list. The maximum number of glide airports supported is 25. Airports ranked lower than the top 25 will not be available until the number of airports in the glide ring is reduced. Activating any other form of navigation will cause smart glide to cancel. If activating a direct-to, smart glide will automatically cancel and the direct-to will be active. Activating any procedure including a visual approach will prompt the user to cancel smart glide before proceeding.

Smart Glide Activation/Deactivation

The system can be activated by a discrete momentary switch if equipped or by a two-second press of the Direct-To button. These methods of activation are mutually exclusive. The Direct-To press and hold is disabled when a discrete activation switch is installed. All aircraft have a secondary method to activate Smart Glide via a button on the GTN Xi emergency page.

The GTN Xi indicates that smart glide is active by the appearance of the Yellow GLIDE button in the menu bar and by the Smart Glide status bar when viewing the emergency page.

When deactivated, the system will return back to normal operational modes including the flight plan that was in the GTN Xi prior to Smart Glide activation. The pilot will need to verify the active flight plan leg and set autopilot modes, airspeed bug, and altitude pre-selector as desired.

In certain situations, crossfill may be turned on or off when Smart Glide is activated. Verify the crossfill status is set as desired after the system is deactivated.

In aircraft equipped with a Garmin GFC autopilot, autopilot and flight director modes including airspeed references may be changed when activating and cancelling smart glide. Always verify the autopilot modes are set as desired after smart glide is cancelled. In certain situations when Smart Glide is cancelled, re-loading of the previous flight plan may cause the active navigation to change abruptly and in some situations the autopilot may begin following this new navigation immediately.

Map Page

The Glide Range Ring and Best Glide Airport Indicator are overlays on the map page. The Glide Range Ring and Best Glide Airport Indicator can be enabled and disabled individually in normal mode.

The Glide Range Ring provides the pilot with an estimated glide range in the event of a loss of engine power. The Glide Range Ring accounts for terrain, obstacles, and winds if wind data is available. If no wind data is available, the pilot will be notified when the glide range ring is displayed. In some cases, glide range ring may rely on datalink wind data which may not reflect current wind conditions.

Glide Range Ring

In normal operation the Glide Range Ring is displayed in cyan. This indicates that the displayed glide range is based on the published glide ratio for the aircraft. See the POH or AFM for the aircraft configuration and conditions required to achieve this range. In normal operation, the Glide Range Ring and Best Glide Indicator update at approximately 5 second intervals. Because of these limitations, the Glide Range Ring is only an estimate and should only be used for situational awareness.

When Smart Glide is active, the cyan Glide Range Ring is replaced with a yellow Smart Glide Range Ring. This range ring does not use a fixed value for glide ratio but instead updates approximately once per second using real-time glide performance. This range ring also accounts for terrain, obstacles, and wind just like the normal range ring. This ring will dynamically change size to reflect changes in glide performance that occur for any reason. The ring is most accurate when the glide is stabilized. Changes in glide ratio due to changes in aircraft configuration, changes in engine power, or un-accounted for changes in wind can cause the glide range ring to change size more rapidly. Because of these limitations, the Smart Glide Range Ring is only an estimate and should only be used for situational awareness.

Arrival AGL

The arrival AGL flag is automatically displayed when Smart Glide is active. This value is calculated based on the Smart Glide Range Ring data and the direct-to course to the glide airport. If the aircraft is further than 2NM from the glide airport the course and arrival AGL will automatically be recalculated when the CDI reaches $\frac{1}{2}$ scale deflection. If the aircraft is within 2NM of the glide airport, the arrival AGL flag will be removed when the aircraft leaves the direct-to course for landing and the course will not be recalculated. The arrival AGL is updated approximately once per second and has the same limitations as the Smart Glide Range Ring on which the data is based.

Best Glide Airport Indicator

The Best Glide Airport Indicator is depicted as cyan chevrons on the map page which point the pilot toward the “best” airport to glide to in the event of loss of engine power. When the best glide airport indicator is enabled, it will be shown if there are any airports within the glide range ring that meet the configured criteria. If there are no airports that meet the criteria, the indicator will not be displayed even when it is enabled. The “best” glide airport is selected based on runway surface type, distance from present position, runway length, and weather

if weather data is available. Additionally, public airports are prioritized over private airports. Because of this fixed determination and the limited information available to the avionics, the best glide airport is a suggestion, and the pilot is responsible for choosing the most favorable landing site in the event of an emergency.

When Smart Glide is activated, the system will use the same logic as the best glide airport indicator to pick a glide destination. The system may choose a different airport when activated if the solution has changed since the best glide indicator was last updated. However, once the glide destination is selected, it will not change while smart glide is active unless modified by the pilot.

Emergency Glide Page

The emergency page on the GTN Xi, G500/600 TXi, and G3X automatically becomes the emergency glide page when Smart Glide is active. This page can be accessed quickly while Smart Glide is active by pressing the yellow GLIDE icon in the menu bar. This page displays information about Smart Glide status, pertinent airport information, and shortcut buttons for common actions during glide. A map shortcut button is always displayed on the emergency glide page. A Squawk 7700 button will be displayed on the controlling unit if a transponder is being controlled by the GTN or G3X.

Nearest Airport Page

The Nearest Airport Page indicates which airports are within the glide range ring by displaying the word “Glide” with a green checkmark.

The GTN Xi uses data about the airport and installer configured data to determine the best suitable glide airport. The airports within the glide range that are of the surface type designated by the installer will be ranked according to:

1. Weather Category (LIFR, IFR, MVFR, VFR) if available.
2. Distance from the aircraft.
3. Runway length.
4. Public vs Private (Public is preferred)

The highest ranked airport will be selected as the glide destination. If no public airports meet the requirements for desired runway length and weather, airports with shorter runway lengths, airports with IFR/LIFR weather, airports with winds above the max desired gust speed, and private airports may be selected. If no airports within the glide range meet the surface type criteria, the system will advise that there are no airports within glide range.

Glide Prediction

When active, the system will continuously monitor the aircraft glide performance and adjust the yellow Smart Glide Range Ring as necessary.

If the currently selected airport falls out of glide range as measured by the system, the system will alert the pilot with visual and aural alerts. The pilot has the option to choose an alternate glide airport from the map or the “Alternate

Airport” button on the Emergency Glide page of the GTN Xi. Only airports that are eligible to be glide airports can be selected. Sudden changes in aircraft performance while the system is active will cause a degradation in the accuracy of the glide range estimation.

System Requirements

Smart Glide requires the following to function:

- Valid GPS position fix
- Valid data from a compatible Garmin PFD
- Terrain and Navigation database installed on GTN Xi

Visual/Aural Alerts

The following describes how the system functions as the aircraft approaches the glide airport or off-airport landing areas.

With a Glide Airport Selected

4NM from the Glide Airport

An “Approaching Airport” aural and visual alert is generated.

2NM from the Glide Airport

A “Maneuver and Land” aural and visual alert is generated along with a distance and clock position callout. If the autopilot is still engaged after 10 seconds and the aircraft altitude is low, another aural alert will remind the pilot to “Disconnect Autopilot”. Once the aircraft is within 2NM of the glide airport, the pilot must take full control of the aircraft. At this point Smart Glide will no longer provide range alerts and GPS guidance will not recalculate.

500' AGL

At 500’ above the ground, a “500” aural alert is generated as a reminder to prepare for touchdown.

With No Glide Airport

Altitude AGL Callouts

At 2000’, 1000’, and 500’ above the ground, an associated aural alert is generated as a reminder to prepare for touchdown. No GPS course guidance is given.

CAUTION

This system is intended to aid the crew in the initial avionics setup during a glide emergency, and if possible, to aid the pilot in finding and navigating to a suitable airport within the glide range of the aircraft. The pilot must make every effort to ensure the system guidance is as desired. Other or more suitable airports or off-airport landing areas may be available but unknown to the Smart Glide system. The pilot must evaluate all options and choose the most appropriate course of action given the conditions.

Alert	Description
“Smart Glide Disabled. Low Altitude”	Smart glide cannot be activated below 1000’ AGL.
“Smart Glide Disabled.”	Smart Glide cannot be activated, but the switch was used to attempt to activate. NOTE: If Smart Glide was manually disabled using the Emergency Page menu, this aural alert will not play.
“Smart Glide Active”	Smart Glide is active and functional.
“Smart Glide Canceled”	Smart Glide was canceled by the pilot.
“Engaging Autopilot”	Smart Glide has engaged the autopilot in GLIDE mode.
“Disconnect Autopilot”	Reminder to the crew that the system is no longer navigating, and the crew should take over for the landing or descent maneuver.
“Airport X o’clock X miles	The glide airport distance and bearing are given relative to the aircraft at the time the alert was generated. Distance is given in nautical miles.
Altitude Aurals	Alert the pilot when at specified altitude AGL. A “Five Hundred” callout is standard. Additional “Two Thousand” and “One Thousand” callouts are issued when there is no airport in range.
“No Airports Within Glide Range”	The GTN cannot find an airport for Smart Glide. Consider airports not available in the GTN Xi, or other off-airport landing sites.
“Approaching Airport”	The aircraft is within 4NM of the glide airport.
“Maneuver and Land”	The aircraft is within 2NM of the glide airport. The pilot should maneuver the aircraft for landing.
“Airport Out of Range”	The glide airport is no longer in the predicted glide range.
“Smart Glide Failure, consider alternate landing site.”	The Smart Glide system has failed due to loss of data input or system failure. Smart Glide guidance is not available. The pilot should consider all available alternatives, including continuing to the previously chosen airport, and not rely on the GTN Xi for glide information.
“ALTN Airport Out of Range”	If an alternate airport is selected that is on the edge of the glide range ring, the airport may go out of range while the system is recalculating. If this occurs, the guidance to the current airport will be maintained (if available) and the “ALTN Airport Out of Range” message will be displayed for five seconds.

Table 7-5: Smart Glide Alerts

TXi Integration

Smart Glide is fully compatible with the G500/G600 TXi if a PFD or MFD is configured. When Smart Glide is active, a yellow GLIDE button will appear on the MFD or PFD if no MFD is visible. Pressing the GLIDE button will bring up the emergency glide menu. The G500/G600 MFD map page will mirror the information on the GTN map page when smart glide is active. While information can be viewed on TXi, changing the glide airport can only be done on the GTN Xi.

G3X Touch Integration

Smart Glide is fully compatible with the G3X Touch system if a PFD or MFD is installed. When Smart Glide is active, a yellow GLIDE button will appear on the bottom of the PFD and MFD. Pressing the GLIDE button will bring up the emergency glide page. If displayed, the G3X Touch *Glide Range Ring* will be removed when smart glide is active. Refer to GTN Xi glide range ring display. While information can be viewed on G3X Touch, changing the glide airport can only be done on the GTN Xi.

GI 275 Integration

The GI 275 will indicate when smart glide is active by yellow “GLIDE” text on the top of the altitude tape. When the GI 275 controls a GFC 500, this indication will also indicate when IAS glide mode is active.

GFC Integration

When select Garmin GFC autopilots are interfaced to the system, the autopilot will automatically modify its behavior to assist the pilot when Smart Glide is active. The following table describes compatible GFC 500 and 600 software versions that have Smart Glide compatibility:

GFC Model	Software Version
GFC 600	v2.80 or later. Check the GFC 600 AFMS to determine Smart Glide compatibility and configuration.
GFC 500	GI 275 version: v2.40 or later G3X: v9.00 or later G5: v8.00 or later

Table 7-6: Smart Glide Software Compatibility

If the airplane is more than 2NM from the best glide airport when smart glide is activated, the autopilot will automatically engage the servos and set the flight director to GPS and IAS modes. IAS mode will automatically target best glide speed or autopilot minimum engagement speed if best glide is less than the minimum engagement speed. If the airplane is within 2NM of the best glide airport, the flight director will still be activated in GPS and IAS modes but the autopilot servos will not be engaged. If no airport is within glide range when

Smart Glide is activated, the autopilot will engage servos and the flight director will be set to ROL mode with a wings level reference and IAS mode.

When Smart Glide is active, the behavior of IAS mode is modified so that the airspeed reference initially targets best glide speed or autopilot minimum engagement speed if best glide is less than the minimum engagement speed. The airspeed reference and vertical mode may be changed by the pilot at any time, but if IAS mode is selected again, it will set the airspeed reference back to the initial smart glide speed. This behavior is indicated by the presence of the “GLIDE” indication on GTN and on GFC 600 by “GLIDE” being annunciated on the GMC 605. As soon as Smart Glide is cancelled, IAS mode reverts to its normal function.

Smart glide only engages the autopilot servos on initial activation when further than 2NM from the best glide airport. It is the pilot’s responsibility to manage the autopilot and disconnect it at the appropriate time. There is no automated autopilot disconnect. If the pilot later selects a new glide destination, the flight director modes will be switched to GPS and IAS modes, however the autopilot servos will not be automatically engaged. The pilot may manually engage the autopilot servos by pressing the AP button on the autopilot mode controller.

When Smart Glide is cancelled, autopilot mode changes may occur. It is the pilot’s responsibility to disconnect the autopilot or verify the flight director modes are as desired after cancelling Smart Glide.

7.25 Autopilot Coupling

It is possible to create flight plan waypoint sequences, including Search and Rescue patterns, which exceed the autopilot’s bank angle capabilities. The pilot shall monitor autopilot performance regarding flight path deviation.

Autopilots coupled to the GTN Xi system in an analog (NAV) mode will follow GPS or VHF navigation guidance as they would with existing VOR receivers. See section 4.4 for autopilots that support NAV mode.

Autopilots that support GPSS or GPS Roll Steering in addition to the analog course guidance will lead course changes, fly arcing procedures, procedure turns, and holding patterns if coupled in a roll steering mode. See section 4.4 for autopilots that support GPSS or GPS Roll Steering.

The GTN Xi supports autopilot roll steering for heading legs when an approved heading source is interfaced to the GTN Xi.

For autopilot operating instructions, refer to the FAA approved Flight Manual or Flight Manual Supplement for the autopilot.

7.25.1 RNP 1.0 RF Leg Types

This STC does not grant operational approval for RF leg navigation for those operators requiring operational approval. Additional FAA approval may be required for those aircraft intending to use the GTN Xi to provide RNP 1 or RNP 0.3 navigation in accordance with FAA Advisory Circular AC 90-105A.

AC 90-105A states that procedures with RF legs must be flown using either a flight director or coupled to the autopilot.

This STC has demonstrated acceptable crew workload and Flight Technical Error for hand flown procedures with RF legs when the GTN Xi installation complies with limitation set forth in Section 2.6.1 of this document. It is recommended to couple the autopilot for RNP 1.0 RF procedures, if available, but it is not required to do so.

7.25.2 RNP 0.3 RF Leg Types

This STC has demonstrated acceptable crew workload and Flight Technical Error for coupled procedures with RF legs when the GTN Xi installation complies with limitation set forth in Section 2.6.1 of this document. It is required to couple the autopilot for RNP 0.3 RF procedures.

7.26 StormScope® Display (Optional)

StormScope® lightning information displayed by the GTN Xi is limited to supplemental use only. The use of the StormScope® lightning data on the display for hazardous weather (thunderstorm) penetration is prohibited.

StormScope® lightning data on the display is intended only as an aid to enhance situational awareness of hazardous weather, not penetration. It is the flight crew's responsibility to avoid hazardous weather using official weather data sources.

When the GTN Xi StormScope® page is operating without a heading source, as indicated by the "HDG N/A" label at the upper right corner of the StormScope® page, strikes must be cleared after each heading change.

7.27 Flight Planner/Calculator Functions

The Fuel Planning page uses Fuel on Board or Fuel Flow as received from an on-board fuel totalizer, as entered by the pilot at system startup, or as entered by the pilot when on the Fuel Planning page. This *is not* a direct indication of actual aircraft fuel flow or fuel on board and those values are only used for the Fuel Planning page. The fuel required to destination is only a calculated and predicted value based on the data entered into the planner. It is not a direct indication of how much fuel the aircraft will have upon reaching the destination.

7.28 Fuel Range Rings

The fuel range rings displayed on the moving map are intended for situational awareness and do not represent a direct indication of endurance or fuel remaining. The distance between the segmented green reserve ring and the

yellow zero fuel ring is 45 minutes by default. The reserve value can be changed from the GTN Xi map setup menu.

Fuel range data is derived by the interfaced fuel totalizer data. Data entered in the Fuel Planning pages will not update the fuel range ring.

7.29 Glove Use / Covered Fingers

No glove or covered fingers may be used to operate the GTN Xi touchscreen unless the Glove Qualification Procedure located in the GTN Xi Series Pilot's Guide has been successfully completed. The Glove Qualification Procedure is specific to a pilot / glove / GTN 725Xi, 750Xi or GTN 625Xi, 635Xi, 650Xi combinations.

7.30 Active Weather Radar

Radar is broadcasting energy while in Weather or Ground mapping modes. If the GTN 750Xi/725Xi system is configured to control an airborne weather radar unit, observe all safety precautions, including:

- Do not operate in the vicinity of refueling operations.
- Do not operate while personnel are in the vicinity (approximately 20 feet) of the radar sweep area.

CAUTION

If a radar system is installed, it generates microwave radiation and improper use, or exposure, may cause serious bodily injury. Do not operate the radar equipment until you have read and carefully followed the safety precautions and instructions in the weather radar user manual and/or pilot's guide.

7.31 Telephone Audio

Telephone audio must not be distributed to the pilot or co-pilot unless a phone call is active.

CAUTION

Failure to turn off telephone audio when the telephone is not in use may result in telephone ringer or text message aural notifications being received during critical phases of flight.

7.32 Multi Crew Aircraft (GMA 35 Only)²

For aircraft type certified with more than one required pilot, or operations requiring more than one pilot, the "Group Co-Pilot with Passenger" audio panel option shall not be activated. This option is found in the Intercom Setup Menu when a Garmin GMA 35 audio panel is installed.

² Includes GMA 35 and GMA 35c Audio Panels

Additionally, when the GTN Xi and TXi are installed in the same cockpit, it is recommended that the GTN Xi and TXi have the same chart types and cycles to ensure appropriate lookup and chart syncing/streaming functionality.

7.33 Automatic Speech Recognition

Pilots may not use the ASR function to operate the GTN Xi/GMA unless they have completed the ASR Qualification Procedure located in the GTN Xi Series Pilot's Guide successfully. The ASR Qualification Procedure is specific to each pilot / headset / aircraft combination.

7.34 Connex Data (Optional)

The Connex product line uses a wireless transceiver to provide data to and from a GTN Xi to personal electronic devices (PEDs).

The Flight Stream 210 is a remotely mounted unit that provides the capability to interface Portable Electronic Devices (PEDs) to the GTN Xi via Bluetooth. The Flight Stream 510 is mounted in the GTN SD card slot and includes a Bluetooth and Wi-Fi transceiver. The GDL 60 is a remote mounted wireless access point that includes Bluetooth and Wi-Fi connectivity to the PED, and LTE or Wi-Fi connectivity to Garmin services on the ground.

Data such as traffic, flight plan, datalink weather, entertainment audio information, and attitude information are sent from the Flight Stream or GDL 60 to the PED. The PED can send flight plans and databases (except Flight Stream 210) to the GTN Xi via the access point. Limitations regarding database operations are found in Section 2.15.

Garmin provides a list of tested and compatible devices that can be used with the Flight Stream or GDL 60. Connection to the Flight Stream or GDL 60 may be possible with devices other than those on the supported device list, but Bluetooth® and/or Wi-Fi stability and wireless data integrity cannot be guaranteed.

For details about the Garmin supported devices and apps for use with the Connex product line, please visit: http://garmin.com/connex/supported_devices

7.35 System Databases

7.35.1 Database Provided Altitudes

When the GTN Xi provides altitude data for waypoints included in IFR procedures, the altitudes provided are those shown on the procedure chart for “Turbojet” or “Jet” aircraft. If altitudes for other aircraft such as “Turboprop” or “Prop” are required, the crew must manually edit the waypoint altitude.

7.35.2 Database Sync with G500/600 or G500/600/700TXi GDUs

When a GTN Xi hosts a Flight Stream 510 for database syncing to GDUs, the GTN Xi and GDU must be configured for the same chart database type (FliteCharts or ChartView). If the GDU and GTN are not configured for the same chart type, charts database sync and Chart Streaming will not be available.

7.35.3 Databases and Flight Plan Waypoints/Procedures

Database versions (or cycles) and effective dates are displayed on the start-up database verification page immediately after power-on for those databases with an effective or expiration date. Databases with no effective or expiration date (e.g. - terrain database) are considered effective upon installation in the GTN Xi. Database information can also be viewed on the System – System Status page.

The Obstacle Database has an area of coverage that includes the United States and Europe and is updated as frequently as every 56 days. The HOT Line wire database only includes the continental United States and portions of Canada/Mexico.

Only the Obstacle/HOT Line wire database may be used in accordance with the limitation found in Section 2.14.

If a stored flight plan contains a waypoint or procedure that does not correspond to a waypoint or procedure in the navigation database in use, the waypoint or procedure will become locked (depicted as “lockd”) in the flight plan. Flight plans with locked waypoints may be placed in the active flight plan portion of the system but no navigation will be provided. The locked waypoint/procedure must be resolved by removing or replacing it with the correct waypoint/procedures in the flight plan before the system will provide navigation.

Discrepancies that invalidate a procedure should be reported to Garmin International. The affected procedure is prohibited from being flown using data from the navigation database until a new navigation database is installed in the aircraft and verified that the discrepancy has been corrected. Navigation database discrepancies can be reported at FlyGarmin.com by selecting “Aviation Data Error Report.” Flight crew and operators can view navigation database alerts at FlyGarmin.com then select “NavData Alerts.”

If the navigation database cycle will change during flight, the flight crew must ensure the accuracy of navigation data, including suitability of navigation facilities used to define the routes and procedures for flight. If an amended chart affecting navigation data is published for the procedure, the database must not be used to conduct the procedure.

7.35.4 Single Point Database Acknowledgement

For GTN Xi units running software version 20.20 or later, the remote database confirmation feature has been replaced by single point database acknowledgement. This feature is available on all GTN Xi installations, and it gives users a quick way to verify databases on Garmin products are up to date before flight.

Upon startup GTN #1 will display a database summary page. Other Garmin products that support this feature will all skip their database confirmation pages. If all databases are up to date, GTN #1 will display a green check on the database summary page. If some databases are missing or out of date, GTN #1 will display the database details page and highlight the offending databases in yellow as before. If a database mismatch warning appears, that means that the databases are not the same on all the Garmin products. If more information is needed, the user can tap on the database mismatch label to see detailed information about a given database.

Recommendations for managing databases:

1. When downloading databases from the Fly Garmin website, always choose to use Database Sync and always choose to reinstall all databases when creating a database card.
2. If using Database Concierge on Garmin Pilot, verify that all database concierge downloads are up to date before attempting to install databases on GTN.
3. Always load databases to GTN #1 in installations with dual GTN Xi or a G500/G600 TXi. Don't load databases onto the SD cards for GTN #2 or TXi unless necessary. If databases are on the SD card, the unit will not skip the database page.
4. If a database mismatch occurs, power on all units to the home page and wait until the database sync is complete. A system message will appear while database sync is in progress. If a database mismatch still occurs check the Terrain database version on each unit and update as necessary. If the issue persists, contact Garmin Support.

7.35.5 GDL 60 (Optional)

The GDL 60 is a wireless access point for your airplane. It provides wireless access for PEDs in the aircraft similar to a FlightStream 510, automatic wireless database updates for aircraft avionics and wireless sensor data query and database downloads over LTE or wireless internet.

If wireless sensor data query is enabled in an installation, certain displays can power on when queried. During a query, the display backlight will be powered off to conserve battery.

The GDL 60 will wake up on battery power to download databases. Wireless sensor data query also uses a small amount of battery to listen for a request to wake up the avionics. It is recommended to install and use a battery tender in conjunction with the GDL 60.

If the aircraft will not be flown for an extended period without a battery tender or you are in a remote location and wish to eliminate the possibility of battery drain, open the “CNXT BATT” breaker to disable the GDL 60 live query functionality. While this breaker is open the GDL 60 will not download databases or respond to sensor queries.

7.35.6 Charts Database (Dual GTN7XX and TXi GDU)

When the aircraft installation includes 2 GTNs capable of displaying charts (GTN 725, 725Xi, 750, or 750Xi) and crossfill is enabled between the GTNs, the GTNs should have identical chart types (ChartView or FliteCharts) and charts cycles installed. Failure to have identical charts could affect the chart lookup features and automatic chart selection.

7.36 Core Procedure Selection

With GTN 20.41, runway selection may be deferred when loading a SID or STAR, if possible for that procedure. If the runway selection is deferred, this will result in only the procedure core being added to the flight plan. The core of the procedure is the section of the procedure that does not change *route or altitudes* based on the runway transition.

The runway may be selected in the flight plan page on next to the procedure header, in which case the runway transition will be added to the flight plan. If user modified altitudes exist within the route, a popup will be provided asking if the user would like the GTN to attempt to retain user modified data. When selecting a runway transition, verify flight plan and crossing altitudes remain correct per the published procedure.

The runway may also be selected by returning to the procedures page, a popup will be provided asking if the user would like the GTN to attempt to retain user modified data.

7.37 ATC Data Link System (CPDLC) (Optional)

Controller Pilot Data Link Communications (CPDLC) provides data link communication between the flight crew and Air Traffic Control (ATC) facilities. Communication is in the form of text message elements that resemble phraseology used in voice communications with ATC. CPDLC is an application that runs within FAA Data Comm and is a reduced function of FANS 1/A+. CPDLC allows operators to use departure clearances (DCL) at participating airports and enroute services within continental US and above 16,000 ft. DCL is similar to a PDC, but with push-to-load capability for flight plan amendments.

With the proper software enablements, GDR 66 digital radio installed, and service registration through FltPlan.com, FAA Data Comm can be used. The GDR 66 VHF Data Link Transceiver provides the line-of-sight link between the aircraft and ground systems. FltPlan.com allows the user to register for FAA Data Comm service for access to the SITA ACARS network.

Prior to logging on to CPDLC, an ICAO flight plan must have been filed for the system to reference and the information entered into the Log-on display must match the filed flight plan. See Section 1.6, ATC Data Link System, for information regarding FAA Data Comm approvals and ICAO flight plan equipment codes. Refer to the GTN Xi Pilot's Guide Data Comm Addendum (190-02327-A2) for more detailed information regarding the use of CPDLC.

7.37.1 System States

Once a successful logon has been completed by the flight crew, the system will go into a CPDLC waiting state. In this state, the system is waiting for a CPDLC session to be initiated by the ATC facility. When the ATC facility sends a CPDLC session start command and it is accepted by the system, the flight crew will have the ability to send and receive CPDLC messages.

Displayed Connection Status	Description
 Waiting For Link	The system is waiting for an ACARS connection or has initialized the VHF Data Link router but does not have an air-ground connection.
 FANS Link Available	The system has established ACARS communication. This state indicates that an AFN (ATS Facilities Notification) logon can be attempted to establish CPDLC communications.
 Connecting	The system has initiated a network logon with an ATC facility.

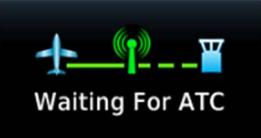
Displayed Connection Status	Description
 Waiting For ATC	The system has successfully completed the network logon procedure. During this state the system is waiting for an ATC facility to initiate a CPDLC session. This state will exist during initial connection or if a CPDLC session has been closed and the network logon is still valid.
 CPDLC Active	The system has successfully established a CPDLC session with a ground facility. CPDLC messages can be exchanged in this state.
 FANS Logon Failed	Logon Failed The system was unable to establish a network logon.
 CPDLC Inactive	The system has disconnected from a CPDLC connection. This state will exist when ATC ends a session. If the network logon is still valid, the system is capable of another CPDLC session from an ATC facility.

Table 7-7: ATC Data Link Connection Status

7.37.2 Messages

CPDLC downlink messages are messages initiated by the flight crew and sent to ATC. CPDLC uplink messages are messages initiated by ATC and sent to the flight crew

Icon	Text	Description
	Sent	Message sent to ATC.
	Standby	'Standby' message response sent to ATC. The exclamation point notifies the flight crew that an action is needed to close the message.
	Send Fail / Expired	Message failed to send or the message timed out (270 seconds).
	Closed	Message sent to ATC and message thread closed.

Table 7-8: Downlink (Aircraft to ATC) Status Icons

Icon	Text	Description
	Standby (message not opened)	Unopened 'Standby' message response sent by ATC.
	Standby (message opened)	Opened 'Standby' message response sent by ATC.
	Need Response (message not opened)	Unopened message that requires a response to ATC.
	Need Response (message opened)	Opened message that requires a response to ATC.
	Expired (message not opened)	Unopened expired message sent by ATC (100 seconds).
	Expired (message opened)	Opened expired message sent by ATC (100 seconds).
	Closed (message not opened)	Unopened message that closed the message thread.
	Closed (message opened)	Opened message that closed the message thread.

Table 7-9: Uplink (ATC to Aircraft) Status Icons

7.38 GCO 14 (Optional)

The GTN Xi can be interfaced to a Garmin GCO 14 carbon monoxide (CO) monitor. When a GCO 14 is installed on the GTN 6XX/7XX or other interfaced LRU, the GTN can provide a readout of CO concentration in parts per million (PPM), CO alerts, and a separate customizable advisory message to alert the pilot to levels of CO below the alerting threshold. The readout of CO concentration can be selected as a user field on the GTN.

CO alerts will be provided when the CO level meets or exceeds the concentration and duration thresholds shown in table 7-10. The CO alert includes both an amber visual and aural annunciation “Carbon Monoxide”.

A customizable advisory message can be set via the GCO settings menu to advise the pilot of CO levels below the alerting threshold. The pilot must select a concentration in PPM as well as a duration for the desired advisory. Once the CO concentration has been above the selected concentration threshold for the selected duration, a system message will be presented alerting the pilot to high CO levels.

Settings and information for the GCO can be found in Utilities > CO Monitor. The GCO 14 sensor has an expiry date. It is recommended to replace the sensor prior to expiration. If the sensor is not replaced prior to expiration, a system message will be issued to notify the pilot that the sensor has expired.

Concentration (PPM)	Alert After (minutes)
≤ 30	No Alert
> 30	120
> 50	60
> 100	10
> 300	<i>No delay</i>

Table 7-10 - CO (carbon monoxide) Alert Thresholds