FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT
or
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for the

GARMIN GI 275 MULTIFUNCTION INSTRUMENT
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 SA02658SE for the installation and operation of the Garmin GI 275 Multifunction Instrument. This document must be carried in the airplane at all times.

The information contained herein supplements or supersedes the information made available to the operator by the aircraft manufacturer in the form of clearly stated placards or markings, or in the form of an FAA approved Airplane Flight Manual, only in those areas listed herein. For limitations, procedures and performance information not contained in this document, consult the basic placards or markings, or the basic FAA approved Airplane Flight Manual.

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LOG OF REVISIONS			
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1	All	Initial issue.	See Cover Page

TABLE OF CONTENTS

Section 1. GENERAL

The GI 275 Multifunction Instrument (hereafter referred to as the "GI 275") is a panel-mounted, multifunction instrument with a single touch display and virtual "Pages" within each instrument that may be configured as individual "instruments". The GI 275 can be configured as an ADI, HSI, EIS or MFD with multiple hazard awareness pages, depending on the number and type of integrated navigation and hazard sensor sources. The GI 275 can be used as a primary Engine Indication System (EIS) for single and twin-engine aircraft. The ADI and HSI can be installed as stand-alone primary flight instruments as long as there are other equivalent source(s) of primary flight information that are independently powered. The ADI or HSI can also be installed as a backup instrument. Any GI 275 ADI, HSI, or MFD may be configured with an optional internal battery to provide an independent and automatic backup power source.

Individual GI 275s may be grouped or connected as follows to expand and enhance their capabilities and to provide redundancy. Groups of connected GI 275s are hereafter referred to as a "GI 275 system" in this document.

Attitude Direction Indicator (ADI) 	Units configured as an ADI will contain a single page that displays aircraft attitude. Altitude, airspeed, vertical speed and heading may also be displayed on the ADI page depending on the aircraft configuration.
Horizontal Situation Indicator (HSI) 	Units configured as an HSI will contain two pages; an HSI page and an HSI Map page. The HSI Page is a conventional HSI with CDI, VDI, heading indication and compass card. There are navigation annunciations and distance/time fields. The HSI MAP Page includes a top-down view, inset map, hazard awareness overlays (traffic, terrain, topo), along with traditional lateral and vertical navigation cues.

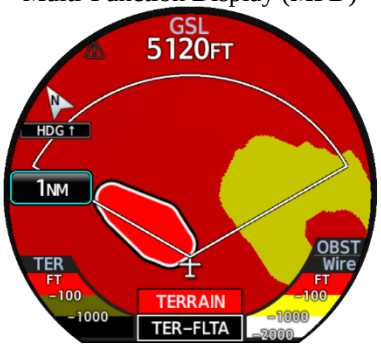
Multi-Function Display (MFD) 	Units configured as an MFD contain multiple installer configurable pages that may include HSI, HSI Map, CDI, Map, Terrain, Traffic, Weather, Radar Altimeter, Stormscope, and Engine Indication System (EIS)
Standby ADI 	The HSI and MFD can be configured as a "Standby" instrument to preserve the display of primary flight data in the event the primary ADI fails. If appropriately configured an ADI page will be available during both normal operation and when reverted to preserve the display of primary flight data. A stand-alone ADI may also be considered a Standby ADI since it provides full-time display of primary flight data.
Engine Indication System (EIS) 	Units configured for EIS can display the following engine parameters: Engine RPM Manifold Pressure Oil Pressure Oil Temperature EGT, Primary EGT CHT TIT CDT IAT Alternator / Battery Fuel Flow, Pressure, Quantity Carb Temp

Table 1- GI 275 System Function

-00	Basic Instrument
-10/-30	Includes internal ADAHRS
-20/-40	Capable of Integrating with an Autopilot

Table 2- GI 275 Hardware Variants

GMU 11 and GMU 44B	Magnetometer Heading Sensors
GEA 24 or GEA 110	Engine Sensors
GTP 59	OAT temperature Probe
GSB 15	USB Port
Backup Battery (internal)	

Table 3- GI 275 System Components

MFD functions are supported by GPS navigator interfaces and a variety of other optional interfaces such as traffic systems, Stormscope®, and satellite and ADS weather sources.

Although intuitive and user friendly, the system 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 who are not familiar with the GI 275s or GI 275 system 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 GI 275 system.

1.1 ADAHRS

The integral ADAHRS, included in the GI 275 -10/-30 variant, senses aircraft attitude and air data for GI 275 display of primary flight data and can provide attitude and air data for use by other installed systems.

The ADAHRS requires GPS and airspeed inputs for aiding the system. GI 275 includes an optional GMU 11 or GMU 44B magnetometer interface to determine magnetic heading and an OAT probe for measuring outside air temperature.

1.2 Standby Instruments and the GI 275 ADI

Except for installations that are limited to VFR, GI 275 systems require standby attitude, altitude, and airspeed instruments. Several types of standby instruments might be installed, including a standby GI 275 ADI, other ADI, or individual analog instruments. GI 275 system redundancy is satisfied by using a GI 275 MFD or HSI that is configured as a standby instrument, or by using a dedicated GI 275 ADI. When configured as a standby instrument the GI 275 MFD and HSI include an ADI Page which is displayed automatically when faults are detected or when selected by the pilot. Both the GI 275 primary and standby

ADIs have their own integral ADAHRS and internal batteries for independence and redundancy.

1.3 Backup Battery

The GI 275 may be configured to include a backup battery to provide emergency power to a GI 275 ADI, HSI or MFD. The backup battery is mounted in an internal, partitioned aluminum chassis within the GI 275 to provide thermal security and automatic backup power when aircraft power is unavailable.

NOTE

Backup battery charging requires the battery temperature between 0°C and 60°C. A system message will indicate that the battery is no longer charging.

1.4 Definitions

ADAHRS: Air Data and Attitude Heading Reference System

ADC: Air Data Computer

ADS: Automatic Dependent Surveillance

AHRS: Attitude Heading Reference System

AMMD: Airport Moving Map Display

CDI: Course Deviation Indicator

CRS: Course

EIS: Engine Indication System

FD: Flight Director

FLTA: Forward-looking Terrain Alerting

GPSS: GPS Steering

HDG: Heading

HSI: Horizontal Situation Indicator

IFR: Instrument Flight Rules

IMC: Instrument Meteorological Conditions

LOI: Loss of Integrity

MFD: Multi-Function Display

MFI: Multi-Function Instrument

PED: Portable Electronic Device

SBAS: Space-based Augmentation System

SVT: Synthetic Vision Technology

TAWS: Terrain Awareness and Warning System (a TSO-C151b function)

TIS-A: Traffic Information Service (Addressed)

TIS-B: Traffic Information Service (Broadcast)

VFR: Visual Flight Rules

VMC: Visual Meteorological Conditions

VNAV: Vertical Navigation

VS: Vertical Speed

Section 2. LIMITATIONS

2.1 Minimum Software Version

The following or later software versions must be installed for this AFMS revision to be applicable to the installation:

Component	Identification	Software Version
GI 275	Multi-Function Instrument	2.01

NOTE

This section is not intended to be a comprehensive list of approved software. It is intended to provide a means to determine if this AFMS revision is applicable to the software that is installed in the aircraft. Do not use this AFMS revision if the installation has a software version less than that shown in the table above.

2.2 Heading Operational Area

If the GI 275 is used as the heading source, IFR Operations are prohibited north of 72°N and south of 70°S latitudes. In addition, IFR operations are prohibited in the following four regions:

1) North of 65° North latitude between longitude 75° W and 120° W

2) North of 70° North latitude between longitude 70° W and 128° W

3) North of 70° North latitude between longitude 85° E and 114° E

4) South of 55° South latitude between longitude 120° E and 165° E

Loss of heading may occur near the poles.

2.3 Magnetic Variation Operational Area

If the GI 275 is used as the heading source, IFR operations are prohibited in areas where the magnetic variation is greater than 99.9 degrees East or West.

2.4 Navigation Angle

The Magnetic/True Navigation Angle (as selected in the MENU → SYSTEM → UNITS Page) must match the navigation angle selected on all interfaced GPS/SBAS navigators. If this is not done the navigation deviations will not be accurate.

2.5 ADAHRS Normal Operating Mode

The ADAHRS integrity monitoring uses GPS data and air data. Since the integral ADC provides full time air data, the only required external input is from an approved and installed GPS.

NOTE

GI 275 attitude will remain valid if either GPS or Air Data is lost.

Flight in IMC is not authorized unless the ADAHRS is receiving valid GPS *and* air data. The GI 275 monitors the integrity of these systems automatically and will advise the pilot if the GPS and/or air data is lost or invalid.

NOTE

In dual GPS installations, only one GPS needs to be available to the ADAHRS or AHRS for IFR flight.

2.6 Aerobatic Maneuvers

Do not conduct aerobatic maneuvers if uninterrupted attitude information is required from the GI 275 ADI.

2.7 Electronic Standby and/or Primary Instrument Power

The backup battery's charge state for the standby and/or primary instrument must be verified before flight. The battery indication turns yellow if there is less than 60 minutes of battery capacity. For aircraft with service ceilings below 25000 ft, only 30 minutes of backup battery operation is required. Refer to the battery status and information found in the battery menu (Menu → Systems → Battery).

2.8 Standby and/or Primary Flight Instruments

☐ This installation does not have separate standby instruments or does not require standby instruments (aircraft limited to VFR).

☐ This installation uses pneumatic or the aircrafts original primary flight display instruments.

☐ This installation uses a connected GI 275 system with independent ADHARS and backup batteries for the primary and standby flight instruments. IFR flight must not be initiated unless the systems check in Section 2.7 is completed successfully to verify the following:

- The backup battery is operational and sufficiently charged. Refer to Section 2.7.

- Attitude, heading, altitude, and airspeed from AHRS/ADC 1 are operational on the pilot's primary GI 275 ADI with no warnings, cautions, or advisories present
- Selecting the Reversion Backup Switch to the "ON" position causes the standby GI 275 to change and lock to the ADI page, and displays primary flight information.

WARNING

Failure to observe these limitations may result in the loss of all attitude or air data or both, resulting in loss of aircraft control.

2.9 Sensor Selection

Do not select or operate on secondary AHRS or ADC sensors, unless directed to do so as part of an emergency or abnormal procedure in this AFMS.

CAUTION

In installations with two AHRS/ADC sensors sources, changing the AHRS/ADC sensor source when a white ATTITUDE/IAS/ALT annunciation is displayed on the primary GI 275 ADI will result in the selection of an inoperative sensor source and subsequent loss of information. Operating primary and standby GI 275 ADIs on the same sensor source will inhibit the AHRS/ADC comparison monitor.

2.10 Synthetic Vision

The synthetic vision presentation must not be used as the sole reference for aircraft control (without reference to the primary flight instruments).

The synthetic vision presentation must not be used as the sole reference for navigation or obstacle/terrain/traffic avoidance.

If the installed TAWS or Terrain Alerting system is inoperative, the synthetic vision display on the GI 275 ADI must be selected off.

2.11 Moving Maps

The GI 275 Map page (ownship position relative to map features) must not be used as the primary or sole means of navigation or course guidance.

2.12 Autopilot Disconnect

The "AP DISC" button in the GI 275 ADI Menu → Options (if present for the installation) must disconnect the autopilot when pressed. If the button does not disconnect the autopilot when pressed, then the autopilot must not be used.

2.13 Terrain Display

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

2.14 Terrain/TAWS Alerts

Terrain/TAWS alerts must be inhibited when landing at an airport that is not in the airport database unless the airport can be designated as a user airport (GTN Navigator only).

2.15 Datalink Products (SiriusXM and FIS-B)

Do not use datalink weather information for maneuvering in, near, or around areas of hazardous weather. Information provided by datalink weather products may not accurately depict current weather conditions.

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

Do not rely solely upon datalink services to provide Temporary Flight Restriction (TFR) or Notice to Airmen (NOTAM) information. Not all TFRs and NOTAMS may be depicted.

2.16 Traffic Display

The display of traffic is intended as an aid to visual acquisition and must not be used as the sole basis for maneuvering the aircraft to avoid traffic.

2.17 Stormscope® Display

Stormscope® lightning information displayed 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.

2.18 Surface Operations

The GI 275 Map page shall not be used as the sole basis for ground maneuvering. The zoomed-in Map page does not comply with the FAA requirements and is not certified as an airport moving map display (AMMD). Map page use is limited to airport surface orientation to improve flight crew situational awareness during ground operations.

2.19 Type Ratings

The standby GI 275 ADI is authorized for operations in aircraft that require a type rating.

2.20 Fuel Flow

Fuel flow values may be in error by as much as 15% if the K factor calibration is improperly set. Do not depend solely on the fuel flow indication to determine fuel used, fuel remaining, or fuel reserves.

2.21 Fuel Computer

The fuel computer functions must not be used as the primary means of determining the quantity of fuel in the tanks. The aircraft fuel quantity gauge(s) are the primary means of determining fuel quantity.

2.22 Glove Usage

The touchscreen can be operated with gloves made for capacitive touchscreens.

2.23 VFR GPS

The VFR GPS (VGPS) is an emergency position and temporary navigational aid available for use when the certified navigator data is unavailable or invalid or in VMC flight if no other GPS source is interfaced.

2.24 Service Required

It is prohibited to initiate flight when a “Service Required” advisory is present on the ADI or EIS display.

2.25 Powerplant Gauge Markings

When engine gauges are replaced by the GI 275 EIS in accordance with this STC, gauge markings shall be equivalent or most effectively displayed according to the cumulative Type Design data available for the aircraft.

2.26 Portable Electronic Devices

This STC does not relieve the operator from complying with the requirements of 91.21 or any other operational regulation regarding portable electronic devices.

The GI 275 wireless interface and data provided to a portable electronic device are not approved to replace any certified avionics, including installed navigation or traffic/weather equipment.

2.27 Database Updates

Database updates via USB or wireless transfers must be done while the aircraft is on the ground and stationary. In-flight database transfers or updates are inhibited in flight.

2.28 Kinds of Operations

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 Code of Federal Regulations Part 91, Part 121, and Part 135 when appropriately maintained.

The table below lists the minimum fully functional equipment required for operation of the GI 275.

Equipment	Number installed	VFR	IFR
GI 275 ADI	1	1	1
GI 275 HSI/MFD as Standby ADI	1	0	1
GMU 11 or 44B Magnetometer	1*	0	1*
Reversion Backup Switch	1*	0	1*
GPS/SBAS Navigator or VFR GPS antenna	1**	1	1**
Non-stabilized Magnetic Compass	1	1	1

* Connected to GI 275 ADI
** Connected to GI 275 ADI or the GI 275 HSI/MFD as a Standby ADI

Figure 1- Minimum GI 275 Flight Instrument System when installed with a GI 275 Standby ADI

Equipment	Number installed	VFR	IFR
GI 275 ADI	1	1	1
GMU 11 or 44B Magnetometer	1	0	1
GPS/SBAS Navigator or VFR GPS antenna	1	1	1
Non-stabilized Magnetic Compass	1	1	1

Figure 2- Minimum GI 275 Instrument System when installed with non-GI 275, supporting Standby Instruments

Equipment	Number installed	Req'd
GI 275 EIS	1 or 2*	1 or 2*
Engine Adaptor Unit (GEA 24/110)	1 or 2*	1 or 2*

* one GI 275 EIS and GEA 24/110 are required per engine

Figure 3- Engine Indication System

The following engine indications must be functional on the EIS display (if these gauges are present on the EIS display as installed): Tachometer, Manifold Pressure, Oil Pressure, Oil Temperature, Fuel Quantity, any additional engine instruments required by the aircraft Kinds of Equipment list as listed in the Aircraft Flight Manual.

If the GI 275 EIS is installed between 15 degrees and 35 degrees of the pilot's primary field of view, an external annunciator is required.

2.29 Minimum Flight Crew

Installation of a GI 275 does not affect a Minimum Flight Crew determination.

2.30 Placards

2.30.1 GI 275 Reversion Backup Switch

Adjacent to the GI 275 Reversion Backup Switch:

On

Auto

2.30.2 Installations Limited to VFR

☐ This installation is not limited to VFR.

☐ This installation is limited to VFR and the following placard is required:

“AIRCRAFT LIMITED TO VFR”

2.30.3 Aircraft Category

There is no placarding that is specific or unique to aircraft category.

Section 3. EMERGENCY PROCEDURES

3.1 Emergency Procedures

3.1.1 Loss of Primary Flight Information

If the primary GI 275 ADI fails (loss of some or all primary flight information, display is blank, frozen, or unresponsive).

1. Use standby flight instruments for attitude, airspeed, altitude, and heading reference.
2. If GI 275 reversionary capability is available, the standby GI 275 should automatically change to the ADI page and promptly restore primary flight information. If manual reversion is required, move the Reversion Backup Switch to the "ON" position.
3. Refer directly to the navigation source for navigation information (such as GPS).
4. Seek VFR conditions or land as soon as practical.

   If autopilot is engaged:

5. Verify autopilot mode selections and cross check against standby flight and navigation data. Consider disengaging the autopilot.

3.1.2 AHRS Failure

AHRS failure is indicated by the removal of the attitude/heading information and a red X on the GI 275 ADI. Standard rate turn indications will also be removed. A heading failure may also occur as described in Section 3.2.1.

1. Continue flight by reference to the standby ADI or manually select "ON" to force reversion.

2. Seek VFR conditions or land as soon as practicable.

If multiple AHRS sources are installed:

3. Select the operative AHRS (i.e., AHRS 1, 2 or 3) using the ADI sensors menu (MENU → SENSORS)

NOTE

If airborne AHRS alignment without an operative GPS navigator is necessary, minimize maneuvering and turbulence during and after the restart process. Without an operative GPS navigator, excessive maneuvering or turbulence may prevent the AHRS from aligning properly. Continue to minimize maneuvering and seek smooth air for the first 5 minutes after the attitude becomes valid following the airborne alignment. If maneuvering or turbulence cannot be avoided, carefully cross-check the AHRS for accuracy against other flight instruments until the alignment has completed and becomes stable.

3.1.3 ADC Failure

ADC failure is indicated by:

- Red X over the airspeed and altitude tapes
- Yellow X over the digital vertical speed value

If valid GPS data is available, the GI 275 will automatically revert to display GPS-calculated altitude relative to mean sea level. GPS altitude is displayed in magenta, in the same location as normal operation.

1. Use standby Airspeed Indicator and Altimeter

2. Seek VFR conditions or land as soon as practical

If multiple ADC sources are installed:

3. Select the operative ADC (i.e., ADC 1, 2, or 3) using the ADI Sensors menu (MENU → SENSORS)

3.1.4 ATTITUDE, ALT, or IAS monitor CAUTION

If an ATTITUDE, ALT, or IAS miscompare CAUTION is displayed in amber on the attitude display or airspeed/altitude tape:

1. Cross check flight instruments against all available information to determine which indications are correct
2. Seek VFR conditions or land as soon as practical

NOTE

White ATTITUDE/ALT/IAS no compare annunciations indicate that the other AHRS/ADC source is not available.

3.1.5 Aircraft Electrical System Failure

In the event of a total loss of aircraft electrical power, the GI 275 will cease to operate, except for displays which are equipped with an internal backup battery. Refer to procedures for failure of affected equipment and operation on backup battery.

3.1.6 Operation on Backup Battery (if installed)

Displays equipped with a backup battery will continue to operate after a loss of aircraft electrical power. EIS displays will not be functional. Operation on battery power is indicated by the presence of a battery icon on the affected display. Green battery indication provides at least 60mins, yellow battery indication provides a range between 59mins and 15mins, and red battery indication provides less than 15mins of battery operation.

1. Seek VFR conditions and land as soon as practical.

NOTE

For protection, on backup battery operation is inhibited if the battery‘s temperature drops below -20° C or exceeds 80° C.

CAUTION

To conserve power and to preserve the display of primary flight data and direct-to navigation capabilities with the optional VGPS receiver, GI 275 backup battery operation internally load-sheds interfaces, which will disable the normal interface with certified navigators or other hazard awareness systems. Depending on how these were installed and configured to the GI 275, some information from these configured systems will not be available when the GI 275 is operating on its backup battery.

3.1.7 Display Backup Malfunction

Display backup malfunction is indicated by the unit locking on the ADI page. All other configured pages will not be accessible on the standby ADI or HSI.

3.1.8 Backup Battery Malfunction

A malfunction of the backup battery is indicated by the following indication in the upper left corner of the screen with a system advisory message:

1. Seek VFR conditions or land as soon as practicable.

3.1.9 EIS Failure

EIS failure is indicated by the loss of displayed information on the EIS, including a blank, frozen, or unresponsive display of EIS parameters.

1. Position engine controls to ensure operation within engine limitations.

3.1.10 Terrain Alerts

Aural Alert	Annunciation All Pages	Annunciation Terrain Page	Action
"Terrain, Terrain Pull up, Pull up" -OR- "Obstacle, Obstacle Pull up, Pull up" -OR- "Wire, Wire Pull up, Pull up" -OR- "Warning, Terrain, Terrain" -OR- "Warning, Obstacle, Obstacle" -OR- "Warning, Wire, Wire" -OR- "Pull up"	TER	PULL UP -OR- TERRAIN -OR- OBSTACLE -OR- WIRE	Disconnect autopilot and initiate maximum performance climb (maximum takeoff power and best angle of climb airspeed) NOTE: Only the climb maneuver is recommended, unless operating in VMC or it is determined, based on all available information, that turning in addition climbing is the safest course of action.
"CAUTION, Terrain" -OR- "CAUTION, Obstacle" -OR- "CAUTION, Wire"	TER	TERRAIN -OR- OBSTACLE -OR- WIRE	Take corrective action until the alert ceases. Using all available information to determine the appropriate action, alter the flight path away from the threat by stopping descent, climbing, and/or turning.
"Too low, Terrain"		TERRAIN	Establish climb to the minimum altitude for present position/procedure
"Sink Rate"		TERRAIN	Decrease rate of descent
"Don't sink"		TERRAIN	Establish a positive rate of climb

3.2 Abnormal Procedures

3.2.1 Heading Failure

If the GI 275 is configured with a VFR GPS or interfaced to a certified GPS source, the HDG indications will be replaced with track (TRK) indications in magenta in the event of a heading failure. The heading bug and course pointer will continue to function normally, using GPS ground track as a reference instead of magnetic heading.

Figure 4- Bottom of the ADI when HDG failed (with GPS)

Figure 5- Top of the HSI when HDG failed (with GPS)

If there is no GPS in the GI 275 system or if the GPS has failed, the heading failure will be indicated by a red "X" in place of the heading readout on the ADI or HSIs.

Figure 6- Bottom of the ADI when HDG failed (no GPS)

Figure 7- Top of the HSI when HDG failed (no GPS)

If GPS track is not available:

1. Use standby compass for heading reference.

NOTE

Without magnetic heading or GPS track, the CDI provides no directional information. Only course deviation information is presented, and the orientation of the CDI is based on the selected course, regardless of aircraft heading. Course deviation indications will behave like a traditional CDI. VOR deviations will be relative to the selected course with a TO/FROM indication. Localizer deviations will not be affected by the selected course, and reverse sensing will occur when tracking inbound on a localizer back course.

3.2.2 Display Overtemperature

If the display is in an overheating condition, the system will alert the pilot with a system message.

1. Prepare for loss of the affected display.

3.2.3 GPS Data Failure

GPS data failure may be indicated by any or all of the following:

- Loss of GPS course deviation information on HSI
- Amber "LOI" text on the ADI
- Amber "DR" text on the moving map
- Amber "NO GPS POSITION" text on the moving map
- Loss of waypoint bearing/distance information

1. Select alternate GPS source, if available, by pressing "CDI" button on ADI.

If alternate GPS source is not available:

2. Select alternate navigation source (VOR or LOC, if available) or refer directly to external navigation data.

3.2.4 Navigation Data Failure (VOR/LOC/GS)

Navigation data failure may be indicated by any or all of the following:

- Loss of course deviation information on ADI
- Loss of glideslope/glidepath information on ADI
- Loss of bearing pointer on HSI

1. Select alternate navigation source or refer directly to external navigation data.

3.2.5 Synthetic Vision Malfunction

If the synthetic vision depiction is known or suspected to be inaccurate or malfunctioning:

1. Turn off synthetic terrain using the Menu → Options → Terrain SVT menu on the ADI.

3.2.6 Electrical Load Shedding

The following equipment is considered non-essential. If it becomes necessary to reduce electrical load (for example, during loss of generators or alternators), power to these units may be removed in the order listed.

1. MFD circuit breaker(s) [if installed and not configured as standby ADI] – PULL

NOTE

Any non-required displays on the co-pilot side may also be powered off.

3.2.7 AHRS ALIGN

If an "AHRS ALIGN / Keep Wings Level" annunciation is displayed on the attitude indicator in flight, limit aircraft operation to:

- ±10º bank
- ±5º pitch
- 200 KTAS or less

CAUTION

Exceeding these values may delay or prevent AHRS alignment.

3.2.8 EIS Display Parameter Failure

Indicated by individual parameters having a red or yellow X drawn through the gauge and data removed (see EIS failure procedure for loss of entire EIS function).

1. Monitor remaining parameters and set engine controls to operate within limitations.

3.3 WARNINGs, CAUTIONs, and Advisories

The following tables show the color and significance of the warning, caution, and advisory messages which may appear on the GI 275 displays.

3.3.1 WARNING Annunciations – Red		
Annunciation	*Pilot Action*	*Cause*
HDG Fail 	Use Standby Magnetic Compass or GPS track information	Display system is not receiving valid heading input from the ADAHRS or AHRS; accompanied by a red X through the digital heading display.
Red X 	Reference the data source or alternate equipment.	A red X through any display field, indicates that display field is not receiving data or is corrupted.
Red EIS Alert Banner 	Observe the warning indication on the EIS display and take appropriate action.	One or more engine parameters have exceeded a warning threshold.
Red Engine Parameter 	Take appropriate action to correct condition causing engine parameter exceedance	The engine parameter has exceeded the warning threshold.
Terrain warning 	Take appropriate action to maneuver the aircraft away from the conflicting terrain	Terrain warning due to aircraft proximity to surrounding terrain

3.3.2 CAUTION Annunciations – Yellow		
Annunciation	*Pilot Action*	*Cause*
AHRS ALIGN – Keep Wings Level 	Limit aircraft attitude to ±10º bank and ±5º pitch as AHRS Aligns - OK to taxi.	Attitude and Heading Reference System is aligning. AHRS may not align with excessive pitch/bank angles.
AHRS NOT READY – Do Not Takeoff 	Remain stationary and allow AHRS to finish initialization and allow navigators to acquire sufficient GPS position.	AHRS sensors are not ready for flight. Additionally, the interfaced navigator does not have sufficient GPS position.
LOI 	Loss of Integrity Monitoring	GPS integrity is insufficient for the current phase of flight.
No GPS Position 	Use alternate information for positional and situational awareness	GPS data is unavailable.
Yellow X 	Reference the data source or alternate equipment.	A yellow X through any display field, indicates that display field is not receiving data or is corrupted.
ATTITUDE 	Fly aircraft manually and crosscheck attitude indication with standby attitude indicator and other sources of attitude information (airspeed, heading, altitude, etc.)	The ADI attitude monitors have detected an AHRS malfunction or an error between AHRS sources (if multiple sources installed). Autopilot may disconnect if AHRS is being used to drive the autopilot.

ALT and/or IAS (text on ADI) 	Cross-check the flagged information against other sources to identify erroneous information.	Differences detected between displayed airspeed and/or altitude (multiple ADC installations only).
AHRS 1/2/3 	Confirm intended AHRS source selection	The ADI is using the cross-side AHRS sensor and AHRS monitor is indicating a miscompare or no-compare (multiple ADI and AHRS installations only).
ADC 1/2/3 	Confirm intended ADC source selection	The ADI is using the cross-side ADC sensor and ADC monitor is indicating a miscompare or no-compare (multiple ADI and ADC installations only).
Yellow Alert Banner on EIS 	Observe the caution indication on the EIS display and take appropriate action.	One or more engine parameters have exceeded a caution threshold.
Yellow EIS Parameter 	Take appropriate action to correct condition causing engine parameter exceedance.	The engine parameter has exceeded the caution threshold.
Traffic Caution 	Visually acquire the traffic to see and avoid.	The interfaced traffic system has determined that nearby traffic may be a threat to the aircraft.
Terrain Caution 	Take appropriate action to maneuver the aircraft away from the conflicting terrain	Terrain caution due to aircraft proximity to surrounding terrain
TAWS N/A, TAWS FAIL 	Use vigilance, terrain depiction and TAWS alerting are no longer provided.	External system that is providing TAWS alerting has failed, or the GI 275 cannot communicate with the system.

3.3.3 Advisories – White		
Annunciation	*Pilot Action*	*Cause*
ATTITUDE, ALT, or IAS (text on ADI) ATTITUDE	Be aware that the other (unselected) AHRS/ADC source is not available	The other (unselected) AHRS/ADC source is unavailable.
AHRS 1/2/3 AHRS 1	Confirm intended AHRS source selection	The ADI is using the cross-side AHRS sensor (multiple ADI and ADC installations only).
ADC 1/2/3 ADC 1	Confirm intended ADC source selection	The ADI is using the cross-side ADC sensor (multiple ADI and ADC installations only).
Messages Icon 	View and consider advisory messages. Refer to the GI 275 Pilot Guide for appropriate pilot or service action.	Typically, these indicate system or database status, or data communication issues within the GI 275 System.
Terrain Inhibited TER	Use vigilance, traffic system will not provide alerting.	Terrain is inhibited or a terrain test is in progress
External Navigator Message Icon 	View and consider advisory messages on interfaced navigator. Refer to Pilot Guide for the external navigator for appropriate pilot of service action.	Typically, these indicate system or database status.

Section 4. NORMAL PROCEDURES

4.1 Before Takeoff

1. Review displays for any abnormal warning, caution, or advisory indications.
2. Perform a visual inspection of the fuel tank or other method such as a dipstick, sight gauge, or drip gauge to verify that the fuel quantity indication provided by the GI 275 is accurate.

   Do not use the unverified fuel quantity indication provided by the GI 275 as the sole means of complying with the requirements of CFR 14 91.103, 91.151, or 91.167.
3. If equipped with a TAWS/Terrain warning system, ensure that the terrain alert audio test can be heard clearly (a system test audio clip is played during the startup self-test).

4.1.1 ADI System Check

1. Verify that no amber or red battery icon is displayed on the primary or standby ADI. If a yellow icon is present, verify the battery's remaining capacity is more than 30 mins if the aircraft's service ceiling is below 25,000ft.
2. Verify that attitude, heading, altitude, and airspeed are displayed normally on the ADI (no warnings, cautions, or advisories related to these functions).
3. Select the Reversion Backup Switch to the "ON" position
   a. Verify that the ADI information is displayed on the backup display
   b. Ensure that attitude, heading, altitude, and airspeed are displayed normally on the standby ADI (no warnings, cautions, or advisories related to these functions)
4. Select the Reversion Backup Switch to the "AUTO" position and verify that the display return to their normal state and other configured pages are once again selectable.

4.2 Autopilot Operation

4.2.1 Autopilot Disconnect Test

In some installations, the autopilot may receive attitude from a GI 275 ADI. If this is installed, an "AP DISC" button will be present in the Menu → Options menu, and this function must be tested using the following procedure.

1. While on the ground, engage the autopilot.
2. In the ADI Menu → Options, press the AP DISC button and verify that the autopilot disconnects.

CAUTION

Do not use the autopilot if the AP DISC button fails to disengage the autopilot normally.

4.2.2 Autopilot NAV / APR mode coupling

To couple the autopilot NAV / APR mode:

1. Select the desired navigation source on the Pilot's ADI (NAV Options Menu) or the CDI button.
2. Select the desired NAV / APR mode on the autopilot.

NOTE

The autopilot will use the source that is displayed on the Pilot's ADI or HSI.

4.2.3 GPSS Emulation

When enabled by the installer for autopilots that do not support GPSS roll steering, GPSS allows a configured legacy autopilot to fly GPS curved plan legs (e.g., arcs, procedure turns, etc.) as well as straight legs when the NAV autopilot mode is enabled. When the GPSS emulation mode is enabled in the GI 275 ADI, the autopilot will direct the aircraft to and then guide the aircraft along the active GPS flight plan leg. To use GPSS:

1. Select the desired GPS navigation source on the Pilot's ADI.
2. Enable GPSS emulation on the ADI using the AP REF button in the Menu → Options → NAV Options → HDG Options menu.
3. Engage the autopilot in HDG mode.

NOTE

When GPSS emulation is enabled, the GI 275 ADI's heading bug function will be disabled. This is indicated by a hollowed-out heading bug, and the ADI/HSI heading button will display "GPSS" near the crossed-out heading bug. The "GPSS" text

will be white when GPSS commands are available, and it will be amber when there is no GPSS command available.

NOTE

The GPSS commands to the autopilot are based on the GPS source displayed on the pilot's side ADI (typically the primary ADI or ADI #1).

4.2.4 Coupling the Autopilot for Enhanced Descent-Only VNAV

The GI 275 allows for the display of Enhanced Descent Only (EDO) Vertical Navigation (VNAV) deviations when interfaced with a Garmin GTN. In order to provide autopilot coupling to the EDO VNAV guidance, the interface must also include a Garmin GFC 600 with VNAV capability. If EDO VNAV is enabled on the GTN in these installations, EDO VNAV guidance may be coupled to the autopilot using the VNAV function of the GFC.

☐ This installation is equipped and configured to provide EDO VNAV display and autopilot coupling.

☐ This installation is equipped and configured to provide EDO VNAV *display only*.

☐ This installation *does not* support EDO VNAV display or coupling.

4.3 EIS Operation

4.3.1 Main EIS Page

The *Main EIS* page of the GI 275 displays all engine gauges that have limitations (red and/or yellow markings). The crew must periodically review the engine indications on the *Main EIS* page if the GI 275 is displaying any other EIS page.

Section 5. PERFORMANCE

No change.

Section 6. WEIGHT AND BALANCE

See current weight and balance data.

Section 7. SYSTEM DESCRIPTION

A detailed GI 275 Pilot's Guide is available through the Garmin website or your Garmin dealer.

If a GSB 15 is installed it provides a USB port for loading software and databases. This can also power portable electronic devices but does not provide any data connection to the GI 275 for those devices.

Wireless connectivity is provided for ground database updates. Database updates cannot be performed in-flight. Additionally, the GI 275 supports a Bluetooth connection to personal electronic devices running Garmin Pilot for the supplemental display of traffic, attitude and GPS position. This connection will work in-flight however the personal electronic device must be paired with GI 275 while on the ground.

The following colors are used consistently within the GI 275 system:

Color	Functions
Red	Warning conditions Operating Limits
Yellow	Caution conditions Conditional operating ranges
Green	Safe operating conditions Normal operating ranges VOR/Localizer Data
White	Scales and Markings Current data and values, status
Magenta	GPS Data Active flight plan legs
Cyan	Pilot-selectable references

7.1 Controls Overview

A dual concentric knob with a center push-button provides the primary means with which to navigate between screens and access menus and functions of the GI 275. The outer knob will always change from Page-to-Page on GI 275s that have multiple pages. A display touch is required in most cases to select the display field of a Page that will be changed by inner knob rotation or press. The inner knob changes the value of the selected field. For primary, stand-alone ADIs the outer knob does not provide any control since there is no other page

available for selection. When the outer knob is rotated, a momentary display of knob function is provided at the top of each page.

To access the Menu, press and hold the inner knob. To access the Menu via touchscreen, swipe up from the bottom of the GI 275 display.

7.2 Display Brightness

Display brightness is controlled automatically based on input to a bezel-mounted photocell. The brightness level can be manually adjusted using controls in the Menu → Backlight selection. Optionally, brightness can be controlled using the aircraft's cockpit lighting dimmer control.

7.3 System Power Sources

The GI 275 primarily depends on aircraft power to function. The GI 275 system is directly connected to the aircraft's main or essential bus and energized when the aircraft master switch is turned on. Other systems, like the navigation equipment, weather datalink, and autopilot are typically located on the avionics bus and may not be functional when this bus is powered off.

The major components of the GI 275 are protected with resettable circuit breakers available to the pilot. These breakers are labeled as follows (appropriate boxes will be checked):

Installed	Circuit Breaker Label	Equipment
☐	PFD	Primary ADI
☐	EIS	GI 275 configured for Engine Monitoring – Single Engine
☐	EIS L and EIS R	GI 275 configured for Engine Monitoring – Multi Engine
☐	MFD	GI 275 configured as a MFD
☐	MFD/STBY ADI	GI 275 configured as a MFD with standby ADI
☐	ATT	GI 275 configured as an Attitude Indicator only
☐	HSI	GI 275 configured as an HSI
☐	HSI/STBY ADI	GI 275 configured as an HSI with standby ADI
☐	ENG SNSR	GEA (24 or 110) Engine/Airframe Unit
☐	STBY ADI	Standby ADI (Stand-alone)

☐	USB	GSB 15 USB Interface

7.4 System Status

The GI 275 status can be viewed via the Menu → System → Info menu. This includes the serial number and system ID of the unit, the software version loaded on the unit, and the AHRS and ADC software versions.

An External LRUs list displays information and status of various units that are interfaced to the GI 275 system. This list only includes LRUs that can report status information, which is typically limited to other Garmin LRUs. Software versions, serial numbers, and LRU status is typically provided. A green checkmark indicates normal online status, and a red X indicates offline or failed status. Some LRUs, like the GDL 69, GSR 56, and GTX 345, provide a button to see more detailed information about the status of that unit.

7.5 Databases

The GI 275 utilizes databases to provide some system functions.

Database status information is available to the pilot at system startup on the MFD splash screen and during normal operations on the Menu → System → Databases (or DB) menu. Controls are provided for manually initiating a database update. EIS units only use a Nav database. System time (as received from an interfaced GPS navigator or the internal VFR GPS) is used to determine if a database is within its effective period. Databases are displayed in amber if they are expired, not yet effective, or if the current date/time is unknown. Databases are displayed in white if they are within their effective date range. All database status information is depicted in white on the System Status page.

Databases can be updated using the USB port, by syncing with other compatible units, or using database concierge through a PED. Databases are stored internally on the GI 275s.

The terrain and basemap databases are updated periodically and do not expire.

The Garmin or Jeppesen navigation database contains data associated with navigation including airports, navigation aids, airways, airspaces, and other data. This database is updated on a 28-day cycle.

The obstacle database contains data for obstacles and wires that pose a potential hazard to aircraft. Obstacles 200 feet and higher are included in the obstacle database. Wires which have been identified as a hazard to fixed wing aircraft are included in the database. Coverage of the obstacle database includes the United States and Europe. Wire coverage is limited to the United States. This database is updated on a 56-day cycle.

CAUTION

Not all obstacles or wires are included in the databases.

The Garmin SafeTaxi™ database contains airport diagrams for selected airports. This database is updated on a 56-day cycle.

The magnetic variation model contains data about variations in the earth's magnetic field based on location. This database is included with the navigation database and is updated on a five-year cycle.

7.6 Crew Profiles

The crew profile function is provided for all units to allow the retention of pilot-selectable configurations and settings. If the aircraft is operated by multiple pilots, each pilot can recall their individual settings for use. These profiles include settings from all displays in the system.

If an MFD is installed, the splash screen provides the option for the pilot to select a crew profile upon power up. Otherwise the crew profile can be set in the System → Crew Profile Menu. If no selection is made, the GI 275 will default to the last crew profile used. Only one profile may be selected as active at a time. New profiles are created with the settings currently in use.

7.7 Integrated Standby System

Standby instruments (attitude, altitude, airspeed) may be provided by a second GI 275 display. The GI 275 can be a standby to itself, consisting of two GI 275 displays installed adjacent to each other, with one display configured as the ADI and the second display configured as either an HSI or an MFD.

The standby ADI needs to be of the -10/-30 type with its own integral ADAHRS. A Reversion Backup Switch is installed which will force the standby ADI into the display backup mode of operation when moved to the "ON" position.

A backup battery will provide power to the ADI, MFD, HSI, or standby ADI in the event of aircraft power failure. This configuration will provide the following functionality:

- If the ADI fails or communication with the primary ADI is lost, the MFD with a standby ADI or standby HSI will automatically display its backup primary flight information (attitude, altitude, airspeed).
- Two GI 275 -10 variants monitor and compare their independent attitude, altitude, and airspeed data. If either GI 275 detects a difference between any of the parameters (attitude, altitude, or airspeed), the MFD or HSI will automatically revert to display the standby ADI to restore primary flight information. Amber miscompare annunciations will appear to indicate the discrepancy.

7.8 GPS Approach Mode Annunciations

When interfaced with a certified GPS navigator and the GPS navigator is the selected source, the GI 275 HSI and HSI Map display the current GPS

operational mode. The GI 275 abbreviates the approach modes as defined in the table below.

Description	Annunciation
Lateral Navigation	LNAV
Localizer Performance with Vertical Guidance	LPV
Localizer Performance without Vertical Guidance	LP
Localizer performance approach with advisory vertical guidance	LP+V
Lateral and vertical navigation approach	L/VNAV
Lateral navigation approach with advisory vertical guidance	LNAV+V

7.9 VFR GPS

A Garmin GI 275 may be interfaced with its own optional VFR GPS antenna. In the event that the certified GPS navigation information becomes unavailable, the GI 275 VFR GPS (VGPS) provides 2D GPS position information and Direct To navigation capability. Aside from selecting VGPS as the CDI source and then selecting a Direct To waypoint, airport, or navigational aid within the GI 275 Direct To Menu, there is no pilot action required to enable or use the VFR GPS. When VGPS data is in use, "VGPS" is annunciated as the selected navigation source.

Synthetic Vision and Terrain alerting functionality is available with the VGPS.

7.10 Aircraft Audio Interface

The primary (pilot) ADI is interfaced to the aircraft audio system to provide aural alerts (altitude alerter, minimums, terrain). If multiple ADIs are installed, only the primary ADI is interfaced to the audio system (to prevent duplicate aural alerts).

An MFD may be interfaced to the audio system for terrain alerts or touch clicks, but only if there is no primary ADI installed.

The GI 275 EIS is not interfaced to the audio system.

7.11 Messages

Messages are available on all installed GI 275s. A Message annunciation flashes in the upper left corner of each display to notify the pilot when a new advisory is

available. The pilot may select Messages in the Menu to display a list of active Messages.

Not all Messages are common to all interfaced GI 275s, meaning unit specific issues will not be shown on all the other GI 275s.

7.12 System Settings

The Menu → System → Setup page provides pilot controls for click volume, time format, and local time offset. Controls are provided to set the nearest airport criteria so that airports not usable by the aircraft type do not appear in waypoint searches.

Units of Measure for temperature, barometric pressure, and nav angle are pilot controllable via the Menu → System → Units page. These units are propagated throughout the GI 275 system. Adjustments to temperature units will not affect EIS temperature gauges. All units across all systems must be verified the units match for each function and LRU.

The units and markings on the ADI are not user-configurable. They match the units as specified in the aircraft's FAA approved Airplane Flight Manual and standby instruments.

If pilot-selected navigation angle settings differ on the navigator and the GI 275, the display aspects will be inaccurate.

7.13 System Data Logging

The GI 275 system incorporates a data logging feature that can record parameters related to the aircraft's primary flight instruments, engine indications, and aircraft configuration. Recorded data is stored in internal memory and can be exported via a USB drive.

7.14 Primary ADI

ADI functions are selected by touching the desired adjustable field on the display. Once selected, the inner knob changes the value (Altitude, IAS, Baro, or Heading). An inner knob press will sync the altitude, IAS, or heading to the current value. Baro sync toggles the ADI in and out of standard altimeter setting (29.92"hg and labeled "STD"). The selectable field defaults to Baro when the knob is idle for a period of time. The default timeout is 10 seconds and may be changed in the Menu.

When interfaced to a Garmin G500/600 TXi, the GI 275 will sync barometer (if Baro Sync is enabled), selected heading, selected altitude, and selected airspeed bugs with the TXi. It is recommended that BARO SYNC be enabled when using VNAV functionality as the GTN will only use the pilot-side BARO unless there is a failure.

7.14.1 Primary Flight Data

The ADI can display the following parameters depending on the unit configuration; attitude, heading, airspeed, barometric altitude, and vertical speed data. Airspeed and altitude displays include a six second trend indicator.

Pilot selectable bugs may be configured for airspeed, altitude, and heading.

The GI 275 requires at least one GPS source to ensure the integrity of the AHRS.

When dual GI 275 -10/-30 variants are installed and configured, the pilot is provided with AHRS/ADC source selection controls via the ADI Menu → Options → Sensors menu.

The default ADC and AHRS source on power up is ADC 1 and AHRS 1 for the pilot side ADI and ADC 2 and AHRS 2 for the co-pilot or standby ADI and if a third sensor is installed, it is configured as the standby.

Selection of the non-default sensor source will cause a "ADC [Sensor Number]" or "AHRS [Sensor Number]", respectively, to be displayed with black text on a white background. If there is an AHRS or ADC miscompare or no-compare while on the off-side sensor "ADC [Sensor Number]" or "AHRS [Sensor Number]" will be displayed with black text on a yellow background.

When dual GI 275 -10s/-30s are installed and configured, software monitors provide detection of sensor miscompares. If a monitor detects a difference between sources exceeding the allowable limit, a visual attitude, altitude, heading, or airspeed miscompare annunciation will be shown on the ADI.

Miscompares are annunciated using black text on a yellow background as follows: airspeed miscompare is "IAS" shown near the airspeed pointer, barometric altitude miscompare is "ALT" near the barometric altitude pointer, the near the digital heading readout, and attitude miscompare is "ATTITUDE" on the attitude indicator. The ADI inhibits the "IAS", "ALT", and "ATTITUDE" annunciations in dual GI 275 ADI installations when both ADIs are displaying the same sensor source.

A no compare monitor is used to determine when data between GI 275s cannot be compared. No compares are annunciated the same as miscompares, except for the black text on a white background.

7.14.2 Attitude

The attitude display has a blue over brown presentation and may be configured in either a Fixed or Sky Pointer orientation by the installer. The ADI can also display Synthetic Vision data (SVT), available as an option.

Standard rate turn marks are provided on the roll scale for bank angles less than 30 degrees when the GI 275 ADI is configured with an OAT sensor.

The Sky Pointer orientation will automatically declutter the IAS and Altitude selectable fields when bank angles exceed 45°. Red chevrons, which indicate the direction to level pitch to assist recovery, are displayed when pitch attitudes exceed ~10° nose down or ~25° nose up.

Slip/skid information is shown using a white trapezoid below the roll angle indicator.

7.14.3 Synthetic Vision Technology

SVT may optionally be provided to assist the pilot in maintaining situational awareness with terrain, obstacles, and airborne traffic.

SVT controls are provided via Menu → Options → Terrain/SVT. Synthetic terrain, horizon headings, and airport signs can be enabled or disabled from this menu.

SVT provides additional information on the ADI:

- **Synthetic Terrain:** an artificial, database-derived, three-dimensional view of the terrain ahead of the aircraft within a field of view of approximately 25 degrees left and 25 degrees right of the aircraft heading.
- **Obstacles**: obstacles such as towers, including buildings over 200 AGL that are within the depicted synthetic terrain field of view. Powerlines are not depicted in synthetic vision.
- **Flight Path Marker (FPM)**: an indication of the current lateral and vertical path of the aircraft. The FPM is always displayed when SVT is enabled. The FPM will be dashed when it hits the vertical or lateral display limit.
- **Traffic**: a display on the ADI indicating the position of other aircraft detected by an interfaced traffic system.
- **Horizon Line**: a white line indicating the true horizon is always displayed on the SVT display.
- **Horizon Headings**: Headings may be overlayed just above the horizon line on the ADI.
- **Airport Signs**: pilot-selectable “signposts” displayed on the synthetic terrain display indicating the position of nearby airports that are in the navigation database.
- **Runway Highlight**: a highlighted presentation of the location and orientation of the runway(s) at the destination airport.

The synthetic terrain display is intended to aid the pilot awareness of the terrain and obstacles ahead of the airplane. It may not provide either the accuracy or fidelity, or both, on which to solely base decisions and plan maneuvers to avoid

terrain or obstacles. The synthetic vision elements are not intended to be used for primary aircraft control in place of the primary flight instruments.

7.14.4 Airspeed

If configured, the airspeed tape on the left side of the ADI displays red/white striping to indicate the maximum allowable airspeed (V_{NE}/V_{MO}). This maximum allowable airspeed display is configured to indicate the appropriate maximum allowable airspeed for the airplane.

The airspeed tape displays a red low-speed awareness band at the lower range of the airspeed tape. This low-speed awareness band is displayed at airspeed values below V_{S0}. It does not indicate an actual or calculated stall speed and does not adjust with variations in aircraft weight or other factors.

All other airspeed tape indications are configured to indicate the type design limitations. The airspeed tape does not adjust these additional markings for variations with aircraft weight, altitude, or other factors.

Airspeed references ("V speeds") are shown on the airspeed tape when enabled for display by the pilot via Menu → Options → Airspeeds.

7.14.5 Barometric Altitude and Vertical Speed

If configured, barometric altitude is displayed on a tape on the right side of the display. The vertical speed is displayed via an inset window adjacent to the altitude numerical value. The Baro setting may be adjusted by touching the field and rotating the inner knob or simply rotating the knob when the active field reverts to the Baro field home state. Altitude, airspeed, and heading bugs may be configured and synchronized across all GI 275 ADIs and configured G500 TXi displays. The Altitude bug may be removed by adjusting the value to -1,000 ft.

Barometric altitude is required for Vertical Navigation (VNAV) calculations on interfaced GTNs. Baro sync should be enabled on GI 275 units. VNAV uses the pilot-side baro setting unless that GI 275 fails, in which case the co-pilot side baro setting will be used (if installed).

7.14.6 Navigation

Navigation information is presented on the ADI using an optional lateral deviation indicator (LDI) above the heading display and a VDI to the left of the altitude readout. For MFD installations, the CDI/VDI are shown on CDI, HSI, and HSI map pages. Additionally, the CDI/VDI are displayed on the HSI and HIS map page on HIS installations. Bearing Pointers may be displayed on the HSI Page.

Navigation information can be cycled through up to four independent sources in normal operation by pressing the "CDI" button at the bottom of the HSI, HSI Map, or CDI pages. The navigation source can also be changed using the NAV

Option Menu on the ADI (Menu → Options). VGPS will be displayed as an additional navigation source if all certified navigators fail or will be the only navigation source in installations without a certified GPS source. The selected navigation source is shown on the left side of the HSI or LDI. CDI source selection can be synchronized across multiple GI 275 and G500 TXi's if enabled by the pilot.

7.14.7 HSI

The course pointer and deviation indicator are shown as a single, solid line for GPS 1 and VLOC 1, and as an outline with no fill for GPS 2 and VLOC 2. GPS and VLOC sources are further differentiated with color.

The selected course is displayed above and to the right of the HSI. The selected course is set via touchscreen keyboard entry or dual-concentric knob.

In addition, the HSI can display two simultaneous bearing pointers sourced from GPS or VHF NAV.

The bearing pointer display and navigation source are pilot controlled under the Menu → HSI Options → Bearing sub menus.

The HSI Map includes an integral moving map within the HSI depiction. HSI map data is a subset of the data on the MFD map page. Traffic, terrain, obstacle, topographic, and weather overlays are also available for the HSI map. Flight plan, runways, TAWS FLTAs, and TFRs are always displayed. Overlays are controlled on the Menu → HSI Options → HSI Map Options → Map Options menu.

7.14.8 Lateral Deviation Indicator (LDI)

A Lateral Deviation Indicator (LDI) is displayed on the ADI above the heading display when selected in the Menu. This LDI shows course deviation, navigation source, and VLOC station identifier or GPS phase of flight. The LDI uses the same color convention as the HSI .

The LDI incorporates automatic reverse sensing correction into the deviation display. When the difference between the heading and the selected course is greater than 107°, the LDI will enable reverse sensing correction. Reverse sensing correction inverts the course deviation needle and to/from indicator so that they correctly indicate the direction of the course and waypoint. The course deviation needle will be deflected in the direction of the desired course, and the to/from indicator will point in the direction of the waypoint (similar to how the HSI depiction inverts with heading changes).

Message, waypoint, phase of flight, LOI, and DR annunciations from a GTN or GNS interfaced to the GI 275 are annunciated on the LDI.

7.14.9 Vertical Deviation Indication (VDI)

Vertical guidance is shown by a vertical deviation indicator (VDI) adjacent to the altitude tape. The VDI displays glideslope (GS) information from an ILS source, glidepath (GP) information for a GPS approach, or barometric VNAV guidance from a GTN navigator.

7.14.10 Minimum Altitude Display and Alerting

When enabled by the pilot, an altitude minimums bug will be displayed in cyan on the altitude tape. If a radar altimeter is installed, the pilot can select between barometric or radar-altitude minimums. If installed with a G500 TXi, the minimums set on the TXi will crossfill to the GI 275.

Altitude minimums are accessed under the Menu → Options → Minimums sub menu.

Both visual and aural altitude minimums alerts are provided. During a descent to minimums, the minimums bug will change from cyan to white when the aircraft descends to within 100 ft of minimums. An aural "Minimums, Minimums" alert will be triggered when the aircraft's altitude descends through minimums and the minimums bug will change to yellow. As the aircraft altitude climbs back above minimums, the minimums bug will change to white 50 ft above minimums and cyan 150 ft above minimums. Alerting is rearmed once the aircraft is 150 ft or more above the minimums altitude.

7.15 Autopilot Interfaces

The GI 275 system can interface with certain types of autopilots.

The GI 275 installation in this aircraft provides the following autopilot functions (appropriate boxes will be checked):

- ☐ This installation *does not* interface with the autopilot (basic wing leveling autopilot or no autopilot is installed in the aircraft).
- ☐ Course / NAV Selection coupling to the autopilot.
- ☐ Heading Bug steering to the autopilot.
- ☐ Roll Steering emulated via heading mode.
- ☐ Roll Steering capable autopilot.
- ☐ Altitude Pre-Selector integrated with the autopilot.
- ☐ Flight Director display driven from external autopilot or FD computer.
- ☐ GI 275 provides attitude / air data to autopilot

7.15.1 Navigation Data for Autopilots

The GI 275 can provide course and heading data to the autopilot based on the data selected for display on the HSI. For aircraft equipped with multiple GPS/NAV systems, the HSI can act as a selection hub for the autopilot's NAV mode. Alternatively, the NAV mode can be selected using the NAV Options menu on the ADI. The GI 275 may also provide GPS Steering (GPSS) data.

Not all autopilot systems are approved for providing vertical guidance on GPS-based approaches; consult the AFMS for the autopilot and/or GPS system.

If the installation has pilot and copilot HSIs, control of navigation course, heading, or altitude data affecting the autopilot from the co-pilot side can only be made if the systems are synchronized with each other.

If the autopilot can receive GPSS Roll Steering, the data is transmitted via a digital communications bus from the GI 275 to the autopilot. The HSI receives this data from the GPS. In dual GPS installations, the HSI sends Roll Steering information from the selected GPS source.

For autopilots which are not GPSS Roll Steering capable, the GI 275 can convert GPSS turn commands into a heading error signal for the autopilot. When the autopilot is operated in HDG mode and GPSS is selected as the GI 275's heading source, the autopilot will fly the turn commands from the GPS navigator selected on the GI 275. If an autopilot is interfaced to the GI 275 which supports GPS steering (GPSS), a menu selection is provided in the ADI (Menu → Options → NAV Options→ HDG to change the autopilot heading reference between GPSS and selected heading. When GPSS is selected, the heading bug will become hollow and the selected heading display will annunciate "GPSS" with an icon of a crossed out heading bug. The heading bug may still be adjusted by the pilot as a visual reference without affecting GPSS or its steering commands to the autopilot.

If the GPSS data is invalid (for example, if there is no active GPS leg) or the selected HSI source on HSI / ADI 1 is not GPS, the annunciated GPSS text will be yellow and a wings level command will be sent to the autopilot.

GPSS commands are not available when the CDI source is a VOR or LOC.

7.15.2 Flight Director Display

If autopilot flight director commands are interfaced to the GI 275, they will be presented as a single cue flight director on the ADI. Control of the flight director is accomplished via the autopilot/flight director controller; there are no pilot controls or adjustments for the flight director on the GI 275.

The GI 275 limits the distance the flight director pitch commands may deviate from the Aircraft Reference Symbol. If the pitch command provided by the autopilot flight director is greater than the position allowed by the GI 275, the command bars will be displayed at the maximum offset position allowed by the GI 275. As the aircraft pitch changes to satisfy the command bars, the bars will continue to be displayed at the maximum offset from the Aircraft Reference Symbol until the aircraft pitch deviation is within the command display limit.

7.15.3 Attitude and Rate Data Sources for Autopilots

Attitude-based autopilots may be interfaced to the GI 275 ADI, -20/-40 variant. If the GI 275 system is providing attitude to the autopilot, it will be noted in Section 7.15 above. Otherwise, the autopilot is receiving attitude or rate information from the standby or a remote gyro and the autopilot attitude input is independent of the attitude displayed on the GI 275 ADI.

It is recommended that pilots thoroughly familiarize themselves with the autopilot system and how it is interfaced with the GI 275 and other installed avionics to enhance operational efficiency and troubleshooting. Refer to the autopilot flight manual for more specific information.

7.16 MFD

On all MFD pages, the *nose* of the ownship symbol represents the actual location of your aircraft. (R01724944)

7.16.1 Map Page

A 2D moving map function is provided on the MFD. The appearance and determination of data displayed on the moving map is controlled by pilot selections made in the Menu. The Menu provides on/off controls for map overlays, a map detail selector, and a map setup button which accesses additional map controls.

The map range can be altered by “pinch zooming” the touchscreen or rotating the inner knob when the Range field is active. The range scale of the map is indicated by a range ring, centered on the ownship, with the current selected range shown at the 9 o’clock position on the ring. In addition to range adjustment, a panning function is provided to allow the position of the map to be centered on a location other than that of the ownship. The Panning mode is entered by dragging a single finger on the display and exited by touching the BACK softkey. The map orientation is continuously displayed in the top left corner of the Map Page.

The active flight plan of an interfaced navigator is shown in magenta on the Map. Traffic, Terrain, Weather, Land, and Aviation data can be selected for overlay on the Map as well.

7.16.2 Traffic Display

The MFD can display traffic data from interfaced traffic systems. Sources of traffic data include TIS-A, TAS/TCAS, and ADS-B TIS-B. The information from these systems is displayed on and may be controlled within the GI 275 MFD's Traffic Page.

The Traffic Page displays traffic according to selected range, relative to the aircraft ownship. It also shows the traffic system status and allows ADS targets to be selected for more information. Traffic controls and options are contained within the Traffic Page Menu, depending on the interfaced traffic system type. A display altitude filter is also provided via Menu selection. Filtering of targets based on relative altitude is accomplished by the display and affects the traffic displayed on the Traffic, HSI Map, and Map Pages. When interfaced to a TIS-A traffic system, altitude filtering is not available.

The *center* of the traffic target icon serves as the reported location for the target aircraft. (R01724954)

Additional functions are provided on the dedicated traffic page when an ADS-B traffic system is interfaced, including the depiction of motion vectors.

Absolute motion vectors are white and show 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 green and depict the motion of the traffic target relative to the ownship. 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 the ownship indicates that the traffic target *is* converging with your aircraft.

For ADS-B traffic systems - if while on ground without valid magnetic heading and the aircraft stops the traffic page orientation will change from TRACK UP to LATCHED. In this mode the display remains oriented to the last valid track until a new valid track is obtained.

Traffic can be displayed on the moving map as an overlay. Additional filtering based on traffic type (all, advisories, alerts) can be selected using the Menu Traffic selection. For TIS-A traffic selection of the advisories and alerts will result in display of alerted targets only.

Traffic page units are always in nautical miles and feet. If systems units for altitude are selected to meters, then an annunciation is provided on the traffic

page indicating that traffic altitudes are depicted in feet and the traffic overlay icon for the map includes a “FT” indication.

If a traffic alert occurs and the MFD is not selected to the dedicated traffic page, then a traffic “popup window” is provided which depicts the traffic and provides controls to either go to the dedicated traffic page or close the popup window. All other pages on an ADI, HSI or MFD will display a yellow TFC annunciator in the upper right corner of the screen when alerts are present.

7.17 Terrain Awareness and Alerting

The following terrain awareness and alerting functions may be provided by the GI 275 system: Terrain Proximity, Terrain FLTA, or TAWS-B. If the GI 275 system is interfaced to a GNS or GTN navigator equipped with TAWS-B, then the GI 275 will display TAWS-B parameters provided by the GNS or GTN. The Terrain or TAWS function provided by the GI 275 system is indicated by a text box on the bottom of the Terrain Page.

Terrain Proximity function is a 2D depiction of terrain, obstacle, and powerlines with no alerting. A dedicated terrain page is provided on the MFD on which the relative height of terrain, obstacles, and powerlines are depicted using color to convey the height of the obstruction relative to aircraft altitude based on database data. Obstacle and wires are displayed on the terrain page at certain zoom scales. Obstacle data is displayed at zoom settings of 10nm or less and wire data is displayed at zoom settings of 5nm or less. The Terrain Proximity function is present on the system regardless of other higher level terrain functions that may be selected.

If SVT is enabled in the GI 275 system, then the Terrain - FLTA function is provided. Forward Looking Terrain Alerts and Reduced Terrain Clearance Alerts are provided for terrain, obstacles, and wires.

If the GI 275 is interfaced to a GNS or GTN with TAWS-B enabled, then TAWS alerts are only displayed from the GPS/TAWS navigator interfaced as GPS 1 and are displayed regardless of the CDI 1-2 setting.

Visual indications are provided for terrain, obstacle, and wire alerts as follows:

- For all GI 275 configurations which provide alerts and all configurations where the GI 275 is interfaced to GNS or GTN with TAWS-B enabled:
    - An annunciator located in the upper right corner of all configured pages on ADI, HSI and MFD units provides text annunciations of alert conditions.

- For all GI 275 configurations which provide alerts and all configurations where the GI 275 is interfaced to a GTN with TAWS-B enabled:
    - If a terrain alert occurs and the MFD is not selected to the dedicated terrain page, then a terrain "popup window" is provided, which depicts the obstruction generating the alert with controls provided to either go to the dedicated terrain page, inhibit the terrain alert, or close the popup window. On a primary ADI GI 275, if a terrain alert occurs, an annunciation will illuminate in the top right corner of the display.
    - The terrain page and map page, if the terrain overlay is enabled, will depict the area or obstruction causing the alert as an area of color corresponding to the alert severity and encircling the obstruction.
    - If Synthetic Vision depiction is turned on, an area corresponding to the alert area on the map/terrain page is shaded in the corresponding color for terrain alerts. Obstacle alerts will cause the relevant obstacle to be depicted in the alert color in SVT. Powerline alerts do not have a corresponding indication in SVT.
    - In Dual ADI installations, GI 275 generated alert audio is only provided by the Pilot side GDU. If the Pilot side GDU becomes inoperative, the Co-Pilot side GDU visual annunciations may still function, but the aural alerts will not be heard.

Controls are provided for terrain, obstacle, and wire alerts as follows:

- For all GI 275 configurations in which the GI 275 system provides alerts:
    - Controls are provided in the Terrain Page menu. A "Terrain Inhibit" button inhibits terrain, obstacle, and powerline alerts when pressed. An annunciation is provided on all configured pages to indicate that alerts are inhibited. A "Terrain Test" button initiates a self-test sequence which results in aural and visual self-test annunciations.

7.17.1 Weather Data

The MFD can display weather data from interfaced datalink systems. Sources of weather data include the Garmin "GDL 69(A)" and "GDL 69(A) SXM" Sirius XM receivers and Garmin ADS-B transceivers. If one of these optional weather datalink receivers is installed, the pilot will be able to access graphical and text weather products using the MFD. Datalink weather products use color and/or timestamps to indicate the recency with which the data was received.

Selected weather products from each receiver can be overlaid on the map page as well as the enhanced HSI map while all received products can be displayed

on the dedicated weather pages. The products available on the map page and HSI are different for each weather receiver. The map page and HSI provide controls to select the desired weather receiver; only one weather receiver can be selected at a time.

Text and graphical datalink weather associated with a facility can only be viewed when a database which includes that facility is installed.

The MFD can optionally display data from Stormscope® lightning detection systems. Stormscope data can be depicted on the map page, dedicated Stormscope page, and HSI map. For detailed information about the capabilities and limitations of the Stormscope system, refer to the documentation provided with that system.

7.17.2 Waypoint Information

The MFD provides pages that display information about the different waypoint types. These pages can be accessed by touching one of the supported waypoint types on the map and then pressing the provided Waypoint Info button.

7.18 Engine Indication System

Engine gages are optionally provided for single and twin engine aircraft with four and six-cylinder reciprocating engines.

The following indications are provided in all EIS installations:

- Tachometer
- Manifold Pressure (If required)
- Oil Pressure
- Oil Temperature

Other engine gauges may be provided by either the EIS display or previously installed indicators in their original locations. The following gauges may be provided on the GI 275 EIS display:

- Fuel Flow
- Cylinder Head Temperature (CHT)
- Exhaust Gas Temperature (EGT)
- Fuel Pressure
- Electrical gauges (Amps / Volts)
- Main and Auxiliary Fuel Quantity
- Carburetor Air Temperature (CAT)
- Turbine Inlet Temperature (TIT)
- Inlet Air Temperature (IAT)
- Compressor Discharge Temperature (CDT)
- IAT/CDT Differential

Additional functions provided by the EIS system include a fuel computer, hour meters, and pilot-selectable engine advisories.

The layout of EIS gauges is dependent on the GI 275 display type and number of engines. The determination of which data is presented in which slot is set by the installer in configuration mode based on data in the STC which specifies the data located in each position. The markings on the EIS gauges are the same as those markings provided by the previously installed gauges and depict the operating ranges and limitations provided in the Airplane Flight Manual and Type Certificate Datasheet.

Some previously installed aircraft gauges included non-required markings such as advisory marks for certain altitude and power combinations. EIS gauges will include all markings required to comply with operating limitations associated with that gauge. Markings not required by regulation and which do not convey limitations or operating ranges are provided to the pilot by means of a placard.

EIS gauges include display characteristics to attract the pilot's attention when outside normal operating ranges. Gauge alerting behavior in caution or warning ranges is suppressed when the engine is OFF and the aircraft is on the ground.

All gauges will highlight the digital readout in yellow or red when entering a non-safe range and cause the colorized CAUTION or WARNING annunciator to flash at the bottom of the EIS screens.

7.18.1 Tachometer

For aircraft in which a starting vibrator is installed the RPM indication is not accurate during engine cranking.

For aircraft equipped with P lead sensors to measure engine RPM, the RPM indication may momentarily fluctuate when selecting operation on a single magneto.

7.18.2 Carburetor Air Temperature

The Carburetor Air Temperature gauge (if installed) is marked with a blue arc from -15 to 5 °C which indicates a range of temperatures where carburetor icing is likely to occur. Operation in this temperature range should be avoided in conditions where carburetor icing is possible (humid air or visible moisture).

7.18.3 CHT

CHT is displayed on a graph on the CHT page. Each cylinder will numerically display it's respective CHT below the indicated bar. Additionally, CHT is displayed on a bar gauge on the main or aux gauge page. CHT on the bar gauge will indicate the temperature associated with the hottest cylinder.

7.18.4 EGT

An exhaust gas temperature gauge is provided on the EIS display for all configurations. The EIS display can provide indications of EGT for each cylinder and additionally can indicate primary EGT which is a measurement of the EGT in the exhaust manifold.

Primary EGT (if installed) will be displayed on a bar gauge on the main or aux gauge page. Cylinder specific EGT is displayed on a graph on the EGT page. Each cylinder will numerically display its respective EGT below the indicated bar. Additionally, cylinder specific EGT is displayed on a bar gauge on the main or aux gauge page. EGT on the bar gauge will indicate the temperature associated with the hottest cylinder.

7.18.5 Mixture Leaning

GI 275 EIS provides two different lean assist methods, rich of peak or lean of peak.

Lean assist mode is entered by pressing the Lean Button on the EGT page. Lean mode automatically detects the EGT peak and indicates peak by using a bar above the EGT indicator for the cylinder. As the mixture is leaned, the system will transition from “Rich of Peak” indications to “Lean of Peak” indications automatically. The system requires fuel quantity indication, fuel flow indication and EGT indication to function.

Rich of peak leaning detects and indicates the first engine cylinder to peak during the leaning process. Once the first peak in EGT is detected, the temperature differential from the recorded maximum EGT of the first cylinder to peak is displayed.

Lean of peak leaning detects and indicates the last engine cylinder to peak during the leaning process. Once the last cylinder peak EGT is detected, the system will display the temperature differential from the recorded maximum EGT of the last cylinder to peak.

Notes

The Lean Assist is meant to aid the pilot in detecting the peak temperatures. Smooth leaning technique is required for the system to be able to accurately detect the peak temperature.

Caution should be used to ensure that, during the leaning procedure, the engine is not leaned beyond the engine or aircraft limitations and that the engine continues to operate smoothly after setting the mixture. Should any engine roughness occur during leaning, consult the aircraft POH or AFM for appropriate leaning of the engine.

The Lean Find functions are calculated using the relationship between fuel flow and EGTs. If a false EGT peak is observed and

does not automatically reset, disable the Lean Find function, reset throttle and mixture controls, and reattempt.

It is recommended to set the aircraft power settings for cruse flight prior to beginning the lean find process.

7.18.6 Fuel Quantity

Usable fuel may be displayed on the EIS display. Main fuel quantities are grouped together and aux/tip fuel quantities are grouped together.

Previously installed aircraft low fuel quantity annunciators will be deactivated as part of the fuel quantity installation in some aircraft. In this case, the low fuel annunciators will be placarded as deactivated, and a red or yellow arc must be added to the fuel quantity gauge to indicate the fuel level that corresponds to the low fuel annunciation.

7.18.7 Fuel Computer

A Fuel Computer/Totalizer is provided on the Fuel page. The fuel computer function provides computation and display of estimated fuel remaining, range, endurance, endurance at destination, fuel at destination, range at destination, and fuel used. The fuel computer calculates these values using the engine fuel flow sensor, ground speed, flight plan, and estimated fuel remaining. Estimated fuel remaining is independent of the measured fuel quantity shown on the fuel quantity gauges.

CAUTION

The pilot must ensure that the initial estimated fuel quantity value is accurate. The fuel computer calculates the remaining fuel based on the initial fuel value entered by the pilot. The estimated fuel remaining is derived by the fuel computer by subtracting the measured fuel flow from the initial fuel entry. Fuel quantity indications shown on the fuel gauges may not provide the accuracy required for determination of estimated fuel remaining values. “Fuel Est” and “Act Used” buttons are available to aid the pilot in entering the initial estimated fuel.

CAUTION

The fuel computer functions must not be used as the primary means of determining the quantity of fuel in the tanks. The aircraft fuel quantity gauge(s) are the primary means of determining fuel quantity.

7.18.8 Engine Advisories

Engine advisories can be configured by the pilot from the Menu → [EIS] Main Opts to provide supplemental advisory notifications when a pilot-configured threshold has been exceeded. These thresholds are determined solely by the pilot and do not affect the EIS Page presentation, EIS operating ranges, or gauge alerting thresholds.

The following parameters may be configured by the pilot to provide advisories: High CHT, Low Oil TEMP, High Oil TEMP, CHT Cooling Rate, EGT DIFF, Low Endurance, Low EST Fuel Remaining, Low Bus Voltage, High Bus Voltage, Low Voltage, High Battery Voltage, and High TIT.

7.18.9 Flight and Engine Hour Meter

The Flight/Engine Hour Meter can be accessed from the Engine Menu. The flight hour meter will increment in tenth of an hour resolution when the aircraft is in the air and the engine hour meter will increment in tenth of an hour resolution when any engine is running.

7.19 Wireless Functions

The GI 275 has a wireless transceiver to provide data to personal electronic devices (PEDs) and includes a Bluetooth and Wi-Fi transceiver.
Data such as traffic, datalink weather, entertainment audio information, and attitude information is sent from the GI 275 to the PED. Limitations regarding database operations are found in Section 2.27.

Garmin provides a list of tested and compatible devices that can be used with the Connext platform. Connection to the GI 275 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 Flight Stream product line, please visit: http://garmin.com/connext/supported_devices