FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT
or
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for the

GARMIN G500/G600 TXi DISPLAY 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 SA02571SE for the installation and operation of the Garmin G500/G600 TXi System. 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.

FAA APPROVED BY: JR Brownell

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ODA-240087-CE

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	14	Turboprop gauge types added	
	15	Updated MFD logic in Section 2.34	
	18	Added HDG monitor to Section 3.1.4	
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	40	Added GEA 71B references	
	43	New turboprop modes shown in Section 7.7	
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		Updated standard rate turn text in Section 7.15.2	
	49	Note added to Section 7.15.3	
	51	Preview needle text added to Section 7.15.7	
	52	Added preview needle to table 1	
	56	Updated FD text in Section 7.16.2	
	57	New ARC VSI text for Section 7.16.5	
	62-68	Additional turboprop gauge information added to Section 7.19	
	68	New Section 7.23	
4	1	Added planforms	See page i
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43	Additional coloration added for clarity	
47	Additional text	
50	Additional text	
53	MACH, variable V_{NO} text	
54	New installer checkbox and description of CDI feature. Updated text	
55	Updated title	
56	New subsections and corrected table #	
58	Clarified text	
60-62	New feature text	
66	New interface added to list	
67	Updated primary gauge list, added new text, and corrected table #	
68	Clarified title, added note	
70	Updated section with new features.	
71	New section.	
72	Amended text for twin timers and corrected table #'s	
73-74	Added new sections 7.24 thru 7.26	

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Section 1. GENERAL

The G500/G600 TXi system is a display and sensor system which provides one or more of the following functions:

- Primary Flight Display (PFD) – Provides attitude, heading, air data and navigation information to the pilot
- Multi-Function Display (MFD) – Provides pilot awareness of factors that may affect the overall conduct of the flight
- Engine Indicating System (EIS) – Provides engine and airframe operating parameters to the pilot

The G500/G600 TXi system consists of one or more of the following displays:

- GDU 1060 – 10" PFD/MFD or MFD/MFD (optional EIS)
- GDU 700P – 7" Portrait PFD, MFD, EIS, or MFD/EIS (single engine only)
- GDU 700L – 7" Landscape PFD, EIS, or MFD/EIS (single engine only)

PFD functions are supported by interfaced AHRS/ADC (either integrated or external) and at least one GPS navigator. An optional GAD 43/43e adapter provides additional functions such as third-party autopilot and analog interfaces. An optional GCU 485 controller provides additional dedicated controls for PFD operation. Other PFD interfaces may include VHF navigation radios, radar altimeter, ADF, and DME.

EIS functions are supported by either a GEA 110 engine/airframe unit, or a GEA 71B Enhanced unit, along with sensors to measure engine parameters.

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

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 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.

1.1 GDU 1060

The GDU 1060 is a 10" PFD/MFD or MFD/MFD display, with an optional EIS function. Each function is segregated into a portion of the display. If installed the EIS function occupies on the left or right edge of the display and is always shown.

1.2 GDU 700P

The GDU 700P is a 7" portrait display which provides a single PFD, MFD, EIS, or MFD/EIS function. In some installations, a 700P display may provide backup PFD or EIS information in the event that the primary PFD or EIS display fails or malfunctions.

1.3 GDU 700L

The GDU 700L is a 7" landscape PFD, MFD/EIS, or EIS display.

1.4 AHRS / ADC

The AHRS and ADC sense aircraft attitude and air data to be used for display to the pilot and for use by other installed systems. The AHRS and ADC can be either remote-mounted or integrated into the display.

All AHRS units have a magnetometer interface for determining magnetic heading. The AHRS also requires GPS and airspeed inputs for aiding the system.

1.5 OAT Probes

All ADC units have an OAT probe interface for measuring outside air temperature. Static and ISA relative temperatures can be displayed on the GDU in those installations. In EIS-only installations, the OAT can be interfaced with the system directly and will only display Total Air Temperature on the EIS display.

1.6 Standby Instruments or Standby PFD

Except for installations that are limited to VFR, PFD installations require standby attitude, altitude, and airspeed instruments. Several types of standby instruments are acceptable, including individual analog instruments and certain electronic standby indicators.

An integrated standby system configuration is also available, which consists of two GDU 700P 7" portrait displays, each with separate AHRS / ADC functionality. One display serves as the PFD, and the other display can be either an EIS, MFD, or MFD/EIS display. The EIS/MFD provides standby PFD functionality which is displayed automatically when faults are detected or upon manual command. A backup battery provides emergency power to the PFD and sensors in the event of a failure of aircraft power.

1.7 Backup Battery

An optional GBB 54 backup battery can be installed to provide emergency power to a GDU 700P/L display. The backup battery is mounted remotely and provides power to the GDU when aircraft power is unavailable. The GDU, in turn, may be equipped with an integrated ADAHRS and can provide power to the EIS sensors for one engine. This allows for continued PFD and EIS functionality when aircraft electrical power is lost.

1.8 PFD Controller

An optional GCU 485 PFD controller may be installed to provide dedicated PFD controls. Although control of all PFD functions is available using the GDU knobs and touchscreen, the PFD controller provides dedicated knobs for heading, altitude, vertical speed, airspeed, and BARO setting. Dedicated buttons are also provided for CDI source selection, GPSS emulation mode, altitude capture arming, and vertical speed mode engagement.

1.9 Block Diagrams

The following diagrams illustrate the typical TXi installation and integrated standby configuration. Due to the large scalability of the TXi system, it is not practical to represent every possible installation combination.

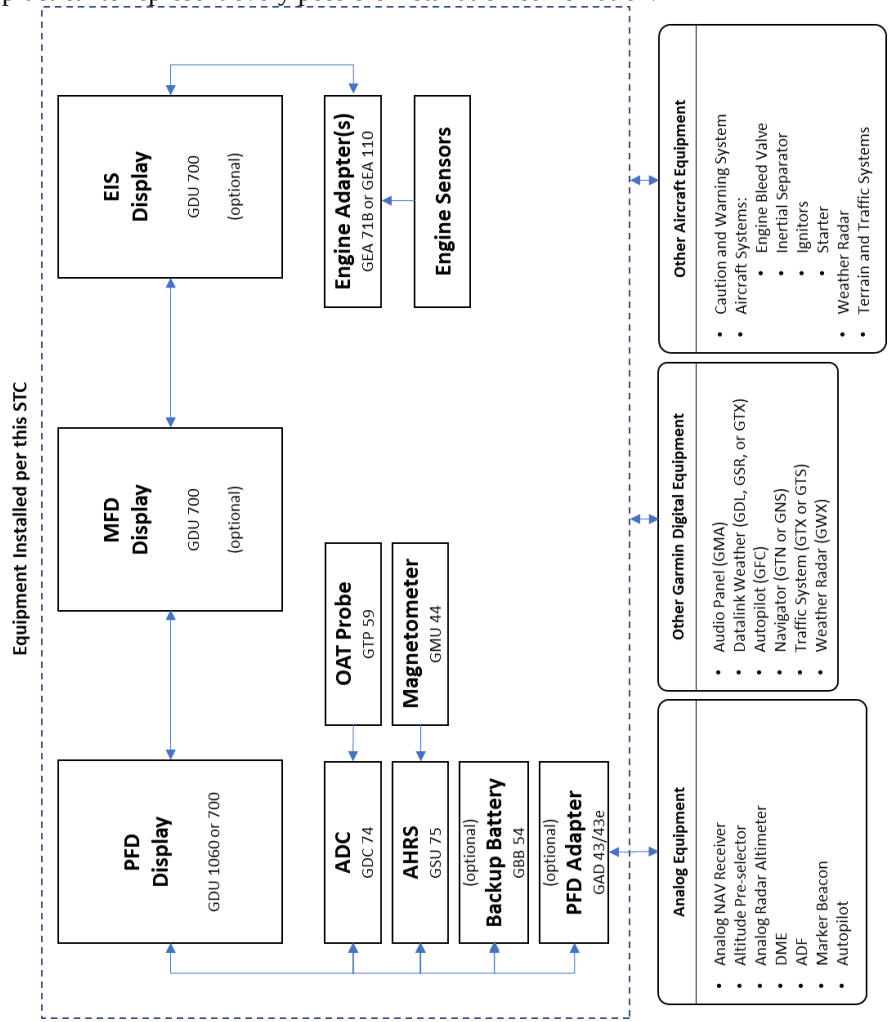


Figure 1 TXi System Overview

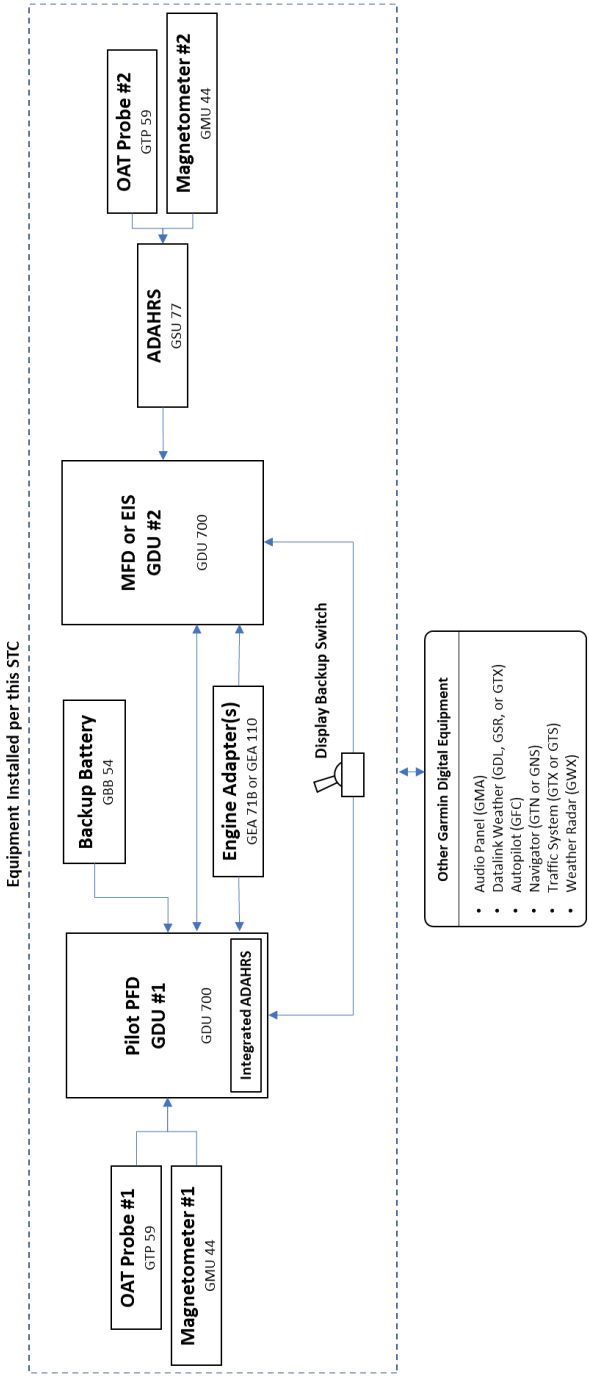


Figure 2 Typical Integrated Standby Configuration

1.10 Definitions

ADAHRS: Air Data and Attitude Heading Reference System

ADC: Air Data Computer

AHRS: Attitude & Heading Reference System

CDI: Course Deviation Indicator

CRS: Course

EDM: Emergency Descent Mode

EIS: Engine Indicating System

FD: Flight Director

FLTA: Forward-looking Terrain Alerting

FS510: Flight Stream 510

GPSS: GPS Steering

HDG: Heading

HSI: Horizontal Situation Indicator

IFR: Instrument Flight Rules

IMC: Instrument Meteorological Conditions

LOI: Loss of Integrity

MFD: Multifunction Display

PED: Portable Electronic Device

PFD: Primary Flight Display

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
GDU	PFD, MFD, and/or EIS	3.12
GEA 71B	Engine Adapter	2.60

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 Databases

Databases identified as intended for helicopters must not be used. These databases are identified by the word "HELI" or "HELICOPTER" in their title, as displayed on the database status page.

2.3 AHRS Operational Area

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 attitude and heading may occur near the poles.

2.4 Magnetic Variation Operational Area

IFR operations are prohibited in areas where the magnetic variation is greater than 99.9 degrees East or West.

2.5 Navigation Angle

The Magnetic/True Navigation Angle (as selected on the System Units page) must match the navigation angle selected on all interfaced GPS/SBAS navigators.

2.6 ADAHRS and AHRS Normal Operating Mode

The Attitude and Heading Reference System integrity monitoring function requires external GPS and Air Data to be provided to the AHRS. An ADAHRS receives Air Data internally and therefore only requires external GPS.

NOTE

Attitude will remain valid if either GPS or Air Data is lost.

Flight in IMC is not authorized unless the ADAHRS or AHRS is receiving valid GPS *and* valid Air Data. The G500/G600 TXi system monitors these integrity systems automatically and will advise the pilot when the ADAHRS or AHRS is not receiving GPS or Air Data.

NOTE

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

2.7 Aerobatic Maneuvers

Do not conduct aerobatic maneuvers if uninterrupted attitude information is required on the PFD.

2.8 Electronic Standby Instrument Power

The independent power source for electronic standby instrument(s) must be verified to be operational before flight, or the electronic standby(s) must be considered inoperative. For the verification procedure, refer to the approved Airplane Flight Manual and/or Instructions for Continued Airworthiness for the independent power source.

2.9 Standby Flight Instruments

- ☐ This installation uses separate standby instruments (other than a GDU) or does not require standby instruments (aircraft limited to VFR).
- ☐ This installation uses the Integrated Standby System with dual GDU 700P displays for the primary and standby flight instruments. IFR flight must not be initiated unless the system check in Section 4.1.1 is completed successfully to verify the following:

- The backup battery is operational and sufficiently charged (no amber or red battery icons on the pilot's PFD)
- Attitude, heading, altitude, and airspeed from AHRS/ADC 1 are operational on the pilot's PFD with no warnings, cautions, or advisories present
- Selecting the display backup switch to ON causes the standby PFD to display attitude, heading, altitude, and airspeed with no warnings, cautions, or advisories present

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.

2.10 Sensor Selection

Do not select or operate on cross-side AHRS or ADC sensors (e.g. PFD 1 using AHRS/ADC 2), unless directed to do so as part of an emergency or abnormal procedure in this AFMS.

CAUTION

Changing the AHRS/ADC sensor source when a white ATTITUDE/IAS/ALT annunciation is displayed on the PFD will result in the selection of an inoperative sensor source and subsequent loss of information. Operating both PFDs on the same sensor source will inhibit the AHRS/ADC comparison monitor.

2.11 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 PFD must be selected off.

2.12 Moving Maps

Moving map displays (ownship position relative to map features) must not be used as the primary or sole means of navigation or course guidance.

2.13 PFD 2 Flight Director

The flight director on PFD 2 (if installed) is a duplicate of the flight director shown on PFD 1 (i.e. the flight director is based on the mode references displayed on PFD 1). When utilizing the flight director on PFD 2, the heading, CDI source, altitude, or other information affecting the flight director must be

cross-checked and verified between the two PFDs. It is recommended that CDI sources and BARO sources are synchronized between PFDs at all times, either with installation settings or pilot-controlled settings.

2.14 Autopilot Disconnect

The "AP DISC" button in the PFD Test Menu (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.

2.15 Terrain Display

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

2.16 Terrain/TAWS Alerts

Terrain/TAWS alerts must be inhibited when landing at an airport that is not in the airport database.

2.17 Datalink Products (SiriusXM, FIS-B, and Connext)

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.

2.18 Traffic Display

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

2.19 Weather Radar

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.

WARNING

An operating radar 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 RADAR USER MANUAL.

2.20 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 responsibility to avoid hazardous weather using official weather data sources.

2.21 PFD/EIS Display Backup Mode

When a 7" display is operating in PFD/EIS display backup mode, the fuel selector must be positioned to use fuel from a tank for which fuel quantity is indicated unless it is deemed operationally necessary by the pilot to select a tank for which quantity is not indicated.

NOTE

In some installations, auxiliary or tip fuel quantity gauges may not be available in PFD/EIS composite display backup mode.

2.22 Surface Operations

SafeTaxi or Chartview functions shall not be used as the sole basis for ground maneuvering. 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). SafeTaxi and Chartview use is limited to airport surface orientation to improve flight crew situational awareness during ground operations.

2.23 Type Ratings

Unless otherwise authorized by this section, operations are prohibited in aircraft that require a type rating.

2.24 Fuel Flow

In some turboprop installations, fuel flow values may be erratic or erroneous before fuel is introduced into the system during engine starts. Once fuel is present in the system, the fuel flow values are accurate. The pilot should disregard fuel flow indications during engine start before fuel is introduced in these aircraft.

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.

2.25 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.

2.26 Glove Usage

No device may be used to cover fingers used to operate the TXi display unless the Glove Qualification Procedure located in the Pilot's Guide has been successfully completed. The Glove Qualification Procedure must be successfully completed for each combination of pilot, glove, and GDU 1060/700P/700L that is intended to be used.

2.27 Backup GPS

The Backup GPS is an emergency positional awareness function and must not be used as a normal means of navigation.

2.28 Service Required

It is prohibited to initiate flight when a "Service Required" advisory is present on the PFD, MFD, or EIS display.

2.29 Powerplant Gauge Markings

Aircraft that were previously equipped with a fuel flow gauge which measured metered fuel pressure may have this gauge replaced by a gauge which measures fuel flow directly. When these gauges are replaced in accordance with this STC, the fuel pressure and fuel flow markings on such gauges are replaced by equivalent fuel flow markings.

2.30 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 Flight Stream interface and data provided to a portable electronic device is not approved to replace any aircraft display equipment, including navigation or traffic/weather display equipment.

2.31 Database Updates

Database updates via MMC / SD card or Flight Stream wireless transfers must be done while the aircraft is on the ground and stationary. In-flight database transfers or updates are prohibited in flight unless part of the Database SYNC function that occurs in the background to move databases from one LRU to another.

2.32 Minimum Crew

There are no additional limitations applicable to the minimum crew required for safe and effective operation of the aircraft utilizing a G500 / G600 TXi system.

2.33 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 tables below list the minimum fully functional equipment required for flight.

The following note applies where indicated:

> For VFR operations under 14 CFR Part 91, the aircraft must have at least one source of altitude and airspeed information. This may be from either the PFD or the standby instruments. (i.e. all “1a” items or all “1b” items from the tables above)

Primary Flight Display (Non-Integrated Standby):

	Equipment	Number installed	VFR	IFR
	Primary Flight Display	1 or 2	1	1
	Garmin GPS/SBAS Navigator (interfaced to a PFD)	1 or 2	-	1
	Air data and Attitude / Heading Unit (ADAHRS)	1 or 2	1a*	1
OR	Attitude / Heading Unit (AHRS)	1 or 2	-	1
	Air data computer (ADC)	1 or 2	1a*	1
	Magnetometer (GMU)	1 or 2	-	1
	Standby Attitude Indicator	1	-	1
	Standby Airspeed Indicator	1	1b	1
	Standby Altimeter	1	1b	1
	Non-stabilized Magnetic Compass	1	1	1

Primary Flight Display (Integrated Standby):

	Equipment	Number installed	VFR	IFR
	Pilot Primary Flight Display	1 or 2	1a*	1
	Pilot MFD or EIS Display providing backup PFD functions	1	1b	1
	Garmin GPS/SBAS Navigator (interfaced to a PFD)	1 or 2	-	1
OR	Air data and Attitude / Heading Unit (ADAHRS)	2	1a*	2
OR	Attitude / Heading Unit (AHRS)	2	-	2
OR	Air data computer (ADC)	2	1a*	2
	Magnetometer (GMU)	2	-	2
	Non-stabilized Magnetic Compass	1	1	1
	PFD Backup Battery	1	-	1
	Display Backup Switch	1	-	1

Engine Indicating System (if installed):

Equipment	Number installed	Req'd
EIS Display	1	1
Engine Adaptor Unit (GEA 110 or 71B)	1 or 2 *	All

* GEA 71 is used for turboprop installations and is limited to a single adapter

For piston engine aircraft, 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
- Propeller RPM
- 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.

For turboprop powered aircraft, the following engine indications must be functional on the EIS display (if these gauges are present on the EIS display as installed):

- Torque
- Propeller RPM
- Gas Generator RPM
- Engine Temperature
- Fuel Flow
- Oil Pressure
- Oil Temperature
- Any additional engine instruments required by the aircraft Kinds Of Equipment list as listed in the Aircraft Flight Manual.

☐ This installation has the EIS display within the primary field of view and does not require a remote EIS annunciator.

☐ This installation does not have the EIS display within the primary field of view and the following limitations apply:

	Equipment	Number installed	Req'd
OR	EIS Annunciator	0 or 1	All
	PFD with EIS Annunciator	0 or 1	All

2.34 Placards

2.34.1 (Removed)

2.34.2 KFC 275/325 Altitude Preselect

When the altitude preselect option is installed with KFC 275/325 autopilots, SOFT RIDE (SR) mode must be disengaged when altitude capture mode is engaged (green ALTC). The following placard must be installed near the autopilot mode controller or above PFD 1:

"DISENGAGE SOFT RIDE DURING ALTITUDE CAPTURE (ALTC)"

2.34.3 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"

2.35 MFD Flight Plan Display

When an MFD is associated with a specific PFD (e.g.- The co-pilot's side has a 700P PFD and a 700P MFD), the flight plan displayed on the MFD is from the navigation source selected on the PFD CDI. If the MFD is not associated with a specific pilot position (e.g.- The MFD is a stand-alone center MFD) the flight plan displayed is from the navigation source selected on the pilot's PFD CDI.

2.36 MFD Engine Page

The MFD engine page is intended as a secondary display of engine operating parameters. As such, any engine alert can only be acknowledged on the primary EIS display. The alerts will be *displayed* on the MFD engine page for reference.

2.37 Percent Power Calculation Limitations (Piston Only)

The TXi calculates the horsepower output of the engine and displays that in percentage of total horsepower rated for the engine on pilot selectable fields on the EIS pages. This calculation is provided to the optional GFC 600 autopilot for use in the Smart Rudder Bias system. The EIS cannot detect a failure of the ignition source of a piston engine and therefore could continue to read positive engine power even if the ignition source of the engine has failed. The pilot should monitor the engine and EIS indications to determine the actions necessary should the ignition source of the engine fail.

Section 3. EMERGENCY PROCEDURES

3.1 Emergency Procedures

3.1.1 PFD Failure

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

1. Use standby flight instruments for attitude, airspeed, altitude, and heading reference.
2. Refer directly to the navigation source for navigation information (such as GPS).
3. Seek VFR conditions or land as soon as practical.

   If autopilot is engaged:

   4. Verify autopilot mode and cross check against standby flight and navigation data.

3.1.2 AHRS Failure

AHRS failure is indicated by the removal of the attitude/heading information and a red X on the PFD. Rate-of-turn information (heading trend vector) will not be available. A heading failure will also occur as described in Section 3.2.1.

1. Use Standby Attitude Indicator.
2. Seek VFR conditions or land as soon as practical.

If multiple AHRS sources are installed:

3. Select operative AHRS using the PFD Sensors menu

NOTE

If the AHRS is restarting in flight without an operative GPS navigator, attempt to minimize maneuvering and turbulence during and after the restart process. Without an operative GPS navigator, excessive maneuvering or turbulence may prevent the AHRS from completing alignment properly. Continue to minimize maneuvering and seek smooth air for the first 5 minutes after the attitude becomes valid following the in-air alignment restart. If maneuvering or turbulence cannot be avoided, carefully cross-check the AHRS for correctness against other flight instruments.

3.1.3 ADC Failure

ADC failure is indicated by:

- Red X over the airspeed and altitude tapes
- Yellow X over the vertical speed tape
- Dashed out TAS and OAT fields

Wind calculations will also be unavailable. If valid GPS data is available, the PFD will automatically revert to display GPS calculated altitude relative to mean sea level. GPS altitude is displayed at the top of the altitude tape.

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 operative ADC using the PFD Sensors menu

3.1.4 ATTITUDE, ALT, HDG, or IAS monitor CAUTION

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

Figure 3- Miscompare Flags

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/HDG/IAS 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 G500/G600 TXi system will cease to operate, except for displays which are equipped with an optional backup battery. Refer to procedures for failure of affected equipment and operation on backup battery. For power loss effects on the G5 standby, see the AFMS for the G5, 190-01112-13.

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. Twin engine aircraft equipped with EIS will lose right engine gauges, fuel quantity from the right tank(s), and amps and volts from the right side. Operation on battery power is indicated by the presence of a battery icon on the affected display and a system advisory. A minimum of 30 minutes of operation on the backup battery is provided.

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

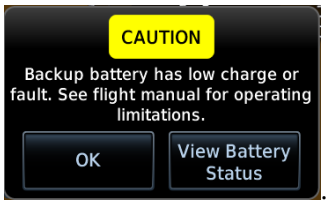
3.1.7 Display Backup Malfunction

Display backup malfunction is indicated by repeated changes to the display layout (e.g. display changes back and forth between normal and backup mode).

1. Select Display Backup switch to ON to force all displays into backup mode.

3.1.8 Backup Battery Malfunction

A malfunction of the backup battery is indicated by the following indication:



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

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 Loss of Electrical Power to 3-inch Electric Standby Attitude Indicator (flashing amber STBY PWR light) (MidContinent 4300 Series)

When a 3-inch electric standby attitude indicator is installed, loss of primary electrical power to the attitude indicator is annunciated by a flashing amber light on the indicator. The attitude indicator is operating on backup battery power, and pilot action is required for the gyro to continue operating.

1. Press STBY PWR button on the indicator one time.
2. Verify that the flashing amber light extinguishes.
3. Verify that the red gyro warning flag is not displayed.
4. Seek visual meteorological conditions (VMC) or land as soon as practical (operation of standby attitude indicator is limited by battery life).

WARNING

Do not press the STBY PWR button a second time after the flashing amber light extinguishes. This will turn off the backup battery and the red gyro warning flag will be displayed. If the STBY PWR button is inadvertently pressed and the red gyro warning flag is displayed, press the STBY PWR button again to return to battery power operation (red gyro warning flag should not be displayed).

3.1.11 Loss of Electrical Power to 2-inch Electric Standby Attitude Indicator (flashing or steady amber STBY text) (MidContinent 4200 Series)

When a 2-inch electric standby attitude indicator is installed, loss of primary electrical power to the attitude indicator is annunciated by amber STBY text on the Annunciation Control Unit. The attitude indicator is operating on backup battery power, and pilot action may be required for the gyro to continue operating.

If the amber STBY text is flashing (manual operation):

1. Press the STBY PWR button one time.
2. Verify that the amber STBY text is steadily illuminated.
3. Verify that the red gyro warning flag is not displayed.
4. Seek visual meteorological conditions (VMC) or land as soon as practical (operation of standby attitude indicator is limited by battery life).

If the amber STBY text is steadily illuminated (automatic operation):

1. Verify that the red gyro warning flag is not displayed.
2. Seek visual meteorological conditions (VMC) or land as soon as practical (operation of standby attitude indicator is limited by battery life).

WARNING

Do not press the STBY PWR button when the amber STBY text is steadily illuminated. This will turn off the backup battery and the red gyro warning flag will be displayed. If the STBY PWR button is inadvertently pressed and the red gyro warning flag is displayed, press the STBY PWR button again to return to battery power operation (red gyro warning flag should not be displayed).

3.1.12 TAWS/Terrain Alerts

Aural Alert	Visual Alert	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"	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"	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 - Airborne

Heading failure is indicated by removal of the digital magnetic heading display on the HSI and a red HDG FAIL annunciation.

If GPS ground track is available, it will automatically be displayed in place of heading when airborne. The heading bug and course pointer will continue to function normally, using GPS ground track as a reference instead of magnetic heading.

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 Heading Failure – On the Ground

Heading failure is indicated by removal of the digital magnetic heading display on the HSI and a red HDG FAIL annunciation.

1. Do not take off.

3.2.3 Display Fan Failure

Display fan failure is indicated by an amber FAN FAIL annunciation on the affected display. Without fan cooling, the affected display will overheat and shutdown.

1. Prepare for loss of the affected display.

3.2.4 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 PFD
- Amber “DG” text on the PFD
- 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 PFD.

If alternate GPS source is not available:

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

3.2.5 Navigation Data Failure (VOR/LOC/GS/ADF)

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

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

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

3.2.6 Synthetic Vision Malfunction

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

1. Turn off synthetic terrain using the PFD Terrain/SVT menu.

3.2.7 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. PFD ADAPTER circuit breaker(s) [if installed] – PULL

NOTE

When the PFD ADAPTER is shed, this may result in the loss of autopilot function and/or loss of some navigation data on the PFD (VOR/LOC, ADF, DME, radar altimeter).

2. PFD CTLR circuit breaker(s) [if installed] – PULL

NOTE

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

3.2.8 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.

3.2.9 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.

3.2.10 G5 Standby Reset

If a G5 is used as a standby for the TXi, and for any reason does not respond to the power button to turn on or off the G5, a hard reset needs to be performed on the G5. To perform a hard reset, use the following procedure.

1. Press and hold the power button on the G5 for 15 seconds.

3.2.11 Emergency Descent Mode (EDM)

If the aircraft if equipped with a GFC 600 autopilot capable of Emergency Descent Mode, the pilot's PFD will host menu buttons and alerting for EDM in the event of activation/deactivation or system malfunctions.

- ☐ This aircraft is equipped with a GFC 600 capable of Emergency Descent Mode.
- ☐ This aircraft is equipped with a manual Emergency Descent Mode activation switch.

If the aircraft if equipped with a GFC 600 autopilot capable of Emergency Descent Mode, the following procedures apply:

3.2.11.1 Emergency Descent Mode Automatic Activation

If the aircraft is above the activation altitude with the autopilot engaged, and the cabin altitude climbs above the configured threshold, automatic activation of EDM will commence. Refer to the Airplane Flight Manual Supplement for the GFC 600 for specific EDM altitude triggers and EDM behaviors.

To Temporarily Inhibit Automatic EDM Activation

1. Select the "Inhibit EDM" button on the EDM popup when presented on the PFD. This will inhibit automatic EDM for 5 minutes.

To Inhibit Automatic EDM Activation (for the duration of the flight)

1. Deselect the "Auto EDM" button on the PFD->System menu.

- or -

2. Override EDM when it is activated by pressing the A/P DISC button on the control yoke, or the "AP" button on the GFC 600.

To Re-enable Automatic EDM Activation

1. Select the "Auto EDM" button on the PFD->System menu.

3.2.12 Fuel Imbalance

The aircraft fuel tanks have exceeded the configured limit for fuel balancing. The pilot should take appropriate action to correct the fuel imbalance. Certain aircraft require specific procedures and are described below.

3.2.12.1 Piper PA-46-500TP (Meridian)

The original aircraft fuel imbalance annunciator was replaced with the Garmin TXi fuel imbalance monitor. The FUEL IMBALANCE annunciator in the TXi will flash until acknowledged (7" EIS only units) or for 10 seconds (10" units with EIS). This is different than the original aircraft FUEL IMBALANCE annunciation. The following procedures apply to the PA-46-500TP aircraft:

If the imbalance is greater than 25# but less than 40#:

Comply with the aircraft POH Emergency Procedure for FUEL SYSTEM Imbalance.

NOTE

The TXi fuel imbalance is illuminated and flashes when the imbalance is 25# or greater. There is no other indication that the fuel imbalance exceeds 40# other than display of the fuel quantity. **The pilot *must* monitor the imbalance and take further action should the imbalance exceed 40#.**

If the fuel imbalance exceeds 40#:

Comply with the aircraft POH Emergency Procedure for FUEL SYSTEM Imbalance Indications for the flashing "FUEL IMBALANCE" annunciation.

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 G500/G600 displays.

3.3.1 WARNING Annunciations – RED or 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.
ENGINE	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.
EDM	Take all appropriate corrective actions to correct the condition that triggered the emergency descent	The autopilot has initiated an emergency descent.
Red Airspeed Parameter	Take immediate action to correct the airspeed limitation being exceeded	An Indicated Airspeed (IAS) or MACH speed limitation has been exceeded.

3.3.2 CAUTION Annunciations – YELLOW or YELLOW		
Annunciation	*Pilot Action*	*Cause*
FAN FAIL	Prepare for loss of display. Display may overheat and shut down.	Cooling fan for the display has failed.
AHRS ALIGN – Keep Wings L**e**vel	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.
No GPS Position	Use alternate information for positional and situational awareness	GPS data is unavailable.
BACKUP GPS	Observe limitations regarding use of emergency backup GPS	No external GPS data is available, and system is using emergency backup GPS.
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 (Autopilot may automatically disconnect)	Fly aircraft manually and crosscheck attitude indication with standby attitude indicator and other sources of attitude information (airspeed, heading, altitude, etc.)	The PFD attitude monitors have detected an AHRS malfunction or an error between AHRS sources (if two sources installed). Autopilot will disconnect if AHRS is being used to drive the autopilot.

ALT, HDG, or IAS	Cross-check the flagged information against other sources to identify erroneous information.	Difference detected between displayed airspeed, heading, or altitude (dual ADC installations only).
ON AHRS 1/2	Confirm intended AHRS source selection	The PFD is using the cross-side AHRS (dual PFD and AHRS installations only).
ON ADC 1/2	Confirm intended ADC source selection	The PFD is using the cross-side ADC (dual PFD and ADC installations only).
NO AP DATA	Verify autopilot mode of operation using alternate means.	Autopilot mode of operation is not available.
ENGINE	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	Visually acquire the traffic to see and avoid.	The interfaced traffic system has determined that nearby traffic may be a threat to the aircraft.
TAWS N/A, TAWS FAIL	Use vigilance, terrain depiction and TAWS alerting is no longer provided.	Database errors or lack of required GPS position.
EDM	Understand that emergency descent mode on the autopilot is not functional.	EDM mode is not functional. Refer to the system advisory message for details.

MAG ANOM (text near the heading readout)	Be aware that the heading indications may be misaligned until clear of the magnetic interference.	The AHRS has detected a magnetic anomaly. This generally occurs near large buildings or metallic areas. Take off with MAG ANOM ***is permitted***
L ENG or R ENG	Be aware that the EIS has detected a significant power difference between two engines.	The engine is producing significantly less power than the other engine and the rudder bias system has engaged. See the GFC 600 pilot documentation for more details.
RB FAIL	Rudder bias system has failed on the GFC 600.	Rudder bias functionality is not available from the GFC 600. See the GFC 600 pilot documentation for more details.

3.3.3 Advisories – WHITE		
Annunciation	*Pilot Action*	*Cause*
ATTITUDE, ALT, HDG, or IAS (text on PFD)	Be aware that the other (unselected) AHRS/ADC source is not available	The other (unselected) AHRS/ADC source is unavailable.
ON AHRS 1/2	Confirm intended AHRS source selection	The PFD is using the secondary AHRS (single-PFD installation only).
ON ADC 1/2	Confirm intended ADC source selection	The PFD is using the secondary ADC (single PFD installation only).
Various Alert Messages may appear in the Alerts list, accessed by pressing the Alert key.	View and understand all advisory messages. Refer to the TXi Pilot Guide for appropriate pilot or service action.	Typically, they indicate communication issues within the TXi System.
EDM	Be aware that automatic EDM activation will not occur.	Automatic EDM engagement has been inhibited by the pilot.
RB OFF	Rudder bias system has been manually deactivated.	The RUDDER BIAS switch has been turned off. See the GFC 600 pilot documentation for more details.

3.4 Engine Exceedances

When the TXi system includes EIS, engine exceedance and some basic airframe exceedances can be logged in the system. Should an exceedance occur, the pilot is notified 30 seconds after the exceedance has ended via a system advisory. The pilot will be reminded of the exceedance when on the ground with a system advisory until the exceedance is acknowledged on the System → Logs → Exceedances page. Additional details regarding the exceedance are available on the exceedance log page. All exceedance thresholds are configured by the installer and will vary from aircraft to aircraft. Refer to the EIS Appendix of this document for aircraft specific details.

Section 4. NORMAL PROCEDURES

4.1 Before Takeoff

1. Review displays for any abnormal warning, caution, or advisory indications.
2. 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).
3. Visually verify the fuel quantity on board during the exterior preflight checks.
4. If configured with fuel quantity systems that include a fuel conditioner, ensure all fuel tanks have been initialized and no fuel tanks are represented with a gray barber pole. See Section 7.19.7 for more details.

4.1.1 Integrated Standby System Check

1. Verify that no amber or red battery icon is displayed on the PFD.
2. Verify that attitude, heading, altitude, and airspeed are displayed normally on the PFD (no warnings, cautions, or advisories related to these functions).
3. Select the “Display Backup” switch to the ON position
    a. Verify that the standby PFD information is displayed on the backup display (MFD becomes a PFD display, or both displays become PFD/EIS composite displays)
    b. Ensure that attitude, heading, altitude, and airspeed are displayed normally on the standby PFD (no warnings, cautions, or advisories related to these functions)
4. Select the “Display Backup” switch to the AUTO position and verify that both displays return to their normal PFD, MFD, or EIS state.

4.1.2 Electric Standby Attitude Gyro (Mid Continent 4200 and 4300 Series)

When an electric standby attitude gyro is installed, test the backup battery before takeoff.

1. Apply power to electric standby attitude gyro and allow the gyro to reach operating speed (approximately 5 minutes).
2. Verify that the red gyro flag is not in view.
3. Press and hold the STBY PWR button until the amber annunciator begins to flash.

4. Verify that the green annunciator is displayed continuously, and the red annunciator is not displayed for the duration of the test (approximately 1 minute).

CAUTION

The standby attitude gyro must be considered inoperative if the red annunciator is displayed during the test.

4.2 Autopilot Operation

4.2.1 Autopilot Disconnect Test

In some installations, the autopilot may receive attitude from an installed PFD Adapter. This adapter converts digital AHRS attitude into analog attitude for use by the autopilot. If this is installed, an "AP DISC" button will be present in the PFD Test Menu, and this function must be tested using the following procedure.

1. While on the ground, engage the autopilot.
2. In the PFD Test Menu, 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 PFD with the CDI button.
2. Select the desired NAV / APR mode on the autopilot.

NOTE

The autopilot will use the navigation source that is displayed on the Pilot's PFD.

4.2.3 GPSS Emulation

To use emulated GPSS roll steering commands with autopilots that do not support GPSS roll steering in NAV / APR modes:

1. Select the desired GPS navigation source on the Pilot's PFD.
2. Enable GPSS emulation on the PFD using one of the following methods:
    a. Use the AP HDG REF button in the heading context menu
    b. Use the GPSS button on the PFD controller (if installed)
    c. Select GPSS on the external HDG/GPSS switch (if installed)
3. Engage the autopilot in HDG mode.

NOTE

When GPSS emulation is enabled, the heading bug will be hollowed out, and the PFD heading button will display "GPSS" text along with a 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

GPSS can be enabled from PFD 2, but GPSS is not annunciated on PFD 2. The GPSS commands to the autopilot are based on the GPS source displayed on PFD 1.

4.2.4 Altitude Preselect

Certain autopilots may use the PFD selected altitude bug for altitude preselect and capture. Except as described in this section, refer to the autopilot AFMS and/or Pilot's Guide for autopilot system operation.

4.2.4.1 S-Tec 55/55X Autopilots

To preselect and capture a selected altitude:

1. Select the desired altitude with the PFD selected altitude bug.
2. On the autopilot programmer computer press/hold VS then press ALT to arm altitude hold mode.

4.2.4.2 Collins Autopilots

To preselect and capture a selected altitude:

1. Select the desired altitude with the PFD selected altitude bug.
2. On the autopilot flight control panel select ALT SEL mode.

CAUTION

Changing the selected altitude bug while ALT SEL mode is selected may result in autopilot mode changes. Verify the autopilot mode after changing the selected altitude.

4.2.4.3 Bendix/King Autopilots

To preselect and capture a selected altitude:

1. Select the desired altitude with the PFD selected altitude bug.

2. Press the ALT CAP button in the ALT context menu or the ARM button on the PFD controller to arm or disarm the selected altitude.

CAUTION

Changing the selected altitude bug while ALTC mode is active will result in cancellation of ALTC mode. Verify the autopilot mode after changing the selected altitude.

NOTE

When the selected altitude is armed for capture, ALTC is displayed in white text in the upper right corner of the PFD. When altitude capture mode is active, ALTC is displayed in green text in the upper right corner of the PFD. When a KA 315 annunciator panel is installed, the "ALT ARM" annunciator on this panel will not be operative.

NOTE

KFC 200/250 autopilots will inhibit glideslope (GS) mode if altitude capture (ALTC) mode is engaged during glideslope intercept.

4.2.4.4 Cessna Autopilots

To preselect and capture a selected altitude:

1. Select the desired altitude with the PFD selected altitude bug.
2. Press the ALT CAP button in the ALT context menu or the ARM button on the PFD controller to arm or disarm the selected altitude.

NOTE

When the selected altitude is armed for capture, ARMED is displayed in white text above the selected altitude.

4.2.4.5 Garmin Autopilots

To preselect and capture a selected altitude:

1. Select the desired altitude with the PFD selected altitude bug.
2. Press the ALT button on the autopilot mode controller.

4.2.5 Vertical Speed Bug Coupling

Certain autopilots may be coupled to the PFD vertical speed bug for maintaining a selected vertical speed. Except as described in this section, refer to the autopilot AFMS and/or Pilot's Guide for autopilot system operation.

4.2.5.1 S-Tec 2100/55/55X and Avidyne DFC90 Autopilots

To select and maintain a vertical speed:

1. Select the desired vertical speed with the PFD vertical speed bug.
2. On the autopilot programmer computer press VS to engage vertical speed mode.

NOTE

The selected vertical speed will automatically be reduced towards zero when approaching the selected altitude bug. AUTO will be displayed in the vertical speed context menu button when vertical speed is being reduced automatically. Manually changing the selected vertical speed while AUTO is displayed will cancel automatic vertical speed reduction.

NOTE

The VS knob on the Avidyne DFC90 autopilot will synchronize with the PFD VS bug on the TXi PFD. The VS bug value may be adjusted from either the TXi PFD or the DFC90

4.2.5.2 Bendix/King Autopilots

To select and maintain a vertical speed:

1. Press the VS ENG button in the VS context menu or the ENG button on the PFD controller to sync the VS to current vertical speed and engage vertical speed mode.
2. Select the desired vertical speed with the PFD vertical speed bug.

NOTE

When engaging VS mode, the VS bug will be synced to the current vertical speed. VS is displayed in green text in the upper right corner of the PFD to indicate that VS mode is engaged.

While VS mode is engaged, the vertical speed bug may be changed by:

- Adjust the vertical speed bug with the PFD knob, or
- Press and hold the vertical trim rocker switch on the autopilot in the desired direction, or

- Press the CWS button on the control wheel to synchronize the vertical speed bug to the current vertical speed.

4.2.5.3 Garmin Autopilots

To select and maintain a vertical speed:

1. Press the VS button on the mode controller.
2. Select the desired vertical speed with the PFD vertical speed bug.

NOTE

When engaging the VS mode, the VS bug will be synced to the current vertical speed. VS displayed in green text in the upper right corner of the PFD to indicate that VS mode is engaged.

4.2.6 Coupling the Autopilot for Enhanced Descent-Only VNAV

The TXi 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 either a Garmin GFC 500 or GFC 600 with VNAV capability. If EDO VNAV is enabled on the GTN and TXi 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 Cold Weather Compensation

The TXi can provide compensated minimums for cold weather compensation for IFR approaches. If the instrument approach chart requires temperature compensation, the pilot must enter the destination airport temperature into the TXi. If interfaced to a GTN that also has temperature compensation enabled, 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.

NOTE

Pilots must coordinate with ATC when flying temperature compensated approaches.

Garmin G500/600/700TXi systems can provide compensated minimum values when interfaced with a GTN and when temperature compensated minimums are selected.

☐ This installation supports cold weather compensated approach and minimums altitudes.

☐ This installation supports cold weather compensated *minimums only*. No GTN is installed in the system.

☐ This installation *does not support* cold weather compensation.

Section 5. PERFORMANCE

No change.

Section 6. WEIGHT AND BALANCE

See current weight and balance data.

Section 7. SYSTEM DESCRIPTION

A detailed G500/G600 TXi Pilot's Guide is available, as well as trainer software applications.

A power button is provided at the top right corner of the bezel on each display (lower left on GDU 700L). When the display is ON, pressing the power button results in an onscreen menu with controls prompting action to close the menu, power the display OFF, or enter display backup mode (if applicable).

Two SD card slots are provided for loading software and databases and for logging flight data. An optional Flight Stream 510 can also be inserted into the top-most SD card slot to add wireless capabilities to the TXi.

The following colors are used consistently within the TXi system:

Color	Functions
RED or RED	Warning conditions Operating Limits
YELLOW or YELLOW	Cautionary conditions Conditional operating ranges
GREEN	Safe operating conditions Normal operating ranges VOR/Localizer Data Engaged Modes
WHITE	Scales and Markings Current data and values Armed Modes
MAGENTA	GPS Data Active flight plan legs
CYAN	Pilot selectable

7.1 Controls Overview

Dual concentric knobs and a capacitive touchscreen provide control of functions for the units. The touchscreen controls accept single touch, two finger pinch, and single finger swiping actions. Virtual "buttons" which can be touched to provide control functions are depicted using white outlines, round corners, and shading. Display range can be controlled using two finger pinching. Map

panning can be accomplished using single finger swiping. The enhanced HSI map display range can be controlled using two finger pinch or single finger swipe.

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 System → Backlight selection. Optionally, brightness can be controlled using cockpit lighting dimmer switches.

7.3 System Power Sources

The G500/G600 TXi system depends on electrical power to function. The Garmin Display Unit (GDU) and Air Data Attitude and Heading Reference System (ADAHRS) (or separate AHRS and ADC) are 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, autopilot and Adapter (GAD) are typically located on the avionics bus and may not be functional when this bus is powered off.

The major components of the G500/G600 TXi system are circuit breaker protected with resettable type breakers available to the pilot. These breakers are labeled as follows:

Circuit Breaker Label	Equipment
PFD	GDU 1060 (PFD/MFD), GDU 700P (PFD), GDU 700L (PFD)
EIS	GDU 700P (EIS or MFD/EIS) or GDU 700L (EIS or MFD/EIS)
MFD	GDU 700P (MFD)
ADAHRS	Air Data and Attitude Heading Reference System
AHRS	Attitude and Heading Reference System
ADC	Air Data Computer
PFD ADAPTER	GAD 43/43e interface adapter
ENG SNSR	GEA 110 or GEA 71B Engine/Airframe Unit
PFD CTLR	GCU 485 PFD Controller
STBY ATT	Electric Standby Attitude Indicator (Mid-Continent 4200/4300 gyros)

In dual installations, the pilot side equipment is suffixed with the number 1 and the copilot side equipment is suffixed with the number 2. For example: PFD 1 and PFD 2.

Equipment that receives power from two different circuit breakers will be suffixed with the letters A and B. For example: PFD 1A and PFD 1B, or PFD 2A and PFD 2B.

7.4 System Status

The G500/G600 TXi system status can be viewed via the status page; this includes the GDU serial number and system ID of the unit, the software version loaded on the unit, and the AHRS and ADC software if the integral ADAHRS is installed.

An External LRUs list displays information and status of various units that are interfaced to the TXi 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. These LRU-specific status pages provide additional controls, like the ability to register the unit, as applicable.

7.5 Databases

The G500/G600 TXi system 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 MFD system status page for units with an MFD, or PFD Menu for PFD only units. Controls are provided for enabling database sync and chart streaming and for manually initiating a database update. EIS-only units do not support database functions. System time (as received from an interfaced GPS navigator or the internal backup GPS) is used to determine if a database is within its effective period. On the splash screen, 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.

The GDU utilizes two sets of databases – those which are active, and standby databases which are databases whose valid period has not yet begun. Upon reaching the effective date of a standby database the pilot is prompted to update the database in use.

Internal database validation prevents incorrect data from being displayed.

Databases can be updated using an SD card, by Syncing with other compatible units, or using database concierge through a FS510 and PED. Databases are stored internally on the GDU.

The terrain and basemap databases are updated periodically and have no expiration date.

The Garmin or Jeppesen navigation database contains data associated with navigation including airports, navigation aids, airways, airspaces, and other data.

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 Garmin FliteCharts or Jeppesen ChartView electronic charts database contains procedure charts for the coverage area purchased. An own-ship position icon will be displayed on these charts when the aircraft icon on the chart page is not X'd. This database is updated on a 28-day cycle. If not updated within 180 days of the expiration date, FliteCharts or ChartView will no longer function.

The airport directory database contains information on landing facilities, such as operating hours, services available, and transportation/lodging resources. Airport directory information may be available from multiple sources and coverage areas. 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 loaded using the GDU and is stored on the AHRS. 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 units which have an MFD to allow the management of pilot-controlled 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.

Upon power up, the MFD splash screen provides the option for the pilot to select a crew profile. If no selection is made the unit will default to the crew profile used on the last power cycle. Profiles can be managed via the System – Setup page. Only one profile may be selected as active at a time. New profiles are created with the settings currently in use.

7.7 Display Backup Modes

Display backup modes are provided to replace the functionality of a failed PFD or EIS display by providing the same function on another display. Display backup capability is enabled based on the configuration of the GDUs installed in the aircraft. The display backup mode is limited in space and may not show all engine parameters normally available on the EIS display.

7.8 Integrated Standby System

For Class I and II aircraft, standby instruments (attitude, altitude, airspeed) may be provided by a second GDU 700P display. The integrated standby system consists of two GDU 700P displays installed adjacent to each other, with one display configured as the PFD and the second display configured as either an EIS or an MFD.

One display has an integrated ADAHRS and the other will be interfaced to a GSU 75. A “display backup” switch is installed which will force both displays into their display backup mode of operation when activated.

A GBB 54 backup battery will provide power to the PFD and sensors (GEA 110, GMU 44, GTP 59) in the event of primary aircraft power failure. This configuration will provide the following functionality:

- If the PFD fails or communication with the PFD is lost, the MFD/EIS will automatically display its backup primary flight information (attitude, altitude, airspeed) with the MFD or EIS behaving as follows:

    - An MFD will transition to a full-screen PFD display
    - An EIS will transition to a split-screen PFD/EIS display
- The two displays monitor and compare the independent attitude, altitude, and airspeed data. If either display detects a difference between any of the parameters (attitude, altitude, or airspeed), the MFD/EIS display will automatically display its backup primary flight information and amber annunciations will appear next to the data generating the miscompare.

7.9 Electric Standby Attitude Gyro

If an electric standby attitude gyro is installed, the gyro operates from the aircraft electrical system with a dedicated emergency battery specific to the electric gyro. The electric attitude gyro battery capacity may vary considerably depending on temperature, charge status, and battery life condition. Low temperatures below 32°F will temporarily degrade battery capacity. Internal chemistry will slowly degrade battery capacity over several years of operation even when correctly maintained. A poorly maintained battery will suffer accelerated degradation. Extended storage in a discharged state and over-charging will permanently damage the battery. Complete charging is required to bring the battery up to full capacity if it has been unused for more than four months or has been partially discharged.

7.10 Backup GPS

Each Garmin TXi GDU is equipped with a backup GPS receiver. When the optional backup GPS antenna is connected, the TXi system will provide 2D GPS position information from the backup GPS if all the certified GPS sources are lost. There is no pilot action required to enable use of backup GPS data.

Backup GPS data is only used to provide non-safety critical functions after the failure of all certified GPS position sources. Backup GPS data will only be provided if a valid GPS position has been received from a certified GPS source since becoming airborne and is subsequently lost.

Backup GPS data is utilized to provide the following functions: ownship position on the moving map, GPS track display, waypoint bearing/distance information, ground speed, and wind calculations. When backup GPS data is in use, a yellow “BACKUP GPS” annunciation is displayed on all georeferenced maps. Navigation using backup GPS is not provided. Overlays of Stormscope®, traffic, terrain, and obstacles on the moving map is disabled when backup GPS is in use. Traffic information from TIS-A and TCAS sources is still available on the traffic page. Other functions which are inhibited include bearing pointer on waypoint info page, chart geo-referencing, Synthetic Vision, GPS altitude displays, GPS navigation status field, and terrain page display.

7.11 Aircraft Audio Interface

The Pilot PFD is interfaced to the aircraft audio system to provide aural alerts (altitude alerter, minimums, terrain). If multiple PFDs are installed, only the Pilot PFD is interfaced to the audio system (to prevent duplicated aural alerts).

GDU 700P MFD displays may be interfaced to audio system for terrain alerts or touch clicks, but only if there is no Pilot PFD installed.

GDU 700P/700L EIS displays are not interfaced to the audio system.

7.12 Advisory Notifications

An Advisory notification system is available on all installed GDUs. This system notifies the pilot when a new advisory is available and displays a queue of active advisories.

When a new advisory occurs, an "Advisory" button appears and flashes at the bottom of each GDU.

Pressing the advisory button opens a popup window with a list of the active advisories. Advisories are scrollable and are separated by a horizontal line between entries.

Advisories are common to all GDUs, meaning that the same list of advisories is displayed on all GDUs.

7.13 System Settings

The 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. A control is provided that allows the pilot to select which weather receiver is used for the weather shortcut accessed by turning the outer dual concentric knob. Crew profiles are managed from this page. Settings on this page are crossfilled to all other GDUs in the system.

Units of Measure for temperature, barometric pressure, nav angle, altitude, fuel, distance, and wind speed are pilot controllable via the System → Units page. These units are propagated throughout the system with the exception of Air Temperature Reference and Fuel Computer units which only affect the display being used to make the selection.

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

7.14 System Data Logging

The TXi 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 to an SD Card by the pilot. Data logs can be sent via the Flight Stream

510 to a PED in the cockpit. Additionally, if an engine exceedance is detected in the system, a separate flight log is recorded during the exceedance period with a higher data rate than the normal flight data log.

7.15 Primary Flight Display

PFD functions are controlled by the dual concentric knob located adjacent to the PFD and using touchscreen controls. The outer knob assigns the function of the inner knob and is annunciated at the bottom of the display adjacent to the knob. The PFD knobs control Selected Heading Bug, Course Pointer, Selected Altitude Bug, Vertical Speed Bug, Airspeed Bug, and Barometric Correction. In addition, the inner knob provides for numeric entry. The knob function defaults to HDG if it is not rotated for a period of 10 seconds.

When interfaced to a G5 via GAD 29, the TXi will send its BARO setting to the G5 but the G5 cannot send its BARO setting to 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.

The PFD can also be controlled using the touchscreen controls. Touching any of the buttons on the screen will display a context sensitive menu. The inner knob may be used to directly change the displayed value or buttons within the menu may be used to access additional control or utilize the touchscreen to enter data.

The PFD can optionally be controlled using a remotely mounted controller which provides dedicated knobs and buttons for Selected Heading Bug, Course Pointer, Selected Altitude Bug, Vertical Speed Bug, Airspeed Bug, Barometric Correction, and GPSS as well as optional controls for interfaced autopilot functions.

A Menu button on the PFD provides access to additional controls and settings.

7.15.1 Primary Flight Data

The PFD displays attitude, heading, airspeed, barometric altitude, and vertical speed data. Airspeed and altitude displays include a six second trend indicator.

Pilot selectable bugs may be provided for airspeed, altitude, vertical speed, and heading.

The G500/G600 TXi requires at least one Garmin GPS/SBAS navigation unit to ensure the integrity of the Attitude and Heading Reference System. The ADAHRS or AHRS will continue to operate in a reversionary mode if the GPS fails, and the attitude display on the PFD will still be presented.

When dual ADC or AHRS sensors are installed and configured, the pilot is provided with AHRS/ADC source selection controls via the PFD Menu → Sensors menu.

The default ADC or AHRS source on power up is ADC 1 and AHRS 1 for the pilot side PFD and ADC 2 and AHRS 2 for the co-pilot side PFD.

For single PFD installations, selection of ADC 2 or AHRS 2 as the sensor source will cause a “ON ADC 2” or “ON AHRS 2”, respectively, to be displayed with black text on a white background, to the right of the HSI.

For installations with two (2) PFDs, the pilot’s PFD will display “ON ADC 2” or “ON AHRS 2” with black text on yellow background if the sensor source is changed from the default. The co-pilot’s PFD will display “ON ADC 1” or “ON AHRS 1” with black text on yellow background if the sensor source is changed from the default.

When dual ADC or AHRS sensors 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, or airspeed miscompare annunciation will be shown on the PFD.

Miscompares are annunciated using black text on a yellow background as follows: airspeed miscompare is “IAS” shown below the airspeed pointer, barometric altitude miscompare is “ALT” below the barometric altitude pointer, heading miscompare is “HDG” in the bottom of the digital heading display window, and attitude miscompare is “ATTITUDE” on the attitude indicator. The PFD inhibits the “HDG”, “IAS”, “ALT”, and “ATTITUDE” annunciations in dual TXi PFD installations when both PFDs are displaying the same sensor source.

A no compare monitor is used to determine when data to the second ADC or AHRS source is not able to be used for comparison. No compares are annunciated using black text on a white background in the same location and same text as miscompare annunciations.

Figure 4- Miscompare Flags on SVT

Figure 5- No Compare Flags no SVT

7.15.2 Attitude

The attitude display is a blue over brown presentation and optionally can display synthetic vision data (SVT).

Standard rate turn marks are provided on the roll scale for bank angles up to 30°. When a standard rate turn would be higher than 30° of bank, the indicator will

be displayed at 30°. A turn rate indicator is displayed across the top of the HSI compass dial. Tick marks are shown for half-standard and standard rate turns.

If pitch exceeds 20° nose down or 30° nose up, or bank angle exceeds ±65°, the attitude display will automatically declutter removing non-essential data to facilitate recognition and recovery from extreme attitudes. Red chevrons which indicate the direction to level pitch are displayed when pitch attitudes exceed 30° nose down or 50° nose up.

Slip/skid information is shown using a white trapezoid below the sky pointer.

7.15.3 Synthetic Vision Technology

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

SVT controls are provided via Menu → Terrain/SVT. Synthetic terrain, horizon headings, and airport signs can be toggled on and off from this menu.

SVT provides additional information on the PFD:

- **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 synthetic terrain is selected for display.
- **Traffic**: a display on the PFD indicating the position of other aircraft detected by a traffic system interfaced to the G500/G600 system.
- **Horizon Line**: a white line indicating the true horizon is always displayed on the SVT display.
- **Horizon Headings**: a pilot selectable display of heading marks displayed just above the horizon line on the PFD.
- **Airport Signs**: pilot selectable "signposts" displayed on the synthetic terrain display indicating the position of nearby airports that are in the G500/G600 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 in front 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.

Note

In aircraft with nose high or nose low pitch attitudes during normal maneuvers, the sky awareness, or ground awareness bands may appear over the SVT display. It is recommended that if this is discreating, that SVT be turned off for those maneuvers.

7.15.4 Airspeed

The airspeed tape on the left side of the PFD displays red/white striping to indicate the maximum allowable airspeed ($V_{NE}/V_{MO}/M_{MO}$). This maximum allowable airspeed display is configured to indicate the appropriate maximum allowable airspeed for the airplane, including variations for altitude or Mach number.

When the aircraft is configured for M_{MO} the MACH number is optionally shown below the PFD airspeed tape. When the pilot selects the field to be shown from the PFD Menu, it will become visible when the MACH number reaches 0.40M and will be removed from the display when the speed is reduced below that threshold. This field will appear on the display if a MACH threshold is being exceeded (red) or the airspeed trend detects the M_{MO} speed will be exceeded within 6 seconds in the current flight conditions (yellow), regardless of the PFD menu settings.

The airspeed tape displays a red low-speed awareness band at the lower range of the airspeed tape. This low-speed awareness band is configured to a fixed value. It does not indicate an actual or calculated stall speed and does not adjust with variations in aircraft weight or other factors.

The airspeed tape is configured to indicate the appropriate maximum normal operating airspeed for the airplane (V_{NO}), including variations for altitude, when the aircraft type design or applied STCs require V_{NO} markings.

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

Airspeed reference bugs are provided on the airspeed tape on are pilot configurable via Menu → Airspeeds.

True airspeed and groundspeed are displayed below the airspeed tape and are always in knots.

7.15.5 Barometric Altitude and Vertical Speed

Barometric Altitude and Vertical Speed are displayed on tapes on the right side of the display. Barometric correction can be set using dual rotary knobs or

touchscreen. Selected altitude and vertical speed bugs may be provided and when set are synchronized across all PFDs. The selected altitude bug may be removed by selecting a value of -1,000ft.

If the pilot uses standard baro mode when above the transition altitude, the pilot can preset the none standard altimeter setting using the BARO controls without leaving STD mode.

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

7.15.6 Navigation

Navigation information is presented on the PFD through a combination of horizontal situation indicator (HSI), a lateral deviation indicator (LDI) above the heading display, vertical deviation indicator (VDI), and GPS navigation status information. Optional bearing pointers, distance measuring equipment (DME) display, and marker beacon annunciations may be displayed.

Navigation information can be selected from up to four independent sources by pressing the "CDI" touchscreen button at the bottom center of the display and selecting the desired navigation source. The selected navigation source is shown on the left side of the HSI or LDI. CDI source selection can be synchronized across multiple TXi PFDs if enabled by the pilot or installer. If only 2 navigation sources are available, the CDI button will simply cycle between those two sources and not provide a menu for source selection.

☐ This installation has the CDI source selection always set to SYNC across PFDs. This includes GPS/VLOC source selection with the selected GTN navigation source (if installed).

Automation of CDI source selection and course selection is provided in the following situations:

- Localizer CDI Switch Prompting (if available) – the CDI button on the PFD will flash when established on the final approach course of a LOC-based approach, if the CDI source is GPS. This serves as a reminder to change the CDI source to LOC.
- Localizer Course Auto-Slewing – the appropriate LOC course will be automatically preset when a LOC-based approach is loaded in the navigator and the CDI source is not already selected to LOC.
- Missed Approach Point Auto-Switching from VLOC to GPS – When the missed approach segment of an approach is begun (navigator unsuspended after the missed approach point), the CDI source will automatically switch from VOR/LOC back to GPS. NOTE: this functionality is not available with GNS 480 (CNX 80) navigators, as they do not suspend at the missed approach point.

7.15.7 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.

Optional CDI preview is available for ILS and GPS approaches when interfaced with a GTN navigator. If enabled, grey CDI/VDI needles will indicate the loaded approach deviations while still navigating on a GPS course.

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, VHF NAV, or ADF. DME distances can be displayed adjacent to the HSI.

The bearing pointer display and navigation source are pilot controlled under the PFD Menu → HSI Setup → Bearing Pointers sub menu.

An enhanced HSI may be selected by the pilot under the PFD Menu → HSI Options sub menu. The enhanced HSI 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 HSI Map Overlays menu.

7.15.8 Lateral Deviation Indicator (LDI)

A Lateral Deviation Indicator (LDI) is always displayed on the PFD above the heading display. 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, OBS, SUSP, phase of flight, LOI, and DR annunciations from a GTN or GNS interfaced to the TXi are annunciated on the upper CDI.

7.15.9 Vertical Deviation Indicator (VDI)

Vertical guidance is shown by a vertical deviation indicator (VDI) inboard of the barometric altitude tape. The VDI can display up to two sources of vertical deviation depending on the interfaced navigator. The following table describes the available vertical deviation indications.

Magenta Diamond	GPS Approach Vertical Guidance
Magenta "V"	Barometric VNAV Guidance
Green Diamond	VHF Glideslope Approach Guidance
Open Gray Diamond	Preview approach guidance when actively using Barometric VNAV as the vertical path

Table 7-1- Vertical Deviation Indication Description

7.15.10 GPS Steering Indicator

When the TXi source selection is GPS, the autopilot and flight director are disengaged, and the GPS is providing roll steering commands, a "V" shaped caret displays the roll steering commands from the GPS along the edge of the roll indices on the PFD attitude display. If the pilot were to align the roll pointer (or sky pointer) with the caret, the lateral path will coincide with the steering provided by the GPS. The display of this indicator is optional and can be toggled from the PFD Menu.

7.15.11 DME Display

Pressing on the DME field opens a DME popup menu. The DME popup menu allows selection of a DME tuning source when two navigation sources are connected and, if supported by the DME, a hold option.

7.15.12 Marker Beacon Display

The PFDs can show marker beacon annunciations from an interfaced marker beacon receiver. The marker beacon annunciations are shown to the left of the selected altitude.

7.15.13 Height Above Ground Display (Radar Altimeter or GPS-based)

The PFD includes a pilot-selectable AGL Field in the PFD menu. This allows the pilot to display a GPS-derived height above ground field on the PFD. The AGL field will show the height above ground until the aircraft is above 2500' AGL in which case the field will be hidden until the aircraft is below 2500' AGL again. This field is only available if the PFD is not interfaced with a radar altimeter.

If interfaced to a radar altimeter the radar altitude will be displayed on the PFD adjacent to the altitude tape. Additionally, when the radar altitude AGL value is within the viewable range of the barometric altitude tape, a ground awareness band is displayed.

If the installed radar altimeter includes self-test capability the Test controls are provided in the "Test" sub-menu under the PFD Menu. Refer to the Radar

Altimeter user documentation for information about values displayed during Test.

NOTE

For KRA 405 Radar Altimeters the displayed Test value will be between 25 and 50ft.

7.15.14 Minimum Altitude Display and Alerting

When enabled by the pilot, an altitude minimums bug will be displayed in cyan on the barometric altitude tape. If a radar altimeter is installed, the pilot can select between barometric or radar-altitude minimums.

Altitude minimums are accessed under the PFD Menu → Minimums sub menu and can be set by touchscreen keypad or dual-concentric knob.

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.

7.15.15 Outside Air Temperature/Density Altitude

The PFD provides a pilot configurable display of outside air temperature or density altitude information below the airspeed tape. The pilot can choose to show Static Air Temperature (SAT), Total Air Temperature (TAT), or temperature delta from the International Standard Atmosphere (ISA). Density Altitude can also be configured to be displayed instead of the temperature.

NOTE

When operating with ice accumulation on the temperature probe, the displayed air temperature may be in error by as much as 4°C.

7.16 Autopilot Interfaces

The G500/G600 TXI System provides various autopilot integration capabilities dependent upon the type of autopilot installed in a particular aircraft.

The G500/G600 TXi 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 coupling capability to the autopilot.

- ☐ Roll Steering emulated via heading mode.
- ☐ Roll Steering capable autopilot.
- ☐ Altitude Pre-Selector integrated with the autopilot.
- ☐ Vertical speed bug integrated with the autopilot
- ☐ Flight Director display driven from external autopilot or FD computer.
- ☐ A GAD 43 Adapter is installed in this aircraft
  - ☐ GAD 43 provides attitude to the autopilot
  - ☐ GAD 43 provides yaw rate to the yaw damper
  - ☐ GAD 43 provides baro correction to the altitude preselector
  - ☐ GAD 43 provides altitude preselect and/or vertical speed
- ☐ G500/G600 TXi provides attitude / air data to autopilot
- ☐ Autopilot Modes annunciated on PFD
- ☐ GFC 500 or GFC 600 is installed in this aircraft and the TXi provides a means for mode annunciation, altitude selection, vertical speed selection, heading bug selection, and navigation source selection.

7.16.1 Navigation Data for Autopilots

The G500/G600 TXi system 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 PFD acts as a selection hub for the autopilot's NAV mode, and the G500/G600 TXi may also provide GPS Steering (GPSS) data.

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

For dual PFDs installations, 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 aircraft has been configured to allow the pilot to change CDI synchronization the controls are provided under the PFD Menu.

If the autopilot is capable of receiving GPSS Roll Steering information, the data is transmitted via a digital communications bus from the G500/G600 TXi to the autopilot. The PFD receives this data from the GPS. In dual GPS installations, the PFD sends Roll Steering information for the currently-selected GPS source.

For autopilots which are not GPSS Roll Steering capable, the G500/G600 TXi 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 on the PFD, the autopilot will fly the turn commands from the GPS navigator selected on

PFD 1. If an autopilot is interfaced to the GDU which supports GPS steering (GPSS), an additional touchscreen button is provided on the selected heading popup window for toggling the autopilot heading reference between GPSS and selected heading. When GPSS is selected, the heading bug display will change to a cyan outline with no fill 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 to the autopilot.

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

GPSS commands are not available when the CDI is selected to a VOR/LOC source.

For GFC 500 only: Even if LOC is the armed mode the autopilot will not capture localizer CDI preview when CDI is on GPS. Change CDI to LOC when capturing if auto CDI sequence is not enabled.

7.16.2 Flight Director Display

If autopilot flight director commands are interfaced to the G500/G600 TXi, they will be presented as a single cue flight director on the PFD. 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 G500/G600 TXi.

The GDU limits the distance the flight director pitch commands may deviate from the aircraft attitude icon. If the pitch command provided by the autopilot flight director is greater than the distance allowed by the GDU, the command bars will be displayed at the maximum distance allowed by the GDU. As the aircraft pitch changes to satisfy the command bars, the bars will continue to be displayed at the maximum distance from the aircraft attitude icon until the aircraft pitch deviation is within the command display limit.

In supported installations, the flight director will show hollow bars when the autopilot is not engaged, and solid colored bars when the autopilot is engaged.

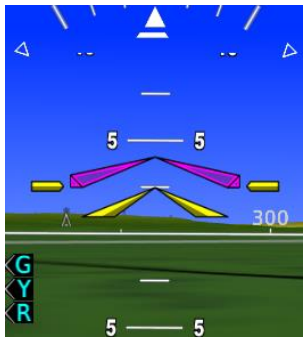


Figure 6- Flight Director Bars (Autopilot Not Engaged)

7.16.3 Attitude and Rate Data Sources for Autopilots

Attitude-based autopilots may be driven by the standby gyro, a remote mounted gyro, the GDU, a G5 when driving a GFC 500, or the GAD 43 adapter. If the TXi system is providing attitude to the autopilot, it will be indicated in Section 7.15.9 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 PFD.

The pilot must understand the autopilot system inputs to detect faults and capabilities with inoperative equipment. Refer to the autopilot flight manual for operational information.

7.16.4 Altitude Pre-Select and VS Engagement

Optionally, G500/G600 TXi system can provide altitude preselect functions such that the autopilot can capture the pre-selected altitude or couple to the selected vertical speed if these capabilities are supported by the autopilot equipment installed. Refer to the autopilot operator's manual or autopilot Airplane Flight Manual Supplement for the proper operation of the autopilot system.

Controls for altitude preselect functions are provided using the selected altitude context menu, and vertical speed controls are provided using the vertical speed context menu. Altitude preselect, and VS mode annunciations are displayed adjacent to the altitude preselect display above the altitude tape.

7.16.5 ARC Style VSI

When an ARC style VSI is configured on the PFD, it is replaced with a standard vertical VSI when the PFD screen is reduced below a 60% PFD on the 10" TXi display. ARC VSI's are not available in 7" PFD's or in aircraft where TCAS II is interfaced with the TXi PFD.

7.17 MFD Functions

The MFD functions are controlled using the dual concentric knob located adjacent to the MFD or using touchscreen controls. The outer knob can be used to select various MFD pages and is annunciated at the bottom of the display adjacent to the knob. The inner knob can be used to control the display range. Various MFD functions can be controlled using the touchscreen. The MFD knob on GDU 1060 PFD/MFD installations can also be used to control PFD functions by pressing and holding the knob for a full one second to toggle between MFD and PFD knob controls.

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

7.17.1 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 via a Menu button. The map 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 using the touchscreen or rotary knob to allow for display of data pertinent to the operation being conducted. The current zoom scale or range of the map is continuously indicated by a range ring centered around the ownship with a range indication at the 11 o'clock position on the ring. In addition to zooming, a panning function is provided to allow the position of the map to be centered on a location other than the ownship. Panning mode is entered by dragging a single finger on the display. The map orientation can be changed to North Up by pressing the North Up arrow in the top left corner.

If an active flight plan is present in the interfaced navigator, it will be depicted on the map. Traffic, Terrain, Weather, Land, and Aviation data can be selected for overlay on the map.

The main MFD map and weather maps have three map views which are pilot controlled. The map views are shared between MFDs within cockpit and changes made to a map view will sync to other MFDs showing the same map view.

7.17.2 Traffic Display

The MFD can display traffic data from interfaced traffic systems. Sources of traffic data include TIS-A, TAS/TCAS, and ADS-B traffic. The information from these systems is displayed on and controlled using the MFD.

Traffic system operating controls and system status are provided on the dedicated traffic page via touchscreen control in the lower left corner and/or the Menu button, depending on the interfaced traffic system type. A display altitude filter is provided in the lower right corner. Filtering of targets based on altitude is accomplished by the display and affects the traffic page and map page. When interfaced to a TIS traffic system, altitude filtering is not available.

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

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 colored white and 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 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.

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. On a GDU 1060, if a traffic alert occurs and display is showing a full screen PFD, then a button is provided which will return to split screen mode and display the dedicated traffic page. On systems with a PFD installed, a yellow TRAFFIC annunciator is provided adjacent to the HSI.

Traffic system controls and display settings are synchronized across TXi displays.

7.18 Terrain Awareness and Alerting

The following terrain awareness and alerting functions may be provided by the TXi system: Terrain Proximity, Terrain FLTA, or TAWS-B. If the TXi system is interfaced to a GNS or GTN navigator equipped with TAWS-B, then the TXi will display TAWS-B parameters provided by the GNS or GTN. The Terrain or TAWS function provided by the TXi system is indicated by a text box in the lower left corner 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. An obstacle and/or wire overlay icon will be shown near the bottom of the display when the obstacle or wire depiction is being provided as determined by the zoom scale. 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 TXi 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 TAWS-B is enabled in the TXi system, then the same alerts as the Terrain – FLTA configuration are provided plus additional alerts necessary for TSO-C151c compliance.

If the TXi 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 TXi configurations which provide alerts and all configurations where the TXi is interfaced to GNS or GTN with TAWS-B enabled:
    - An annunciator located on the PFD adjacent to the HSI provides text annunciations of system status, self-test, and alert conditions using yellow, red, or white as appropriate to the condition.

- For all TXi configurations which provide alerts and all configurations where the TXi 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 or close the popup window. On a GDU 1060, if a terrain alert occurs and the display is showing a full screen PFD, a button is provided which will return to split screen mode and display the dedicated terrain page.
    - The terrain page and map page 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 PFD installations, TXi 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 TXi configurations in which the TXi system provides alerts:

- Controls are provided in the menu on the Terrain Page. A "Terrain Inhibit" button inhibits terrain, obstacle, and powerline alerts when pressed. Annunciations are provided on the PFD and Terrain Page to indicate that alerts are inhibited. A "Terrain Test" button initiates a self-test sequence which results in aural and visual self-test annunciations.

7.18.1 Charts

The MFD can provide depiction of aeronautical charts on a dedicated charts page as well as the map page. Charts are geo-referenced on both the map and charts pages. The map page will always depict the chart that is currently selected on the charts page; this chart is overlaid on top of the terrain, TOPO, and Basemap layers but below the traffic and ownship layers. The overlaid chart is oriented appropriately for the current orientation of the map considering the selected map orientation and position/direction of the ownship. The charts page will include a depiction of the ownship, colored magenta, if the selected chart supports geo-referencing and the ownship is located within a geo-referenced portion of the selected chart. If geo-referencing is not available on the charts page an icon is presented that indicates the ownship is not being depicted.

7.18.2 Flight Plan Page

The MFD includes a Flight Plan page which displays the active flight plan from the selected GPS navigator. The flight plan page is only a display of the active flight plan from the navigator (flight plans in the navigator catalog cannot be displayed). The active flight plan cannot be edited using the MFD. Flight plan waypoints for which addition information is available appear as buttons. Touching a button will jump to the Waypoint Info page for that waypoint.

On a GDU 1060, the active flight plan is shown for the GPS source that corresponds to the PFD CDI selection (e.g. GPS 1 when the CDI source is GPS 1 or VOR/LOC 1, GPS 2 when the CDI source is GPS 2 or VOR/LOC 2). This is the same GPS source shown on the PFD NAV Status field. If a G5 is installed as part of the GFC 500 system, the navigation source matches the TXi and there is no side (1 or 2) indications on the G5.

On a GDU 700P MFD, the active flight plan for the associated PFD is displayed (e.g.- if the co-pilot has a PFD and MFD in the co-pilot panel, the co-pilot PFD CDI selection will change the flight plan data on the associated PFD). If the MFD is a center located stand-alone MFD, the flight plan shown will be from the pilot's PFD source selection.

7.18.3 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, Garmin GSR 56 Iridium Transceiver, 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 G500/G600 TXi system can optionally control various airborne weather radars and display their data. Weather radar data is depicted on the dedicated weather radar page and can be overlaid on the map page. The weather radar page contains controls for operating modes, gain, bearing, tilt, stabilization, horizontal and vertical scan sectors, and scan directions, as applicable. Controls for Garmin radars may include advanced functions such as altitude compensating tilt, turbulence detection, weather advisories, and ground clutter suppression, and a 15-color scale. The TXi will automatically command the radar into standby mode upon landing.

NOTE

Weather radar may be shown on multiple cockpit displays, and some other displays may use a 3-color scale for weather returns (instead of a 4-color scale). The 4-color scale used in the TXi is displayed on the radar page, and the 4-color scale provides additional distinction between heavy (red) and extreme (magenta) returns.

The GWX 70/75/80 Weather Radar can optionally provide a turbulence detection function. The turbulence detection function can only detect turbulence between 2.5 nautical miles and 40 nautical miles ahead of the aircraft. The display of turbulence is only provided when the radar range is set to 160 nautical miles 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.

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.

7.18.4 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, or by navigating to the Waypoint Info page group from the home page

7.19 Engine Indicating System

Engine Indicating functions are optionally provided for single and twin-engine aircraft with four and six-cylinder reciprocating engines, and some single-engine turboprop aircraft powered by Pratt & Whitney PT6A derivative engines.

The following indications are provided in all EIS installations:

Piston Powered Aircraft	Turboprop Powered Aircraft
Tachometer Manifold Pressure (If required) Fuel Flow Oil Pressure Oil Temperature Cylinder Head Temperature (CHT) Exhaust Gas Temperature (EGT)	Torque Propeller RPM Gas Generator RPM Engine Temperature (ITT) Fuel Flow Oil Pressure Oil Temperature

Other engine indications in the aircraft may be provided by either the EIS display or previously installed indicators in their original locations. The following indications may be provided on the G500/G600 TXi EIS display:

- 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
- Vacuum or Air Pressure (e.g.- instrument suction or deice boot pressure)

Pilot-selectable data fields may be present on GDU 700P/L displays, or on the MFD Engine page. Additional functions provided by the EIS system include a fuel computer, hour meters, percent power, and pilot-selectable engine advisories.

The layout of EIS gauges is dependent on the G500/G600 TXi 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.

For installations in which the EIS display is not within the primary field of view, an EIS annunciator is required to be installed within the primary field of view which will draw the pilot's attention to the EIS display when certain parameters are outside normal operating ranges. This annunciation may be provided on a G500/G600 TXi PFD or by a separate red/yellow "ENGINE" annunciator lamp.

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, or by means of dynamic gauge markings based on the state of the engine or other parameters (e.g.- Altitude, OAT, etc.). Consult the EIS Appendix of this document for aircraft specific dynamic EIS settings.

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

The primary engine gauges (see Table 7-2) change the color of the digital readout, gauge title, and pointer to yellow or red when in non-normal ranges. Other gauges will flash when entering a non-safe range and cause the ENGINE annunciator (if installed) to illuminate and flash.

Piston Powered Aircraft	Turboprop Powered Aircraft
Engine Tachometer Manifold Pressure Fuel Flow Oil Pressure	Torque Propeller RPM Gas Generator RPM Engine Temperature (ITT) Fuel Flow

Table 7-2: Primary Engine Gauges

On the GDU 700, flashing will continue indefinitely until the pilot manually acknowledges the alert by pressing the "ACK" button at the bottom on the screen. The color of the "ACK" button is dependent on the type of alert being issued. On the GDU 1060 with a full-time 20% EIS strip present, a parameter will flash for 10 seconds with no option for pilot acknowledgment. After 10 seconds, the flashing will stop.

NOTE

Caution level alerts do not flash in turboprop equipped aircraft.

7.19.1 Dynamic Gauge Ranges (Single-Engine Aircraft Only)

In turboprop aircraft, the gauge markings may be dynamically updated based on certain conditions. For example, ITT gauge markings may change based on the state of the engine (e.g.- different marking while the engine is starting). This allows the pilot to easily interpret several different limitations for the engine that may be based on operating conditions such as temperature, air/ground logic, or engine parameters. The installer will configure those dynamic gauges based on the individual aircraft parameters listed in the aircraft Pilot's Operation Handbook.

- ☐ This installation includes EIS with dynamic gauges. Gauge indications could be different depending on the aircraft engine status. See the attached gauge diagrams for specific gauge markings.
- ☐ This installation does not include EIS with dynamic gauge markings.

7.19.2 Engine Tachometer (Piston Aircraft Only)

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.

7.19.3 Carburetor Air Temperature (Piston Aircraft Only)

The Carburetor Air Temperature gauge (if installed) is marked with a blue arc from -15 to 5 ºC 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).

7.19.4 CHT (Piston Aircraft Only)

A CHT cooling rate monitor is provided on the CHT graph gauge. A single blue down arrow is presented on the graph gauge when cylinder head temperature is decreasing at a rate of approximately 30 degrees Fahrenheit per minute. A double blue down arrow is displayed when the cylinder head cooling rate is approximately 60 degrees Fahrenheit per minute or greater.

The cylinders can be cycled through by touching the CHT gauge. Each cylinder will numerically display it's respective CHT, and after 10 seconds will revert to displaying the hottest CHT.

7.19.5 EGT (Piston Aircraft Only)

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 a primary EGT which is a measurement of the EGT in the exhaust manifold. On the GDU 1060, EGT information is presented on the EIS strip and the MFD engine page. The EIS strip gauge presents the primary EGT (if installed) or hottest EGT of the individual EGTs. The EGT presentation on the GDU 700P/L and GDU 1060 MFD EIS pages shows all cylinders plus primary EGT at the same time on a graphical gauge. Primary EGT is labeled as E, while individual cylinders are labeled by number. The digital EGT readout displays the hottest EGT or the EGT for the cylinder selected by the pilot by touching the EGT graph to cycle through the cylinders.

Cylinder specific EGT displayed on the EGT graph gauge does not provide configurable operating ranges (yellow, red) and will not provide any alerting or non-safe range indications to the pilot. Primary EGT displayed on the EGT graph gauge and bar gauge can be configured with blue arcs, green arcs, yellow arcs and red maximum lines.

7.19.6 Mixture Leaning (Piston Aircraft Only)

G500/G600 TXi EIS provides four different leaning modes depending on the installed configuration: rich of peak, lean of peak, primary EGT, and TIT leaning. The system lean mode can be set from the Engine Menu.

Lean mode is entered by pressing the Lean Button. When in lean mode peak, EGT/TIT is indicated by the appropriate temperature bar turning white on the graph gauge. A white line is also drawn at the recorded maximum EGT/TIT value. The system will display “PEAK” at the top of the CHT/EGT graph gauge for three seconds when a peak is detected. The top of the CHT/EGT will then display the EGT/TIT value for the appropriate cylinder/turbo and the temperature differential from the maximum recorded EGT/TIT value.

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 peak EGT is detected for each engine cylinder, the system will display the temperature differential from the recorded maximum EGT of the last cylinder to peak.

EGT leaning is available when the system is configured to display an EGT other than the EGTs for each cylinder (such as an EGT probe installed in the exhaust manifold). EGT leaning looks for a peak in primary EGT during the leaning process. Once a peak in EGT is detected, the system will display the temperature differential from the maximum primary EGT value.

TIT leaning is available when the aircraft is configured to measure a single TIT. TIT leaning looks for a peak in TIT during the leaning process. Once a peak in TIT is detected, the system will display the temperature differential from the maximum recorded TIT value.

The system supports dual TIT measurements for single engine aircraft. In this configuration, a leaning mode is available for the first TIT sensor to peak, TIT – First Peak, or for the second TIT sensor to peak, TIT – Second Peak. TIT – First Peak functions similar to rich of peak leaning mode. TIT – Second Peak functions similar to lean of peak leaning mode.

7.19.7 Fuel Quantity Indications

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.

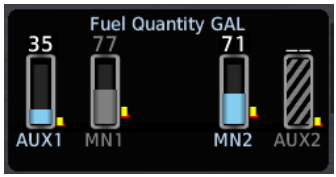


Figure 7- Fuel Tank States

In EIS configured to interface with some fuel conditioner units, the fuel gauge value is only read when the respective tank is selected. In these cases, on startup the tank that is not selected will show an uninitialized state using a gray barber pole as illustrated by the "AUX2" tank in Figure 7 above. In order to initialize the tank, the pilot need only select that tank until a valid quantity reading is achieved after which the pilot can select the appropriate tank for the flight condition. Active fuel quantity readings are indicated by a blue beaker or white digital values. Non-selected tanks indicate the previous fuel quantity for 5 seconds after being deselected, then indicate dashed values. The fuel beaker (if displayed) will show the last previous value when last selected for reference only. The non-selected fuel tanks will be "grayed out".

7.19.8 Fuel Computer

A Fuel Computer/Totalizer is provided on the GDU 1060 MFD engine page and on the GDU 700 EIS display. The Fuel Computer/Totalizer is accessed through the Menu. The fuel computer function provides computation and display of estimated fuel remaining, range, endurance, endurance at destination, fuel at destination, efficiency, 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 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. "TAB" and "FULL" buttons are available to aid the pilot in entering the initial estimated fuel. It is the responsibility of the pilot to ensure that the estimated fuel quantity value is accurate.

User calibration of the fuel flow measurements used for the fuel computer is provided. The fuel flow calibration function compares the estimated fuel used determined by the fuel computer with the actual fuel used determined by the pilot when refueling. Using these inputs, the system develops a fuel flow correction factor which will be applied to future fuel flow calculations. Calibration offset is limited to ±15% of the K-Factor.

7.19.9 Fuel Imbalance

The EIS may be configured with a fuel imbalance limitation. This limitation will be a published airframe limitation. When the imbalance condition is met, the EIS will indicate an imbalance and indicate the tanks that are associated with the imbalance condition. The pilot should take the appropriate action to remedy the fuel imbalance condition per the aircraft flight manual procedures.

7.19.10 Engine Advisories

Engine advisories can be configured by the pilot from the Engine Menu to provide notifications to the pilot via an Advisory notification when the pilot configured threshold has been exceeded. These thresholds are determined solely by the pilot are have no effect on the display of EIS operating range indications or gauge alerting and are not shown on the EIS page in any way.

The following parameters may be configured by the pilot to provide advisories:

Piston Powered Aircraft	Turboprop Powered Aircraft
High CHT	Low Oil TEMP
Low Oil TEMP	High Oil TEMP
High Oil TEMP	Low Endurance
CHT Cooling Rate	Low EST Fuel Remaining
EGT DIFF	Low Bus Voltage
Low Endurance	High Bus Voltage
Low EST Fuel Remaining	Low Battery Voltage
Low Bus Voltage	High Battery Voltage
High Bus Voltage	

Low Battery Voltage High Battery Voltage High TIT	

Table 7-3: Available Engine Advisories

7.19.11 Engine and Airframe Timers

The timers can be accessed from the Engine Menu or the startup screen.

Timer Label	Timer Function
FLIGHT	Flight timer increments in tenths of an hour whenever the aircraft is in an airborne state. This can be triggered via a weight on wheels switch, GPS ground speed, or true airspeed depending on the aircraft installation.
HOBBS	Analogous to an analog HOBBS meter that increments in tenths of an hour whenever one engine is registering >5 PSI of engine oil pressure.
TACH (piston-engine only)	Analogous to analog tachometers such that the timer increments based on the current engine RPM compared to the cruise power setting for that engine as determined by the installer.

Table 7-4: System Timer Functions

On multi-engine aircraft, the TACH hour meter for each engine will start incrementing when the respective engine is running, and are those TACH timers are tracked separately from one another.

7.20 Flight Stream 510 (Optional)

The Flight Stream product line uses a wireless transceiver to provide data to and from a GTN to personal electronic devices (PEDs). The Flight Stream 510 is mounted in the GTN SD card slot and includes a Bluetooth and Wi-Fi transceiver.

Data such as traffic, datalink weather, entertainment audio information, and attitude information is sent from the Flight Stream to the PED. The PED is capable of sending databases to the Flight Stream which will then be available on the GTN. Limitations regarding database operations are found in Section 2.31.

Garmin provides a list of tested and compatible devices that can be used with the Flight Stream. Connection to the Flight Stream 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

7.21 European Visual Reporting Points

If the TXi is interfaced to a GTN, and a flight plan contains a visual reporting point (VRP), the TXi must have a database that contains the VRP in order to appropriately display the VRP. If the database on the TXi does not contain the VRP, the VRP will display on the MFD map as an intersection.

7.22 Database Provided Altitudes

When the TXi displays 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 on the GTN navigator.

7.23 Cycle Counter / Landings Counter

The TXi can count takeoff and landing cycles along with engine cycles when EIS is included in the TXi system. The cycle information is based on the system detection of takeoffs, landings, and engine starts. The cycle counter is available in the System menu of the TXi.

7.24 Percent Power Indications

For both piston and turboprop EIS, percent power and total power (SHP, HP) are available to the pilot. SHP is available on the gauge inset or the pilot-selectable engine fields, and HP is only available on the pilot-selectable fields. Piston HP calculations are approximate, based on the availability of manifold pressure, engine RPM, fuel flow, and outside air temperature. The value is precise enough to verify power settings. In all cases the aircraft POH should be the primary reference for engine power settings.

7.25 Rudder Trim Gauge

The rudder trim gauge can be configured with a green gauge range to indicate approved takeoff position for the rudder trim. If no green range exists on the rudder trim gauge, the pilot is responsible for determining the appropriate trim position for all flight operations. The rudder trim may not be symmetrical and the gauge limits may be different between the full-scale left and full-scale right position of the gauge. Refer to the aircraft operating manual for specific details of the rudder trim system.

7.26 Pilot Configurable MFD Startup Pages

The MFD allows for the pilot to select a specific startup page. This page will be shown in lieu of the HOME page on system startup when selected. Additionally, in PFD/MFD or MFD/MFD GDU 1060 installations, the pilot can elect to start the system in a full-screen mode for a single pane. The pilot can always revert the system to its default startup behavior on the Systems → Setting page for each MFD pane and all MFD pages are still accessible from the HOME page or via MFD knob controls.