ENSTROM 480B OPERATOR'S MANUAL

AND

FAA APPROVED

ROTORCRAFT FLIGHT MANUAL

SUPPLEMENT

GARMIN GTN 650 GPS/NAV/COM
(NAV DISABLED)

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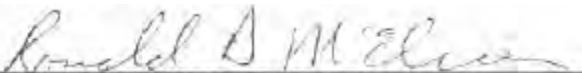
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THIS SUPPLEMENT MUST BE CARRIED IN THE HELICOPTER AT ALL TIMES IF EQUIPPED WITH THE GARMIN GTN 650 INSTALLATION. CHAPTERS 1, 2, 3, AND 4 ARE FAA APPROVED.

FAA APPROVED BY:⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

For TIMOTHY P. SMYTH, MANAGER
CHICAGO AIRCRAFT CERTIFICATION OFFICE
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FEDERAL AVIATION ADMINISTRATION

FAA APPROVAL DATE:⎯⎯MAR 0 5 2015⎯⎯

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ROTORCRAFT FLIGHT MANUAL SUPPLEMENT

GARMIN GTN 650 GPS/NAV/COM

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GARMIN GTN 650 GPS/NAV/COM

INTRODUCTION

Intro-1. General

This supplement contains the operating instructions, procedures, and limitations for the Garmin GTN 650. The supplement is divided into two basic parts, the FAA approved RFM Supplement and Supplemental Data provided by the Enstrom Helicopter Corporation (Enstrom). Chapters 1, 2, 3, and 4 make up the FAA approved RFM Supplement. It is required by Federal Regulations that this supplement be carried in the helicopter at all times if the Garmin GTN 650 unit is installed.

Intro-2. List of Abbreviations

Abbreviations noted in this supplement are listed in Intro-1.

Intro-1. List of Abbreviations

BC	Back Course
CB	Circuit Breaker
CDI	Course Deviation Indicator
COM	Communication
DR	Dead Reckoning
FAA	Federal Aviation Administration
GPS	Global Positioning System
GS	Glideslope
ICAO	International Civil Aviation Organization
ICS	Intercom System
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
LCD	Liquid Crystal Display
LDA	Localizer-type Directional Aid

Intro-1. List of Abbreviations - Continued

LNAV	Lateral Navigation
LOC	Localizer
LPV	Localizer Performance with Vertical guidance
MB	Megabyte
MLS	Microwave Landing System
NAV	Navigation
NAVAID	Navigation Aid
RFM	Rotorcraft Flight Manual
SBAS	Space-Based Augmentation System
SDF	Simplified Directional Facility
SW	Software
TAS	Traffic Advisory System
TAWS	Terrain Awareness and Warning System
TCAS	Traffic Collision Avoidance System
TIS	Traffic Information Service
TSO	Technical Standard Order
TX	Transmitter
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VNAV	Vertical Navigation
VOR	VHF Omni-Directional Range
VOX	Voice Activated
WAAS	Wide Area Augmentation System

CHAPTER 1. OPERATING LIMITATIONS

1-1. General

1. Rotorcraft operations with the GTN 650 are limited to VFR only.

2. The NAV function is not enabled. A placard in close proximity to the GTN 650 shall state:

> **NAV FREQUENCIES NOT ENABLED**

3. A placard in close proximity to the GTN 650 shall state:

> **GPS TO BE USED FOR VFR ONLY**

1-2. Pilot's Guide

1. The Cockpit Reference Guide, P/N 190-01004-04 Rev. F (or later revision), or Pilot's Guide, P/N 190-01004-04 Rev. F (or later revision), must be available for the flight crew whenever navigation is predicated on the use of the GTN 650.

1-3. System Software

1. The system must utilize the software versions listed in Table 1-1 (or later FAA approved version). The software versions are displayed during system initialization after power-up or they can be accessed in the System function page.

2. Subsequent software versions may support different functions. Check the GTN 625/635/650 Pilot's Guide for further information.

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Table 1-1. Approved Software Versions

Software Item	Approved Software Version
Main	5.00
GPS/WAAS	5.0
COM	2.13

1-4. Terrain Database

1. The GTN 650 is configured with the standard Terrain (HTerrain) Proximity function. The optional HTAWS feature is not approved for this installation.

2. Table 1-2 lists the compatible terrain database cards for the GTN 650 and area of coverage available.

NOTE

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

Table 1-2. Approved Terrain Database Cards

Database	Coverage Area
P/N 010-01157-41 (Americas – North)	Latitudes: 0° to N90° Longitudes: W180° to W30°
P/N 010-01157-42 (Americas – South)	Latitudes: N30° to S90° Longitudes: W180° to W30°
P/N 010-01157-43 (Atlantic – North)	Latitudes: 0° to N90° Longitudes: W30° to E90°
P/N 010-01157-44 (Atlantic – South)	Latitudes: N30° to S90° Longitudes: W30° to E90°
P/N 010-01157-45 (Pacific – North)	Latitudes: 0° to N90° Longitudes: W60° to E180°
P/N 010-01157-46 (Pacific – South)	Latitudes: N30° to S90° Longitudes: E60° to E180°

1-5. Navigation

1. No navigation is authorized north of 89° north latitude or south of 89° south latitude.

1-6. Weather Display

1. The Weather interface is not approved for this installation.

1-7. Traffic Display

1. The Traffic interface is not approved for this installation.

1-8. Music Services

1. The Services/Music feature (music, phone, text) is not approved for this installation.

1-9. Nav/Com

1. An aircraft radio station license is not required in U.S. airspace but may be required when operating internationally.

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CHAPTER 2. NORMAL PROCEDURES

2-1. General

After setting the Avionics master (**AVI MSTR**) switch ON (basic RFM para. 2-19) and prior to Engine Runup:

1. During GTN system initialization, perform the following start-up screen procedures when prompted. Press the **Continue** key when finished.

    a. Software and Database Versions and Dates Screen:

    1) <u>Check</u> to ensure databases are current.

    2) <u>Ensure</u> the applicable Terrain SD card is loaded if utilizing the GTN 650 HTerrain Proximity feature.

    b. Panel Self-Test and Fuel Settings Page:

    1) <u>Touch</u> each of the Fuel value keys and set the appropriate values as desired.

    2) <u>Check</u> to ensure CDI/HSI (if equipped) outputs and other displayed data are correct on the external interfaced equipment.

2. The normal operating procedures are detailed in the GTN 625/635/650 Pilot's Guide.

2-2. Approaches

CAUTION

GPS-based approaches with vertical navigation (LNAV+V, L/VNAV, and LPV) have not been evaluated in the 480B. Installation of this equipment is for reference only and does not constitute operational authority for use in IFR/IMC conditions.

NOTE

GPS is to be used for VFR only.

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1. During GPS approaches, the pilot must verify the GTN 650 is operating in the approach mode (LNAV, LNAV+V, L/VNAV, or LPV).

2. Accomplishment of an ILS, LOC, LOC-BC, LDA, SDF, MLS, VOR approach, or any other type of approach not approved for GPS overlay, is not authorized with GPS navigation guidance.

CHAPTER 3. EMERGENCY PROCEDURES

3-1. Emergency Procedures

Refer to the basic RFM.

3-2. Abnormal Procedures

CAUTION

GPS-based approaches with vertical navigation (LNAV+V, L/VNAV, and LPV) have not been evaluated in the 480B. Installation of this equipment is for reference only and does not constitute operational authority for use in IFR/IMC conditions.

1. If the GTN 650 loses GPS position and reverts to Dead Reckoning mode (indicated by the annunciation of "DR" in the lower left of the map display), the moving map will continue to be displayed. The aircraft position will be based upon the last valid GPS position and estimated by Dead Reckoning methods. Changes in airspeed or winds aloft can affect the estimated position substantially. Dead Reckoning is only available while navigating using an active flight plan and the flight phase is either En Route or Oceanic. If the unit is in or transitions to a Terminal and Approach phase of flight when Dead Reckoning takes place, "No GPS Position" will be displayed on the map pages and all navigation data will be dashed.

    a. If the GTN 650 GPS navigation information is not available, invalid, or is disabled utilize other remaining operational navigation equipment as appropriate.

2. If a "Loss of Integrity" (LOI) message is displayed during:

    a. Enroute/Terminal: Continue to navigate using GPS equipment and periodically cross-check the GPS guidance to other approved means of navigation.

    b. GPS Approach: GPS approaches are not authorized under LOI; execute missed approach or revert to alternate navigation.

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3. If, during a GPS LPV precision approach or GPS LNAV/VNAV approach, the message "APPROACH DOWNGRADE" is displayed, vertical guidance will be removed from the external CDI/HSI display (if equipped).

   a. Continue to fly the approach using published LNAV minimums.

4. The message "ABORT APPROACH" is triggered outside the MAP if the GTN system can no longer provide approach level of service. Vertical guidance will be removed from the external CDI/HSI display (if equipped).

   a. Initiate a climb to published safe altitude, abort the approach, and execute a non-GPS based approach.

5. The message "APPROACH NOT ACTIVE" is displayed if the GTN system is on approach and did not have the required position integrity to get to LNAV. It reverts to terminal limits.

   a. Abort the approach and execute a non-GPS based approach.

3-3. Emergency Frequency

1. To quickly tune and activate 121.50, press and hold the volume knob or the external remote COM Flip/Flop key or the remote frequency transfer button on the cyclic for approximately two seconds.

2. Under some circumstances if the COM system loses communication with the main system, the radio will automatically tune to 121.50 MHz for transmit and receive regardless of the displayed frequency.

3-4. Stuck Mic

A "Com push-to-talk key stuck" message will be issued if the microphone sticks in the ON or Transmit position. If the microphone is keyed for longer than 30 seconds, the unit will return to the receive mode on the selected frequency.

CHAPTER 4. PERFORMANCE DATA

4-1. General

Refer to the basic RFM.

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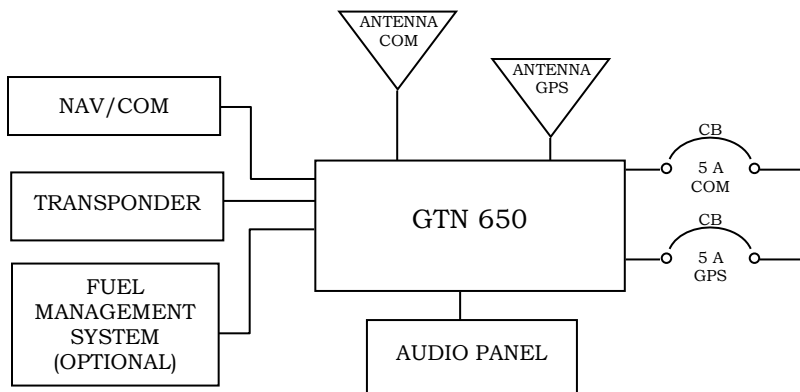## CHAPTER 6. WEIGHT/BALANCE AND LOADING

6-1. General

This installation is included in the basic aircraft weight. Refer to the basic RFM.

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CHAPTER 7. SYSTEM DESCRIPTION AND OPERATION

7-1. System Description

1. The GTN 650 combines a VHF com transceiver and a GPS/SBAS receiver in a single panel-mounted unit. For this configuration, the NAV function is disabled.

2. The GTN 650 installation can also interface with audio and fuel management systems, as well as integrate control and display of transponder functions. VOR/LOC/GS navigation, traffic, terrain (HTAWS), fuel management, and music functions are not configured for this installation. The system interface is shown in Figure 7-1.

3. The GTN 650 utilizes Navigation (Jeppesen), Basemap, SafeTaxi, Terrain and Obstacle databases for the map display. All combined, the map can display topographic data, boundary, road and obstacle information, airport surface diagrams, and location references for all airports, NAVAID, waypoint, and airspace information.

4. The GTN 650 front panel includes a 6.25 inch diagonal color LCD display with touchscreen controls. Most functions are operated and accessed by touching highlighted icons or keys from the main page. The front panel features are shown in Figure 7-2. A brief explanation of the controls is provided in Table 7-1.

Figure 7-1. GTN 650 System Interface

6. The SD card port is used to load and store data. Navigation, Basemap, SafeTaxi, and Obstacle databases and their respective updates are installed via SD card and copied into internal memory. The Terrain database is only stored on the SD card.

7. Power to the GTN 650 is provided via the **GPS** circuit breaker (CB) (5 Amp) and the **COM** circuit breaker (CB) (5 Amp) located on the left side of the instrument console.

7-2. Operation

1. Position the **AVI MSTR** switch to ON to apply system power, if not already switched on. Refer to paragraph 2-1 for Normal Procedures start-up.

2. Touch the applicable function icon on the **Home** page to access function control. Touch the Down key or the scroll bar to view the second page of function icons.

3. For complete operating procedures and detailed descriptions, refer to the GTN 625/635/650 Pilot's Guide. For basic operating procedures, also refer to the GTN 625/635/650 Cockpit Reference Guide.

   a. Touch the applicable function icon on the **Home** page to access function control. Touch the Down key or the scroll bar to view the second page of function icons.

   b. When a message has been issued by the unit, the **MSG** annunciator will blink. Touch the **MSG** key to view, then touch the **Back** key to return to the previous page.

   c. Databases are updated at various cycles. Updates are provided by Garmin and may be downloaded from the Garmin web site. Refer to the pilot's guide for additional information.

Figure 7-2. GTN 650 Front Panel/Main Page

Table 7-1. GTN 650 Front Panel Controls

Controls	Functions
Volume and Squelch Knob	Controls volume of the COM and NAV radios, and other volume levels for external audio input devices that are controlled via the GTN interface, if installed.
	Press to disable automatic squelch control of the COM radio.
	Press to use ident function of the NAV radio.
	Pressing and holding the volume knob will change the frequency to emergency frequency.
HOME	A single press of the Home Key returns the user to the main page to access features.
	Pressing and holding the Home Key while on any page will display the default NAV page.
(Direct-To)	Establish a direct course to a selected destination/waypoint
Large and Small Knobs	Rotate either knob to enter selections.
	Press and hold in the small knob to flip-flop COM and NAV frequencies.
	(Note: NAV function is disabled)
Touchscreen	Provides a visual display of touch-activated controls.
	Touch the icon or key to access the function or information.
SD Card	Used to load and store databases.