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FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT
or
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
for the
Garmin GTX 33X and GTX 3X5 Transponders with ADS-B
as installed in

Make and Model Airplane

Registration Number: ____________ Serial Number: ____________

This document serves as an FAA Approved Airplane Flight Manual Supplement or Supplemental Airplane Flight Manual when the GTX 33X or GTX 3X5 with ADS-B is installed in accordance with Supplemental Type Certificate SA01714WI. This document must be incorporated into the FAA Approved Airplane Flight Manual or provided as an FAA Approved Supplemental Airplane Flight Manual.

The information contained herein supplements the FAA approved Airplane Flight Manual. For limitations, procedures, loading and performance information not contained in this document, refer to the FAA approved Airplane Flight Manual, markings, or placards.

FAA Approved By: [Signature]

Erik Frisk
ODA STC Unit Administrator
Garmin International, Inc.
ODA-240087-CE

Date: 21-DEC-2017
<table>
<thead>
<tr>
<th>Revision Number</th>
<th>Date</th>
<th>Number</th>
<th>Description</th>
<th>FAA Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>05/01/2013</td>
<td>All</td>
<td>Complete Supplement</td>
<td>Robert Murray</td>
</tr>
<tr>
<td>2</td>
<td>03/08/2016</td>
<td>All</td>
<td>New supplement format with GTX 3X5 added.</td>
<td>Michael Warren</td>
</tr>
<tr>
<td>3</td>
<td>12/07/2017</td>
<td>All</td>
<td>Updated SW versions and removed section 3.2.3. Updated section 2.2 Corrected PED FAR reference and additional minor corrections.</td>
<td>See cover page</td>
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</table>
Table of Contents

SECTION                              PAGE
Section 1. GENERAL                  4
  1.1 GTX 33X                        4
  1.2 GTX 3X5                       6
  1.3 Capabilities                  8
  1.4 Installation Configuration    8
  1.5 Definitions                   11
Section 2. LIMITATIONS             12
  2.1 Minimum Equipment              12
  2.2 ADS-B Out                      12
  2.3 TIS Traffic Display with User Navigation Angle 12
  2.4 Applicable System Software     13
  2.5 Pressure Altitude Broadcast Inhibit (PABI) 13
  2.6 Datalinked Weather Display (GTX 345 Only) 13
  2.7 Portable Electronic Devices    13
Section 3. EMERGENCY PROCEDURES    14
  3.1 Emergency Procedures           14
  3.2 Abnormal Procedures            14
Section 4. NORMAL PROCEDURES       15
  4.1 Unit Power On                  15
  4.2 Before Takeoff                 16
Section 5. PERFORMANCE             16
Section 6. WEIGHT AND BALANCE      16
Section 7. SYSTEM DESCRIPTION      17
  7.1 GTX TIS Behavior              17
  7.2 GTX 345R and G950/1000 No Bearing Traffic Alerts 17
Section 1. GENERAL

1.1 GTX 33X

The Garmin GTX 33X family consists of the GTX 330 ES and GTX 33 ES (Non-Diversity Mode S Transponders) and the GTX 330D ES and GTX 33D ES (Diversity Mode S Transponders). The ES option of any of the transponders provides ADS-B extended squitter functionality.

All Garmin GTX 33X transponders are a radio transmitter/receiver that operates on radar frequencies, receiving ground radar or TCAS interrogations at 1030 MHz and transmitting a coded response of pulses to ground-based radar on a frequency of 1090 MHz. Each unit is equipped with IDENT capability to initiate the SPI (special position identification) pulse for 18 seconds and will reply to ATCRBS Mode A, Mode C and Mode S All-Call interrogation. Interfaces to the GTX 33X are shown in the following block diagrams.

Figure 1 – GTX 330 or GTX 33D Interface Summary
The GTX 33X performs the following functions:

- Transmission of ADS-B out data on 1090 extended squitter (1090 MHz)
  - Integration of data from internal and external sources to transmit the following data per 14 CFR 91.227:
    - GPS Position, Altitude, and Position Integrity
    - Ground Track and/or Heading, Ground Speed, and Velocity Integrity
    - Air Ground Status
    - Flight ID, Call Sign, ICAO Registration Number
    - Capability and Status Information
    - Transponder Squawk Codes between 0000-7777.
    - Emergency Status
    - IDENT - initiates SPI (special position identification) pulse for 18 seconds
  - Pressure Altitude Broadcast Inhibit
- Reception of TIS-A traffic data from a ground station
- Provides TIS-A traffic alerting to the pilot via interfaced display and audio output
1.2 GTX 3X5

The Garmin GTX 3X5 family consists of the GTX 335, 335R, 345, and 345R transponders. The functional differences between each of these transponders are described in Table 1.

<table>
<thead>
<tr>
<th>Function</th>
<th>GTX 335</th>
<th>GTX 335 w/GPS</th>
<th>GTX 335R</th>
<th>GTX 335R w/GPS</th>
<th>GTX 345</th>
<th>GTX 345 w/GPS</th>
<th>GTX 345R</th>
<th>GTX 345R w/GPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel mount</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Remote mount</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mode S</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>ADS-B (out)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>ADS-B Traffic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>FIS-B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal GPS</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
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<tr>
<td>Bluetooth</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Optional Garmin</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Altitude Encoder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 – GTX 3X5 Unit Configurations

Interfaces to the GTX 3X5 are shown in Figure 3.
The GTX 3X5 performs the following functions:

- Transmission of ADS-B out data on 1090 extended squitter (1090 MHz)
  - Integration of data from internal and external sources to transmit the following data per 14 CFR 91.227:
    - GPS Position, Altitude, and Position Integrity
    - Ground Track and/or Heading, Ground Speed, and Velocity Integrity
    - Air Ground Status
    - Flight ID, Call Sign, ICAO Registration Number
    - Capability and Status Information
    - Transponder Squawk Codes between 0000-7777.
    - Emergency Status
    - IDENT - initiates SPI (special position identification) pulse for 18 seconds
  - Pressure Altitude Broadcast Inhibit

The GTX 335 performs the following additional functions:

- Reception of TIS-A traffic data from a ground station
- Provide TIS-A traffic alerting to the pilot via interfaced display and audio output.

The GTX 345 performs the following additional functions:

- Reception of ADS-B In data on 1090 MHz
  - ADS-B (Data directly from another transmitting aircraft)
  - ADS-R (Rebroadcast of ADS-B data from a ground station)
- Reception of ADS-B In data on UAT (978 MHz)
  - ADS-B (Data directly from another transmitting aircraft)
  - ADS-R (Rebroadcast of ADS-B data from a ground station)
  - TIS-B (Broadcast of secondary surveillance radar) (SSR) derived traffic information from a ground station.
  - FIS-B (Broadcast of aviation data from a ground station)
- Provide ADS-B traffic information and alerting to the pilot via an interfaced display
Correlation and consolidation of traffic data from multiple traffic sources
- Aural and visual traffic alerting
- Provide FIS-B data to the pilot via an interfaced display
  - Graphical and textual weather products
    - NEXRAD
    - PIREPs
    - AIRMET/SIGMETs
    - METARs
    - TAFs
    - Winds Aloft
- Aviation Data
  - TFRs
  - NOTAMs

1.3 Capabilities
The Garmin GTX 33X and GTX 3X5 as installed in this aircraft have been shown to meet the equipment requirements of 14 CFR § 91.227 when operating in accordance with sections 2.1 and 2.2 of this supplement.

1.4 Installation Configuration
This aircraft is equipped with a GTX 33X and/or GTX 3X5 with the following interfaces/ features:
### Equipment Installed:

<table>
<thead>
<tr>
<th>Transponder #1</th>
<th>Transponder #2 (if installed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ GTX 330</td>
<td>☐ GTX 330</td>
</tr>
<tr>
<td>☐ GTX 330D</td>
<td>☐ GTX 330D</td>
</tr>
<tr>
<td>☐ GTX 33</td>
<td>☐ GTX 33</td>
</tr>
<tr>
<td>☐ GTX 33D</td>
<td>☐ GTX 33D</td>
</tr>
<tr>
<td>☐ GTX 335</td>
<td>☐ GTX 335</td>
</tr>
<tr>
<td>☐ GTX 335R</td>
<td>☐ GTX 335R</td>
</tr>
<tr>
<td>☐ GTX 345</td>
<td>☐ GTX 345</td>
</tr>
<tr>
<td>☐ GTX 345R</td>
<td>☐ GTX 345R</td>
</tr>
</tbody>
</table>

### Interfaced GPS/SBAS Position Source(s):

<table>
<thead>
<tr>
<th>GPS #1</th>
<th>GPS #2 (if installed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Internal</td>
<td>☐ Internal</td>
</tr>
<tr>
<td>☐ GTN 6XX/7XX Series</td>
<td>☐ GTN 6XX/7XX Series</td>
</tr>
<tr>
<td>☐ GNS 400W/500W Series</td>
<td>☐ GNS 400W/500W Series</td>
</tr>
<tr>
<td>☐ GNS 480</td>
<td>☐ GNS 480</td>
</tr>
<tr>
<td>☐ GIA 63W</td>
<td>☐ GIA 63W</td>
</tr>
<tr>
<td>☐ GDL 88 (GTX 330 only)</td>
<td>☐ GDL 88 (GTX 330 only)</td>
</tr>
</tbody>
</table>

### Interfaced Pressure Altitude Source:

<table>
<thead>
<tr>
<th>Pressure Altitude Source #1</th>
<th>Pressure Altitude Source #2 (if installed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ __________________________</td>
<td>☐ __________________________</td>
</tr>
<tr>
<td>☐ Garmin Altitude Encoder</td>
<td>☐ Garmin Altitude Encoder</td>
</tr>
</tbody>
</table>
Interfaced Remote Control Display (Required for remotely mounted GTX variants):

<table>
<thead>
<tr>
<th>Transponder #1 Remote Control Display</th>
<th>Transponder #2 Remote Control Display (if installed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ GTN 6XX/7XX</td>
<td>□ GTN 6XX/7XX</td>
</tr>
<tr>
<td>□ GNS 480</td>
<td>□ GNS 480</td>
</tr>
<tr>
<td>□ G950/1000 Display</td>
<td>□ G950/1000 Display</td>
</tr>
<tr>
<td>□ Gables 7534 Controller</td>
<td>□ Gables 7534 Controller</td>
</tr>
</tbody>
</table>

Interfaced Active Traffic System:

□ None
□ TCAD
□ TAS/TCAS

**NOTE**

If the system includes all of the following components:

- GTX 345R,
- G950/1000 Display, and
- TCAD or TAS/TCAS

Then the aircraft is no longer equipped with a TSO compliant active TCAD, TAS or TCAS system. Any operational requirement to be equipped with such system is no longer met.
1.5 Definitions

The following terminology is used within this document:

**ADS-B:** Automatic Dependent Surveillance-Broadcast

**AFM:** Airplane Flight Manual

**AFMS:** Airplane Flight Manual Supplement

**ATCRBS:** Air Traffic Control Radar Beacon System

**CFR:** Code of Federal Regulations

**ES:** Extended Squitter

**GNSS:** Global Navigation Satellite System

**GNS:** Garmin Navigation System

**GPS:** Global Positioning System

**GTX:** Garmin Transponder

**GTN:** Garmin Touchscreen Navigator

**ICAO:** International Civil Aviation Organization

**LRU:** Line Replaceable Unit

**PABI:** Pressure Altitude Broadcast Inhibit

**POH:** Pilot Operating Handbook

**SBAS:** Satellite-Based Augmentation System

**SW:** Software

**TCAS:** Traffic Collision Avoidance System

**TIS:** Traffic Information Service

**TX:** Transmit
Section 2. LIMITATIONS

2.1 Minimum Equipment

The GTX 33X and GTX 3X5 must have the following system interfaces fully functional in order to be compliant with the requirements for 14 CFR 91.227 ADS-B Out operations:

<table>
<thead>
<tr>
<th>Interfaced Equipment</th>
<th>Number Installed</th>
<th>Number Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncorrected Pressure Altitude Source</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>GPS SBAS Position Source</td>
<td>1 or more</td>
<td>1</td>
</tr>
<tr>
<td>Remote Control Display (for remotely mounted transponders)</td>
<td>1 or more</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 2 – Required Equipment

2.2 ADS-B Out

The GTX 33X and GTX 3X5 only comply with 14 CFR 91.227 for ADS-B Out when all required functions are operational. When the system is not operational, ADS-B Out transmit failure messages will be present on the remote control display interface, or the GTX 330 or GTX 3X5 panel display. If a Gables 7534 controller is being used the ADS-B equipment failure condition will be annunciated on the Gables display “Transponder Fail” while the ADS-B Out Position failure will be annunciated by the remotely installed “ADS-B POSN FAIL” Annunciator.

2.3 TIS Traffic Display with User Navigation Angle

Display of TIS traffic from a GTX 33/330 or GTX 335 is not permitted with an interfacing display configured for a navigation angle of “user”.

190-00734-15 Rev. 3 AFMS, Garmin GTX 33X and 3X5 XPDR with ADS-B FAA APPROVED Page 12 of 17
2.4 Applicable System Software
This AFMS/AFM is applicable to the software versions shown in Table 3.

The Main GTX software version is displayed on the splash screen during start up for the GTX 330 and GTX 3X5 panel mounted units, and the External LRU or System page on the interfaced remote control display for remotely mounted GTX transponders.

<table>
<thead>
<tr>
<th>Software Item</th>
<th>Software Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>GTX 33X Main SW Version</td>
<td>8.04</td>
</tr>
<tr>
<td>GTX 3X5 Main SW Version</td>
<td>2.12</td>
</tr>
</tbody>
</table>

Table 3 - Software Versions

2.5 Pressure Altitude Broadcast Inhibit (PABI)
Pressure Altitude Broadcast Inhibit shall only be enabled when requested by Air Traffic Control while operating within airspace requiring an ADS-B Out compliant transmitter. PABI is enabled by selecting the GTX to ON mode.

2.6 Datalinked Weather Display (GTX 345 Only)
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.

2.7 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.
Section 3. EMERGENCY PROCEDURES

3.1 Emergency Procedures

No Change.

3.2 Abnormal Procedures

3.2.1 LOSS OF AIRCRAFT ELECTRICAL POWER GENERATION
XPDR Circuit Breaker..............................................................PULL

Transponder and ADS-B Out functions will no longer be available.

NOTE
This guidance is supplementary to any guidance provided in the POH or AFM for the installed aircraft for loss of power generation.

3.2.2 LOSS OF GPS/SBAS POSITION DATA
When the GPS/SBAS receiver is inoperative or GPS position information is not available or invalid, the GTX will no longer be transmitting ADS-B Out data.

For GTX 330 installations:

NO ADSB annunciator illuminated:
Interfaced GPS position sources..............................VERIFY VALID POSITION

For GTX 3X5 installations:

NO 1090ES TX annunciator illuminated:
Interfaced GPS position sources..............................VERIFY VALID POSITION

For GTX 33 and GTX 3X5R installations:

Reference Display Device documentation for applicable annunciation:
Interfaced GPS position sources..............................VERIFY VALID POSITION
Section 4. NORMAL PROCEDURES

The procedures described below are specific only to the panel mounted GTX 330 or GTX 3X5 transponders. Cockpit Reference Guides and Pilot Guides for interfaced remote control displays will provide additional operating information specific to the displays or other traffic systems.

ADS-B Out functionality resides within the GTX transponders thereby providing a single point of entry for Mode 3/A code, Flight ID, IDENT functionality and activating or deactivating emergency status for both transponder and ADS-B Out functions. Details on performing these procedures are located in the GTX 330/330D Pilot’s Guide and GTX 3X5 Series Transponder Pilot’s Guide.

4.1 Unit Power On

For GTX 330 installations:

GTX Mode .............................................................. VERIFY ALT
NO ADSB .............................................................. CONSIDERED

For GTX 3X5 installations:

GTX Mode .............................................................. VERIFY ALT
NO 1090ES TX ....................................................... CONSIDERED

NOTE

The NO ADS-B or NO 1090ES TX Annunciation (or associated display annunciations) may illuminate as the unit powers on and begins to receive input from external systems, to include the SBAS position source.
4.2 Before Takeoff

For GTX 330 installations:

ADS-B TX................................................................. VERIFY ON
NO ADSB.............................................................. EXTINGUISHED

For GTX 3X5 installations:

1090ES TX CTL....................................................... VERIFY ON
NO 1090ES TX ...................................................... EXTINGUISHED

NOTE

The ADS-B TX or 1090ES TX CTL must be turned on and the NO ADS-B or NO 1090ES TX Annunciation (or associated display annunciations) must be EXTINGUISHED for the system to meet the requirements specified in 14 CFR 91.227. This system must be operational in certain airspaces after January 1, 2020 as specified by 14 CFR 91.225.

Section 5. PERFORMANCE

No change.

Section 6. WEIGHT AND BALANCE

See current weight and balance data.
Section 7. SYSTEM DESCRIPTION

The Garmin GTX 330 and GTX 3X5 Pilot’s Guides, part numbers, and revisions listed below contain additional information regarding GTX system description, control, and function.

<table>
<thead>
<tr>
<th>Title</th>
<th>Part Number</th>
<th>Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>GTX 330 Pilot’s Guide</td>
<td>190-00207-00</td>
<td>Rev. G (or later)</td>
</tr>
<tr>
<td>GTX 3X5 Pilot’s Guide</td>
<td>190-01499-00</td>
<td>Rev. A (or later)</td>
</tr>
</tbody>
</table>

Pilot’s Guides for interfaced displays, part numbers and revisions listed below, provide additional operating information for the Garmin GTX 33 and GTX 3X5R.

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<thead>
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<th>Title</th>
<th>Part Number</th>
<th>Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garmin GTN 725/750 Pilot’s Guide</td>
<td>190-01007-03</td>
<td>Rev. E (or later)</td>
</tr>
<tr>
<td>Garmin GTN 625/635/650 Pilot’s Guide</td>
<td>190-01004-03</td>
<td>Rev. E (or later)</td>
</tr>
<tr>
<td>GNS 480 Pilot’s Guide</td>
<td>190-00502-00</td>
<td>Rev. D (or later)</td>
</tr>
<tr>
<td>GTX 3X5 Series Transponder G1000 Pilot’s Guide</td>
<td>190-01499-01</td>
<td>Rev. A (or later)</td>
</tr>
</tbody>
</table>

7.1 GTX TIS Behavior
The TIS Standby/Operate controls for GTX 33/330 and GTX 335 units only function when the aircraft is airborne.

7.2 GTX 345R and G950/1000 No Bearing Traffic Alerts
No visual indication is provided for no bearing traffic alerts. Only an aural indication of the no bearing traffic alert is provided. If an aural alert for no bearing traffic has been previously issued, a “no bearing traffic clear” aural indication will be provided once all traffic alerts are resolved.

All aural alerts are inhibited below 500’ AGL, therefore a “no bearing traffic clear” aural may not be heard in a landing or touch and go flight scenario.