

L-3 Communications Vertex LLC
8092 HANGAR ROAD
SAN ANGELO, TEXAS 76904
FAA CRS# RCOR173N

AIRPLANE FLIGHT MANUAL SUPPLEMENT FOR
CESSNA MODEL T210N EQUIPPED WITH GARMIN
GNS-530 VHF COMMUNICATIONS TRANSCEIVER/
VOR/ILS RECEIVER / GPS RECEIVER.
N-2306D S/N-210-63828

FAA APPROVED
AIRPLANE FLIGHT MANUAL SUPPLEMENT
FOR
CESSNA MODEL T210N
WITH
GARMIN GNS 530 VHF COMMUNICATIONS TRANSCEIVER /
VOR/ILS RECEIVER / GPS RECEIVER

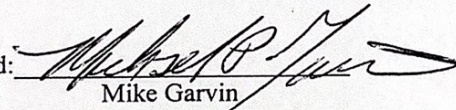
Reg. No. N-2306D
Serial No. 210-63828

This document must be carried in the aircraft at all times. It describes the operating procedures for the GARMIN GNS-530 navigation system when it has been installed in accordance with GARMIN Installation Manual 190-00181-02 Rev. C (Rev. A or later) and FAA Form 337 dated 4-19-04.

For aircraft with an FAA Approved Airplane Flight Manual, this document serves as the FAA Approved Flight Manual Supplement for the GARMIN GNS-530. For Aircraft that do not have an approved flight manual, this document serves as the FAA Approved Supplemental Flight Manual for the GARMIN GNS-530.

The information contained herein supplements or supersedes the basic airplane Flight Manual only in those areas listed herein. For limitations, procedures, and performance information not contained in this document, consult the basic Airplane Flight Manual.

FAA Approved:


Mike Garvin
Title: Aviation Safety Inspector
Office: SAT-FSDO
Federal Aviation Administration

FAA APPROVED
DATE: 4/12/2004

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CESSNA MODEL 441
GNS-530 VHF COMMUNICATIONS TRANSMITTER
VOR/ILS RECEIVER / GPS RECEIVER.
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REVISION	PAGE	LOG OF REVISIONS SUBJECT	APPROVAL	DATE
ORIGINAL	1-3	Initial Release	8-17	8-17-04
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FAA APPROVED
DATE: 7-12-04

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SECTION 1 – GENERAL

1. The GNS-530 System is a fully integrated, panel mounted instrument, which contains a VHF Communications Transceiver, a VOR/ILS receiver, and a Global Positioning System (GPS) Navigation computer. The system consists of a GPS antenna, GPS Receiver, VHF VOR/LOC/GS antenna, VOR/ILS receiver, VHF COMM antenna, and a VHF Communications Transceiver. The primary function of the VHF Communication portion of the equipment is to facilitate communication with Air Traffic Control. The primary function of the VOR/ILS Receiver portion of the equipment is to receive and demodulate VOR, Localizer, and Glide Slope signals. The primary function of the GPS portion of the system is to acquire signals from the GPS system satellites, recover orbital data, make range and Doppler measurements, and process this information in real-time to obtain the user's position, velocity and time.
2. Provided the GARMIN GNS-530 GPS receiver is receiving adequate usable signals, it has been demonstrated capable of and has been shown to meet the accuracy specifications for:
 - VFR/IFR enroute, terminal, and non-precision instrument approach (GPS, Loran-C, VOR, VOR-DME, TACAN, NDB, NDB-DME, RNAV) operation within the U.S. National Airspace System in accordance with AC20-138.
 - One of the approved sensors, for a single or dual GNS-530 installation, for North Atlantic Minimum Navigation Performance Specifications (MNPS) Airspace in accordance with AC91-49 and AC120-33.
 - The system meets RNP5 airspace (BRNAV) requirements of AC90-96 and in accordance with AC20-138, and JAA AMJ 20X2 Leaflet 2 Revision 1, provided it is receiving usable navigation information from the GPS receiver.

Navigation is accomplished using the WGS-84 (NAD-83) coordinate reference datum. Navigation data is based upon use of only the Global Positioning System (GPS) operated by the United States of America.

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SECTION 2 – LIMITATIONS

1. The GARMIN GNS-530 Pilot's Guide, P/N 190-00181-00, Rev. A, dated April 2000 or later appropriate revision must be immediately available to the flight crew whenever navigation is predicated on the use of the system.
2. The GNS-530 must utilize the following or later FAA approved software versions:

Sub-System	Initial Software Version	Current Software Version
Main	2.00	2.04
GPS	2.00	2.07
COMM	1.22	3.00
VOR/LOC	1.25	3.01
G/S	2.00	2.03

The Main software version is displayed on the GNS-530 self-test page immediately after turn-on for 5 seconds. The remaining system software versions can be verified on the AUX group sub-page 2, "SOFTWARE/DATABASE VER".

3. IFR enroute and terminal navigation predicated upon the GNS-530's GPS Receiver is prohibited unless the pilot verifies the currency of the data base or verifies each selected waypoint for accuracy by reference to current approved data.
4. Instrument approach navigation predicated upon the GNS-530's GPS Receiver must be accomplished in accordance with approved instrument approach procedures that are retrieved from the GPS equipment data base. The GPS equipment database must incorporate the current update cycle.
 - (a) Instrument approaches utilizing the GPS receiver must be conducted in the approach mode and Receiver Autonomous Integrity Monitoring (RAIM) must be available at the Final Approach Fix.
 - (b) Accomplishment of ILS, LOC, LOC-BC, LDA, SDF, MLS or any other type of approach not approved for GPS overlay with the GNS-530's GPS receiver is not authorized.
 - (c) Use of the GNS-530 VOR/ILS receiver to fly approaches not approved for GPS requires VOR/ILS navigation data to be present on the external indicator.
 - (d) When an alternate airport is required by the applicable operating rules, it must be served by an approach based on other than GPS or Loran-C navigation, the aircraft must have the operational equipment capable of using that navigation aid, and the required navigation aid must be operational.
 - (e) VNAV information may be utilized for advisory information only. Use of VNAV information for Instrument Approach Procedures does not guarantee Step-Down Fix altitude protection, or arrival at approach minimums in normal position to land.

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SECTION 2 – LIMITATIONS (Continued)

5. If not previously defined, the following default settings must be made in the “SETUP 1” menu of the GNS-530 prior to operation (refer to Pilot’s Guide for procedure if necessary):
- (a) **dis, spd** nm, kt (sets navigation units to “nautical miles” and “knots”)
 - (b) **alt, vs** ft, fpm (sets altitude units to “feet” and “feet per minute”)
 - (c) **map datum** WGS 84 (sets map datum to WGS 84, see note below)
 - (d) **posn** Deg-min (sets navigation grid units to decimal minutes)

NOTE: In some areas outside the United States, datums other than WGS-84 or NAD-83 may be used. If the GNS-530 is authorized for use by the appropriate Airworthiness authority, the required geodetic datum must be set in the GNS-530 prior to its use for navigation.

SECTION 3 – EMERGENCY/ABNORMAL PROCEDURES

EMERGENCY PROCEDURES

No Change

ABNORMAL PROCEDURES

1. If GARMIN GNS-530 navigation information is not available or invalid, utilize remaining operational navigation equipment as required.
2. If “RAIM POSITION WARNING” message is displayed the system will flag and no longer provide GPS based navigation guidance. The crew should revert to the GNS-530 VOR/ILS receiver or an alternate means of navigation other than the GNS-530’s GPS Receiver.
3. If “RAIM IS NOT AVAILABLE” message is displayed in the enroute, terminal, or initial approach phase of flight, continue to navigate using the GPS equipment or revert to an alternate means of navigation other than the GNS-530’s GPS receiver appropriate to the route and phase of flight. When continuing to use GPS navigation, position must be verified every 15 minutes using the GNS-530’s VOR/ILS receiver or another IFR-approved navigation system.
4. If “RAIM IS NOT AVAILABLE” message is displayed while on the final approach segment, GPS based navigation will continue for up to 5 minutes with approach CDI sensitivity (0.3 nautical mile). After 5 minutes the system will flag and no longer provide course guidance with approach sensitivity. Missed approach course guidance may still be available with 1 nautical mile CDI sensitivity by executing the missed approach.
5. In an in-flight emergency, depressing and holding the Comm transfer button for 2 seconds will select the emergency frequency of 121.500 Mhz into the “Active” frequency window.

SECTION 4 – NORMAL PROCEDURES

1. DETAILED OPERATING PROCEDURES

Normal operating procedures are described in the GARMIN GNS-530 Pilot's Guide, P/N 190-00181-00, Rev. A, dated April 2000 or later appropriate revision.

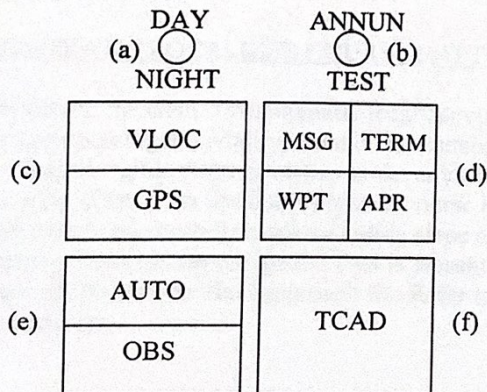
2. PILOT'S DISPLAY

The GNS-530 System navigation data will appear on the Pilot's CDI/HSI. The source of data is either GPS or VLOC as annunciated on the display above the CDI key and repeated on the remote VLOC/GPS annunciator/switch located on the upper left corner of the pilot's instrument panel.

NOTE: It is the pilot's responsibility to assure that published or assigned procedures are correctly complied with. Course guidance is not provided for all possible ARINC 424 leg types. See the GNS-530 Pilot's Guide for detailed operating procedures regarding navigation capabilities for specific ARINC 424 leg types.

3. SYSTEM REMOTE SWITCHES AND ANNUNCIATORS

The internal GNS-530 mode annunciators are repeated on switch / annunciators located on the upper left corner of the pilot's instrument panel. These switch / annunciator's function and display the same information as the switch / annunciator's in the GNS-530. The normal operating procedures of these switch / annunciator's are described in the GARMIN GNS-530 Pilot's Guide, P/N 190-00181-00. The switch / annunciator's are as follows:



- (a) DAY / NIGHT SWITCH – A 2 Position toggle switch, located adjacent to the GPS annunciator's, controls the intensity of the annunciator's.

SECTION 4 – NORMAL PROCEDURES (Continued)

3. SYSTEM REMOTE SWITCHES AND ANNUNCIATORS (Cont.)

- (b) ANNUNCIATOR TEST – A momentary push button switch, located adjacent to the above mentioned DAY / NIGHT switch, illuminates the annunciator's when pressed.
- (c) VLOC / GPS Mode Select Switch / Annunciator - VLOC (white) / GPS (green)
- (d) MESSAGE (MSG) / WAYPOINT (WPT) / TERMINAL (TERM) / APPROACH (APR) Annunciator – MSG (amber) , WPT (blue) , TERM (green) , APR (green)
- (e) AUTO / OBS Select Switch / Annunciator – AUTO (white) / OBS (green)
- (f) TCAD Annunciator – Annunciates traffic advisory warning (amber).

4. AUTOPILOT / FLIGHT DIRECTOR OPERATION

Coupling of the GNS-530 System steering information to the S-TEC 55 autopilot / flight director can be accomplished by engaging the autopilot / flight director in the NAV or APR mode.

When the autopilot / flight director system is using course information supplied by the GNS-530 System and the course pointer is not automatically driven to the desired track, the course pointer on the HSI must be manually set to the desired track (DTK) indicated by the GNS-530. For detailed autopilot / flight director operational instructions, refer to FAA Approved Flight Manual Supplement for the S-TEC 55 autopilot / flight director system.

5. AUTOMATIC LOCALIZER COURSE CAPTURE

By default, the GNS-530 automatic localizer course capture feature is enabled. This feature provides a method for system navigation data present on the external indicators to be switched automatically from GPS guidance to localizer / glide slope guidance as the aircraft approaches the localizer course inbound to the final approach fix. If an offset from the final approach course is being flown, it is possible that the automatic switch from GPS course guidance to localizer / glide slope course guidance will not occur. It is the pilot's responsibility to ensure correct system navigation data is present on the external indicator before continuing a localizer based approach beyond the final approach fix. Refer to the GNS-530 Pilot's Guide for detailed operating instructions.

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SECTION 4 – NORMAL PROCEDURES (Continued)

6. DISPLAY OF LIGHTNING STRIKE DATA

The BFGoodrich WX-500 Stormscope System is interfaced with the GARMIN GNS-530 System. Lightning strike data detected by the WX-500 will be displayed on the GNS-530 System. For detailed operating instructions regarding the interface of the GNS-530 with the WX-500, refer to the WX-500 Pilot's Guide and the GNS-530 Pilot's Guide Addendum for the WX-500 Stormscope interface.

7. DISPLAY OF TRAFFIC ADVISORY DATA

The Ryan International 9900B TCAD System is interfaced with the GARMIN GNS-530 System. Traffic Alert data detected by the 9900B TCAD System will be displayed on the GNS-530 System. For detailed operating instructions regarding the interface of the GNS-530 with the 9900B TCAD System, refer to the FAA Approved Flight Manual Supplement for the Ryan TCAD System, the Pilot's Guide for the Ryan TCAD System, and the GNS-530 Pilot's Guide Addendum for the Ryan TCAD System interface.

8. DISPLAY OF ALTITUDE INFORMATION

An Altitude Encoder supplies Altitude data to the GARMIN GNS-530 System. There are no controls or special operating procedures for use of the Encoder system. Altitude data is displayed on the GNS-530 "AUX PAGE".

9. DISPLAY OF ON BOARD FUEL INFORMATION

The Shadin Company Microflo-L Fuel Flow Indicating System is interfaced with the GARMIN GNS-530 System. On board fuel data is displayed on the GNS-530 "AUX PAGE". For detailed operating instructions regarding the interface of the GNS-530 with the Shadin Microflo-L System, refer to the FAA Approved Flight Manual Supplement for the Shadin Microflo-L Fuel Flow System, the Pilot's Guide for the Shadin Microflo-L System, and the GNS-530 Pilot's Guide for the Shadin Microflo-L Fuel Flow System interface.

SECTION 5 - PERFORMANCE

Refer to the original information. No Change

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SECTION 6 - WEIGHT & BALANCE

Refer to the current weight and balance information.

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SECTION 7 – AIRPLANE & SYSTEM DESCRIPTIONS

1. The GARMIN GNS-530 System is a fully integrated, panel mounted instrument, which contains a VHF Communications Transceiver, a VOR/ILS receiver, and a Global Positioning System (GPS) Navigation computer. The system consists of a GPS antenna, GPS receiver, VHF VOR/LOC/GS antenna, VOR/ILS receiver, VHF COMM antenna, and a VHF Communications Transceiver. The primary function of the GPS portion of the system is to acquire signals from the GPS System satellites, recover orbital data, make range and Doppler measurements, and process this information in real-time to obtain the user's position, velocity, and time. A Course Deviation Indicator (CDI) type display in the GNS-530 provides navigation data, which is repeated on the pilot's Horizontal Situation Indicator (HSI) when selected by the Nav Source Select Switch. Cross Track data is also coupled to the autopilot in the NAV and APR Modes. Bearing to Waypoint is displayed on the pilot's Radio Magnetic Indicator (RMI) Nav-1 Needle when GPS has been selected by the Nav Source Select Switch. Lightning Strike data received by the BFGoodrich WX-500 system and Traffic Advisory data received by the Ryan TCAD system is displayed on the GNS-530 system. On board Fuel Flow information from the Shadin Microflo-L system is displayed on the GNS-530 system. Switch/Annunciators mounted on the upper left corner of the pilot's instrument panel repeat VLOC, GPS, MSG, WPT, TERM, APR, AUTO, and OBS to provide status / failure / integrity data to the pilot. Refer to the GNS-530 Pilot's Guide for a complete description and operational functions of the GNS-530 System.

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