Garmin International, Inc.
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FAA APPROVED

ROTORCRAFT FLIGHT MANUAL SUPPLEMENT

for the

GARMIN 500W SERIES GPS-WAAS NAVIGATION SYSTEM

As Installed In

Bell 206L-3, L-4

Reg. No. _____ S/N _____

This document serves as a Rotorcraft Flight Manual Supplement when the aircraft is equipped in accordance with Supplemental Type Certificate **STC SR02080SE** for the installation and operation of the Garmin 500W Series GPS/SBAS Navigation System. This document must be incorporated into the FAA Approved Rotorcraft Flight Manual.

The information contained herein supplements or supersedes the basic Rotorcraft Flight Manual only in those areas listed herein. For limitations, procedures and performance information not contained in this document, refer to the FAA Approved Rotorcraft Flight Manual, markings, or placards.

FAA Approved By: _____
Michael Warren
ODA STC Unit Administrator
GARMIN International, Inc.
ODA-240087-CE

DATE: 10-July-2017

LOG OF REVISIONS				
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2	6	06/21/17	Added sections 1.9 and 1.10	See page 1

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Section 1. LIMITATIONS

1.1 Kinds of Operation

This model helicopter when equipped with the GNS 500W is limited to VFR ONLY operations in accordance with 14 Code of Federal Regulations Part 91 and Part 135. This RFMS does not grant approval for IFR operations. The placard listed below shall be located in close proximity to the 500W Series unit.

"**APPROVED FOR DAY/NIGHT VFR**"

1.2 System Software:

Use of this RFMS is limited to the software versions shown in Table 1. The software versions are displayed on the self-test page immediately after turn-on for approximately 5 seconds or they can be accessed in the AUX pages.

Software Item	**Approved Software Version** *(or later FAA approved versions for this STC)*	
	SW version	As displayed on unit
Main SW Version	5.20	5.20

Table 1 - Approved Software Versions

1.3 Navigation Database

The 500W Series unit database cards must be installed. The software automatically precludes invalid databases for use by the 500W. Database cycle information is displayed at power up on the screen, but more detailed information is available on the AUX – UTILITY page.

a) Installations with dual 400W/500W Series units will only crossfill between units when they contain the same database cycle. Updating of each database must be accomplished on the ground prior to flight.

1.4 Terrain Database

The 500W Series unit supports Terrain Proximity or HTAWS and requires a Terrain database card to be installed in order for the function to operate. Database cycle information is displayed at power up on the screen, but more detailed information is available on the AUX – UTILITY page. Terrain database cards contain the following data:

a) Due to the terrain resolution used in this system, the terrain database is divided into six regions [Americas North; Americas South; Atlantic North; Atlantic South; Pacific North; Pacific South]. Use of the proper database region must be verified by the pilot.

b) The Obstacle Database has an area of coverage that includes the United States and Europe, and is updated as frequently as every 56 days.

NOTE:

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

1.5 Navigation

No navigation is authorized north of 89° (degrees) north latitude or south of 89° (degrees) south latitude.

1.6 Terrain Proximity Display [All Units]

Terrain Proximity is the display of terrain information and comprises of a 2-D picture of the surrounding terrain and obstacles relative to the position and altitude of the rotorcraft, however it does not provide any alerts.

Navigation must not be predicated upon the use of the terrain display. The terrain display is intended to serve as a situational awareness tool only. By itself, it may not provide either the accuracy or the fidelity on which to base decisions and plan maneuvers to avoid terrain or obstacles.

Terrain may not be depicted on the terrain display within 1nm of airports and heliports, however terrain hazards may exist in these areas.

1.7 HTAWS Function [Units with HTAWS]

HTAWS shall NOT be used for navigation purposes.

HTAWS shall only be inhibited when in visual contact with terrain and when the pilot can be assured of maintaining clearance from terrain and obstacles.

RP Mode shall only be used when in visual contact with terrain.

External HTAWS annunciators installed in the aircraft shall be fully functional in order to use the HTAWS system.

1.8 Maximum Aircraft Operating Temperature

The maximum ambient air operating temperature of the helicopter shall be limited to +46°C if the helicopter is not equipped with Air Conditioning or the Air Conditioning is not functional.

1.9 Datalinked Weather Display (Optional)

This limitation applies to datalinked weather products from the GDL 88 or GTX 345.

Data link weather information shall not be used for maneuvering in, near, or around areas of hazardous weather.

The indicated data link weather product age shall not be used to determine the age of the weather information shown by the data link weather product.

Information provided by data link weather products may not accurately depict current weather conditions. Due to time delays inherent in gathering and processing weather data for data link transmission, the weather information shown by the data link weather product may be significantly older than the indicated weather product age.

Data link services shall not be the sole means used to obtain Temporary Flight Restriction (TFR) or Notice to Airmen (NOTAM) information. Not all TFRs and NOTAMS may be available on the GNS.

Datalinked text weather is decoded for the convenience of the pilot, however it is possible that the decoding may be affected by anomalies in the data or differences in the units of measure between the decoding system and the text weather source. All text weather displayed on the GNS also includes the raw weather text for pilot review.

1.10 Traffic Display (Optional)

The display of traffic is an aid to visual acquisition and shall not be utilized for aircraft maneuvering.

Traffic is displayed in feet regardless of the unit settings for altitude.

Section 2. NORMAL PROCEDURES

Refer to the 500W Series unit Pilot's Guide defined in the GENERAL section of this document for normal operating procedures. This includes all GPS operations, VHF COM and NAV, HTAWS and Multi-Function Display information.

2.1 Unit Power On

Database..... **REVIEW EFFECTIVE DATES**
Self Test.....**VERIFY OUTPUTS TO NAV INDICATORS**
Self Test - HTAWS Remote Annunciators (if installed):
HTAWS (Red).....**ILLUMINATED**
HTAWS (Yellow).....**ILLUMINATED**
HTAWS N/A (Yellow).....**ILLUMINATED**
AURAL MESSAGE..... **VERIFY VOLUME**
Self Test - HTAWS Annunciator on G500H (if installed):
HTAWS TEST .....**ILLUMINATED**

2.2 Before Takeoff

System Messages and Annunciators.....**CONSIDERED**

Section 3. EMERGENCY/MALFUNCTION PROCEDURES

3.1 Emergency Procedures

No change.

3.2 Abnormal Procedures

3.2.1 HTAWS WARNING

Red annunciator and aural "TERRAIN" or "OBSTACLE":
Aircraft Controls .....**INITIATE ESCAPE MANUEVER**

3.2.2 HTAWS CAUTION

Yellow annunciator and aural "TERRAIN" or "OBSTACLE":

VERIFY THE AIRCRAFT FLIGHT PATH AND CORRECT, IF REQUIRED.

3.2.3 HTAWS N/A and HTAWS FAIL

If the amber external HTAWS N/A status annunciator is displayed, the system will no longer provide HTAWS alerting or display relative terrain and obstacle elevations. The crew must operate the aircraft in a manner to ensure minimum safe terrain and obstacle separation.

3.2.4 LOSS OF GPS NAVIGATION

LOSS OF POSITION AND DR MODE ANNUNCIATED
Navigation.....**USE ALTERNATE MEANS**

If the Garmin 500W Series unit GPS navigation information is not available, or is invalid, utilize other remaining operational navigation equipment installed in the aircraft as appropriate. If the 500W Series unit loses GPS position and reverts to Dead Reckoning mode (indicated by the annunciation of "DR" in the lower left of the display), the moving map will continue to be displayed. Rotorcraft 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 in Enroute and Oceanic mode; Terminal and Approach modes do not support DR.

LOSS OF INTEGRITY (LOI) ANNUNCIATED

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

3.3 AVIONICS FAN FAIL

Amber "FAN FAIL" annunciator illuminated:

AV FAN Circuit Breaker ..... **RESET ONCE**
COM Radio Transmissions..... **REDUCE TO MINIMUM REQUIRED**
Non Essential Avionics in Pedestal ..... **POWER OFF**
Cockpit Ventilation..... **MAXIMIZE**

The avionics cooling fan ensures the Garmin 500W series units remain within operating temperature limitations when operating with high cockpit air temperatures. Failure of the avionics fan does not indicate an imminent failure of the GNS.

Section 4. PERFORMANCE

No change.

Section 5. WEIGHT AND BALANCE

See current weight and balance data.

MANUFACTURER'S DATA

Section 1. SYSTEM DESCRIPTIONS

The Garmin 500W Series Pilot's Guide, part number and revision listed below, contain additional information regarding GNS system description, control and function. The Pilot's Guides *do not* need to be immediately available to the flight crew.

- 500W Series Pilot's Guide & Ref P/N 190-00357-00 Rev J
- 400W/500W Series Optional Displays P/N 190-00356-30 Rev L

Although intuitive and user friendly the 500W Series unit requires a reasonable degree of familiarity to enable unit operations without becoming too engrossed at the expense of basic see-and-avoid. Pilot workload will be higher for pilots with limited familiarity in using the unit. Garmin provides training tools with the Pilot's Guide and PC based simulator. Pilots should take full advantage of these training tools to enhance system familiarization.

Garmin 500W Series GPS/WAAS Nav Com

The Garmin 500W Series GPS/WAAS Navigator is a panel-mounted product that contains a GPS/WAAS receiver for GPS approved primary navigation under TSO C146a, (plus optional VHF Com, VHF Nav radios and HTAWS) in an integrated unit with a moving map and color display. The 500W Series unit features a graphical display.

The navigation functions are operated by dedicated keys and graphical menus which are controlled by the buttons and the dual concentric rotary knob along the bottom and right side of the display.

Optional VHF Com and VHF Nav radio functions are controlled via dedicated buttons and knobs on the left side of the display and adjacent to frequencies they are controlling.

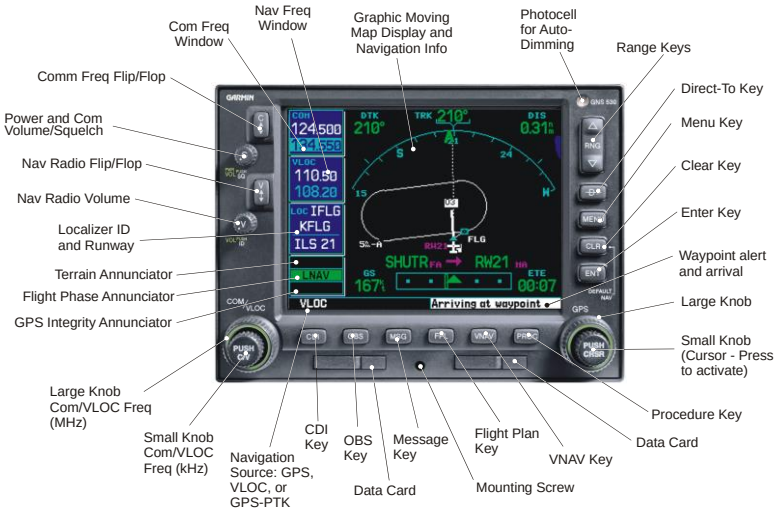

Figure 1 - 500W Series Control and Display Layout

Operation

GPS/WAAS TSO-C146a Class 3 Operation: The Garmin 500W Series unit uses GPS and WAAS (within the coverage of a Space-Based Augmentation System complying with ICAO Annex 10) for enroute, terminal area, non-precision approach operations (including “GPS”, “or GPS”, and “RNAV” approaches), and approach procedures with vertical guidance (including “LNAV/VNAV” and “LPV”).

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

TERRAIN PROXIMITY

Terrain Proximity refers to the display of terrain information and comprises of a 2-D picture of the surrounding terrain and obstacles relative to the position and altitude of the rotorcraft, however it does not provide any alerts.

Relative terrain elevation is depicted using a five color scale in which terrain that is at or above the helicopter’s current altitude is depicted in orange and red while terrain within 250 feet of the helicopter’s current altitude is shown in yellow.

Obstacles are depicted using a three color scale in which obstacles whose top is at or above the helicopter’s current altitude are shown in red while obstacles within 250 feet of the helicopter’s current altitude are shown in yellow.

The terrain page scale depicts the terrain scale but does not depict the obstacle scale.

NOTE

Terrain Proximity and HTAWS are separate features. If "HTAWS" is shown on the bottom right of the dedicated terrain page, then HTAWS is installed.

HTAWS

The GNS 500W can include an optional Helicopter Terrain Awareness and Warning System (HTAWS) which includes visual depictions of terrain and obstacles relative to helicopter altitude as well as visual and aural alerts if terrain or obstacles are a threat to the safe flight of the helicopter.

HTAWS is an alerting system. The system does NOT guarantee successful recovery from a conflict due to factors such as pilot response, aircraft performance, and database limitations. No standardized recovery technique is defined as recovery maneuvers may vary. HTAWS protection is provided at groundspeeds above 30 knots.

The Obstacle Database contains only KNOWN obstacles and does not contain ALL existing obstacles. The Obstacle Database does not contain the location of power line poles or wires.

HTAWS also includes pilot selectable Voice Callouts (VCOs) of helicopter height above terrain from 500 feet AGL to the surface.

If HTAWS is not installed, then the GNS 500W will provide Terrain Proximity functions which only provide visual depictions of terrain and obstacles on the map page but provides no alerting or VCOs.

TERRAIN AND OBSTACLE DEPICTION

Terrain and obstacle elevations relative to aircraft altitude are depicted on the Terrain page.

HTAWS NORMAL MODE

The GNS 500W will power on with HTAWS in Normal Mode. Normal Mode provides for separation from terrain and obstacles appropriate for enroute, night, and operations where the pilot is not in visual contact with terrain.

HTAWS REDUCED PROTECTION MODE

The "RP MODE" menu selection on the terrain page is used to activate the Reduced Protection (RP) functionality. RP Mode reduces alerting thresholds and suppresses aural and visual cautions to allow operation in closer proximity to terrain and obstacles while continuing to provide protection from terrain and obstacles. An optional "RP MODE" external switch installation on the

instrument panel or avionics console is allowed to toggle Reduced Protection mode in the same manner as using the Terrain Menu selection.

HTAWS INHIBIT

The "INHIBIT" menu on the terrain page is used to inhibit visual and aural HTAWS terrain and obstacle alerts. VCOs will still be provided. HTAWS shall only be inhibited if the pilot is certain of the ability to maintain separation from terrain and obstacles.

HTAWS TEST

The "HTAWS TEST" menu selection on the Terrain Page is used to activate a manual test which verifies proper operation of the aural and visual annunciations of the system. The aural message "HTAWS System Test, OK" is played if the system passes the test, if the system fails the test "HTAWS System Failure" is played. HTAWS test is only available while on the ground.

VOICE CALL OUTS

Voice callouts (VCOs) provide voice annunciation of the aircraft height above terrain when that altitude is descended through. VCOs may be enabled by the pilot in 100ft increments from 500 feet above ground level to the surface. Selecting the altitude above ground at which VCOs begin is accomplished using the Voice Callout Selection under the AUX Setup 2 page.

HTAWS ANNUNCIATORS

When HTAWS is installed, HTAWS Mode and Status annunciations are provided at the lower left corner of the HTAWS enabled GNS 500W unit. In addition, HTAWS Mode and Alert annunciators external to the GNS 500W will be present.

If an optional G500H system is installed in the helicopter then all HTAWS mode and status annunciators from the GNS 500W will be provided on the Primary Flight Display of the G500H.

If no G500H system is installed, then two HTAWS mode and status annunciators from the GNS 500W will be installed in the eyebrow panel adjacent to the aircraft annunciator panel. One annunciator provides visual alerts for HTAWS warning (red) and caution (yellow) conditions. The second annunciator indicates whether HTAWS protection is being provided by means of a dual color HTAWS N/A indication. When HTAWS N/A is illuminated in amber HTAWS protection is not being provided as the result of either a system failure or loss of a required input. When HTAWS N/A is illuminated in white HTAWS protection is not being provided as the result of either automatic inhibiting below 30 knots groundspeed or pilot inhibiting of HTAWS alerting.