

SERVICE INFORMATION NO. SI 40-033 SERVICE INFORMATION NO. SI D4-048

NOTE: SI's are used **only**:
1) To distribute information from DAI to our customers.
2) To distribute applicable information / documents from our suppliers to our customers with additional information.
Typically there is no revision service for SI's. Each new information or change of that will be send along with a new SI.

I. TECHNICAL DETAILS

1.1 Airplanes affected:

All DA 40 aircraft with GNS 430 or GNS 430A installed
All DA 40D aircraft with GNS 430 or GNS 430A installed
All DA 40F aircraft with GNS 430 or GNS 430A installed

1.2 Subject:

Garmin GNS 430/430A use of additional TERRAIN functionality
ATA-Code: 34-00

1.3 Reason:

Garmin has issued a new Service Bulletin regarding the GPS 400, GNC 420/420A and GNS 430/430A.

1.4 Information:

For detailed technical information see Garmin Service Bulletin which is applicable without any further additions or restrictions.

II. OTHERS

The Mandatory Service Bulletin No.: 0532 Revision B of Garmin is attached to this SI.

In case of doubt contact Diamond Aircraft Industries.



SERVICE BULLETIN

NO.: 0532 Revision B

(Revision B Supersedes All Prior 0532 Service Bulletins)

TO: All Garmin Aviation Service Centers

DATE: April 11, 2006

SUBJECT: Procedures to perform an alteration to a Garmin GPS 400, GNC 420/420A, or GNS 430/430A unit and means to obtain installation and operational approval for use of added TERRAIN functionality

Revision B: Provides revised procedures to incorporate an FAA approved Addendum to a new or existing Federal Aviation Administration (FAA) approved Airplane Flight Manual Supplement (AFMS) or Supplemental Airplane Flight Manual (SAFM) and procedures to return an airplane to service following installation of a unit incorporating TERRAIN function.

A. PURPOSE

This Service Bulletin (SB) describes procedures to perform an alteration to and means to obtain installation and operational approval for use of added TERRAIN functionality when incorporated into a Garmin GPS 400, GNC 420/420A, or GNS 430/430A unit. This TERRAIN functionality does not perform the functions of Terrain Awareness and Warning System (TAWS) and does not meet the performance requirements established under TSO-C151(), and is not intended to substitute for TAWS. This added TERRAIN functionality is advisory only. Note: TERRAIN functionality is not designed for, or intended for installation or operational use within any rotorcraft.

B. DESCRIPTION

Information contained within this SB provides procedures to modify (alter) a GPS 400, GNC 420/420A, or GNS 430/430A unit which consists of replacing the Map Board, adding a data card, and upgrading to Main software version 5.01, or later FAA approved version. Procedures for incorporating the FAA approved AFMS or SAFM Addendum to a newly proposed or previously FAA approved AFMS or SAFM, are also contained. Also contained within this SB is a specimen FAA Form 337 which describes the work accomplished showing compliance for the unit alteration and for incorporating the FAA approved AFMS or SAFM, as appropriate, as well as instructions for completing and submitting the FAA Form 337 for returning the airplane to service following installation of the altered unit. The Wichita Aircraft Certification Office (ACO) has approved Sections A, C-E, G, J, and K of this Service Bulletin. Procedures for completing and submitting the FAA Form 337 to record the approved alteration, as well as criteria for return-to-service of the airplane following installation of an altered GPS 400, GNC 420/420A, or GNS 430/430A unit were coordinated with the Aircraft Maintenance Division, Airmen and Avionics Branch.

C. APPROVAL

Approval for unit alteration and operational use of TERRAIN function is by Supplemental Type Certification (STC), SA00800WI (GPS 400), SA00801WI (GNC 420/420A), or SA00705WI (GNS 430/430A), as applicable.

Design assurance of the hardware and software, as well as the authorization to manufacture the Map Board are captured in the technical data recognized under the following Technical Standard Orders: TSO-C129a, TSO-C37d, JTSO-2C37e (ETSO-2C37e for the GNS 430A), TSO-C38d, JTSO-2C38e (ETSO-2C38e for the GNS 430A), TSO-C40c, JTSO-2C40c (ETSO-2C40c for the GNS 430A), TSO-C36e, JTSO-C36e (ETSO-C36e for the GNS 430A), and TSO-C34e, JTSO-C34e (ETSO-C34e for the GNS 430A).

D. AIRPLANE FLIGHT MANUAL SUPPLEMENT (AFMS) OR SUPPLEMENTAL AIRPLANE FLIGHT MANUAL (SAFM) ADDENDUM, AND PILOT'S GUIDE ADDENDUM REQUIREMENTS

400/500 Series Garmin Optional Displays Pilot's Guide Addendum, Garmin P/N 190-00140-13 Rev. G, or later, shall be provided to the airplane owner or operator. (This Pilot's Guide Addendum is included in the TERRAIN upgrade kit, P/N K00-00222-00).

GPS 400, GNC 420/420A, or GNS 430/430A AFMS or SAFM Addendum, Garmin P/N 190-00140-14 Rev. A, or later FAA approved AFMS or SAFM Addendum shall be inserted into a newly proposed or previously FAA approved AFMS or SAFM for the GPS 400, GNC 420/420A, or GNS 430/430A unit, in accordance with the following instructions:

1. Print a double-sided copy of the FAA approved AFMS or SAFM Addendum, as appropriate to the altered unit incorporating "TERRAIN." Alternately, utilize the copy of the FAA approved Addendum, P/N 190-00140-14, provided in the Installation Kit, P/N K00-00222-00.
2. Insert the FAA approved AFMS or SAFM Addendum for the GPS 400, GNC 420/420A, or GNS 430/430A, as applicable, at the end of Limitations section within the newly proposed or existing approved AFMS or SAFM, as appropriate.

Note: If there is no existing, previously approved AFMS or SAFM, an FAA approved placard may have been installed into the aircraft and described in a previously approved FAA Form 337 to limit kinds of operation of the GPS navigation equipment, i.e. "GPS Not Approved for Use in IFR." If this is the case, the FAA approved Addendum for operational use of Terrain functionality is the approved AFMS or SAFM which must be carried in the airplane and be immediately accessible to the flight crew or pilot.

3. The Service Center must complete and submit an FAA Form 337 for the airplane, describing the work accomplished. See pages 11 and 12 of this SB for specimen FAA Form 337 for language pertaining to installation and operational use. The FAA Form 337 must reflect the FAA approved AFMS or SAFM Addendum and compliance statements, as applicable, and will require no further review and approval by the FAA for installation and operational use of the TERRAIN function. See Section L on page 9 for further instructions.

E. PRODUCT AFFECTED

GPS 400, GNC 420/420A, and GNS 430/430A units without TERRAIN are affected. TERRAIN-equipped units can be positively identified by Mod 7 marking on the unit serial tag (identification label).

The following models are affected:

| Model | Garmin P/N |
|----------|--|
| GPS 400 | 011-00504-00, 011-00504-10 |
| GNC 420 | 011-00506-00, 011-00506-10, 011-00506-30 |
| GNC 420A | 011-00837-00, 011-00837-10 |
| GNS 430 | 011-00280-00, 011-00280-10, 011-00280-30 |
| GNS 430A | 011-00836-00, 011-00836-10 |

F. COMPLIANCE

Compliance with this SB is optional. If implemented, the alteration and approval instructions must be strictly adhered to as described herein.

G. REFERENCES

| Document | Garmin P/N |
|--|-------------------------------|
| GNS 430/430A Pilot's Guide | 190-00140-00, Rev. G or later |
| 400 Series Installation Manual | 190-00140-02, Rev. Q or later |
| 400 Series Maintenance Manual | 190-00140-05, Rev. D or later |
| 400/500 Series Garmin Optional Displays Pilot's Guide Addendum | 190-00140-13, Rev. G or later |
| GNC 420 Pilot's Guide | 190-00140-20, Rev. C or later |
| GPS 400 Pilot's Guide | 190-00140-60, Rev. B or later |
| GPS 400, GNC 420/420A, or GNS 430/430A Terrain Addendum | 190-00140-14, Rev. A or later |

H. MANPOWER

This modification will require approximately one hour (1.0) of labor including testing.

I. WARRANTY INFORMATION

This modification is optional and is not warranty reimbursable.

J. MODIFICATION INSTRUCTIONS

ESD & High Voltage Precautions



The 400 Series units contain static sensitive components. Observe proper anti-static procedures when replacing assemblies.

WARNING

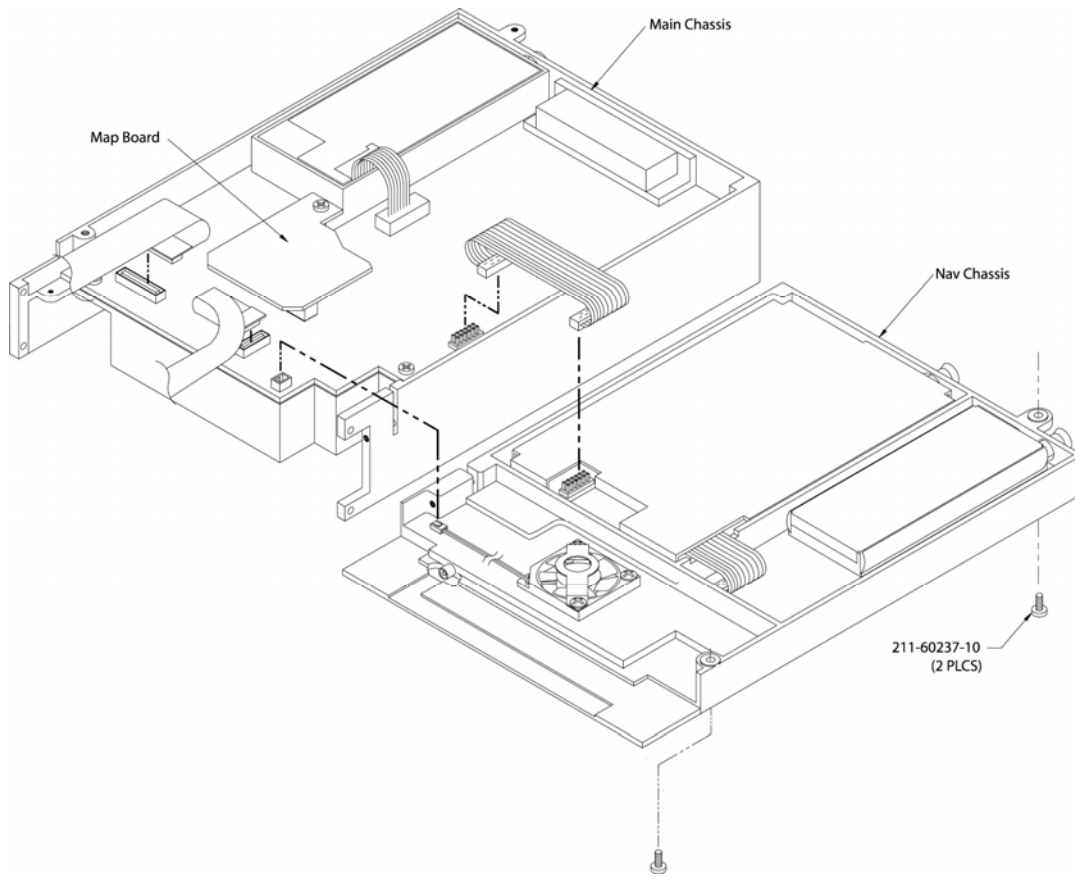
Do not replace assemblies with the unit turned on. Hazardous voltages exist on the Inverter Board. Under normal operating conditions the voltages range up to 2500 V ac peak to peak. Under open circuit conditions voltages can range over 8000 V ac peak to peak. Remove all power to the unit and wait at least six minutes before starting disassembly. Death or serious injury could result from electrical shock.

Remove the Map Board (012-00296-00)

1. Ensure unit is turned off and power is removed.
2. Remove the two screws (211-60237-10) that connect the Main Chassis to the Nav Chassis.
3. Open unit to expose the Main and Nav boards.
4. Remove the screw (211-60234-11) that secures the Map Board (012-00296-00) to the Main Board.
5. Lift the Map Board (012-00296-00) off the Main Board Connector.

Install the Map Expansion Terrain Board (012-00296-21)

1. Insert the Map Expansion Terrain Board (012-00296-21) onto the Main Board Connector.
2. Secure the Map Expansion Terrain Board (012-00296-21) to the Main Board using the screw (211-00114-00) provided in the kit.
3. Close the unit.
4. Secure the Main Chassis to the Nav Chassis using the two screws (211-60237-10).



Remove the Dummy Data Card (right card slot)

1. Gently press on the front center of the tab using a slight upward motion. This will partially deploy the swing arm handle.
2. Rotate the swing arm handle upward (and outward) until it locks into place, perpendicular to the face of the unit.
3. Grasp the swing arm handle and pull directly away from the face of the unit.

Insert the TAWS/TERRAIN Data Card (010-10201-20)

1. Ensure unit is turned off.
2. Place the TAWS/TERRAIN Data Card (010-10201-20) into the right card slot, with the label facing to the left and the swing arm handle at the bottom front.
3. Press the TAWS/TERRAIN Data Card into place until it seats on the internal connector and the front of the card is flush with the face of the unit. If the swing arm handle is up, gently close the handle and push it into place flush with the face of the unit.

Upload Main Software Version 5.01 or later

NOTE

This procedure will cause all user waypoints, flight plans, system setup, and satellite almanac information to be lost.

1. Check the unit's current software version for the Main Processor. This information can be viewed on the Software Version Page under the AUX Menu. If the Main Software Version is 5.01 or later, skip this procedure and proceed to the TERRAIN Configuration procedure.
2. Write down the display contrast level value on the Display Page, located on AUX page 4, before clearing the memory. This number will be required later in the process.
3. Remove the Jeppesen NavData Card from the left card slot.
4. Apply power and turn the unit on. Allow the Self Test to complete and press the ENT key to acknowledge as required.
5. Insert the software upgrade data card into the left card slot on the front of the unit. (Note: It may take several seconds before recognizing the data card).
6. Confirm the software upload by pressing the <ENT> key on the User Card Upload Confirmation Window.
7. The software upload status is displayed during the upload (upload time is approximately 30 seconds).
8. When complete, the unit will reset and a color display test will appear.
9. Turn the unit off and wait for the unit to power off.
10. Remove the software upgrade data card and place the Jeppesen datacard in the left card slot.
11. Turn the unit on and verify the new software version is 5.01 or greater on the Startup / Self-Test Page or Software Version Page.
12. Turn the unit off and wait for the unit to power off.
13. Press and hold the <CLR> key down while turning the unit on. (This will clear all memory including waypoints, user setup and satellite almanac information.) Verify

the success of this procedure by confirming the message “Stored data was lost” is displayed when MSG button is pressed.

14. Turn the unit off.
15. Turn the unit on and enter the display contrast level value (written down in Step 2) on the Display Page located on AUX page 4.
16. Connect an outside antenna to the unit and allow it to collect almanac data for 15 minutes.

TERRAIN Configuration

1. With the unit turned off ground Test Pin (J1-76).
2. Turn the unit on.
3. Using the CRSR knob go to the MAIN SYSTEM CONFIG page.
4. Select “Terrain” in the ‘CONFIGURE’ field.
5. Select “TERRAIN” in the ‘TERRAIN TYPE’ field.
6. Ensure “TERRAIN” appears in the ‘HW CONFIG’ field and “-21” appears in the ‘012-00296-’ field. If any other message is displayed in the ‘HW CONFIG’ field, there is a hardware conflict.



TAWS/TERRAIN Data Card Test

1. Using the large CRSR knob select ‘TEST CARD?’ and press the ENT key.
2. Ensure “PASS” appears in the ‘TEST CARD?’ field (test status is indicated by the percentage shown). If any other message appears in the ‘TEST CARD?’ field after the test is complete, ensure TAWS/TERRAIN Data Card is installed in the right card slot.

MOD Status

1. With an indelible marker, mark Mod 7 on the unit’s Mod Status Plate to indicate that this Service Bulletin has been complied with.

K. TESTING PROCEDURE

Successful completion of the modification steps above and the unit self-test process that occurs at each power on cycle is adequate to return the unit to service.

L. COMPLETING AND SUBMITTING THE FAA FORM 337 AND RETURNING THE AIRPLANE TO SERVICE

Successful completion of the Post Installation Check Out Procedure in the airplane, as described within the 400 Series Installation Manual (190-00140-02), is required to be performed in order to assure performance and airworthiness for returning the airplane to service.

Complete sections (blocks) 1 through 3 and 5 through 8 of the FAA Form 337, as appropriate to the airplane into which the altered GPS 400, GNC 420/420A, or GNS 430/430A with Terrain functionality is installed. Ensure that all the actions and compliance statements as described in block 8 of the Form 337, "Description of Work Accomplished", have been assured prior to returning the airplane to service. Submit your newly prepared FAA Form 337 to your local FAA Flight Standards District Office for processing, noting that no further FAA approval is required.

Note 1: Previous alterations performed to a GPS 400, GNC 420/420A, or GNS 430/430A unit and installations accomplished under the initial release of this Service Bulletin must include AFMS or SAFM limitations language equivalent to that provided in the approved Terrain Addendum referred to in this Service Bulletin, P/N 190-00140-14. The aircraft alteration must be documented in a FAA Form 337 and submitted to your Flight Standards District Office for processing. The initial release of this Service Bulletin referenced the following sample flight manual supplements:

GNS 430 Sample Airplane Flight Manual Supplement, 190-00140-04, Rev. M
GNC 420 Sample Airplane Flight Manual Supplement, 190-00140-24, Rev. J
GPS 400 Sample Airplane Flight Manual Supplement, 190-00140-64, Rev. K

These sample flight manual supplements (above) contain equivalent Limitations language as the FAA approved AFMS or SAFM Addendum, P/N 190-00140-14, referred to within Section D. As such, prior installations that utilized the referenced Sample AFMSs which were documented by FAA Form 337 and was previously FAA field approved and was included in the aircraft records, requires no further filing or submittal to the FAA for approval.

Note 2: If the GPS 400, GNC 420/420A, or GNS 430/430A unit was not configured to enable the Terrain capability upon initial installation, and Terrain is intended to be used, you must comply with this service bulletin, in its entirety, in order to facilitate approval for use.

M. MATERIAL INFORMATION

All parts required to modify one GPS 400, GNC 420/420A, or GNS 430/430A unit per this Service Bulletin are listed below:

| QTY | Part Number | Description |
|-----|--------------|---------------------|
| 1 | K00-00222-00 | TERRAIN Upgrade Kit |

A Software Upload Datacard is available if required:

| QTY | Part Number | Description |
|-----|--------------|---|
| 1 | 010-00194-10 | Software Upload Datacard, Main ver. 5.01, *NOTE * <i>This datacard carries a charge of \$50.00, which will be refunded upon return of the datacard to Garmin.</i> |

A connector kit is also available to construct a test harness if required:

| QTY | Part Number | Description |
|-----|--------------|--|
| 1 | 011-00351-04 | Upload connector kit <i>Consists of:</i> 78 Pin connector and pins |

MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act 1958)

| | | |
|--------------------|---|--|
| 1. Aircraft | Make | Model |
| | Serial No. | Nationality and Registration Mark |
| 2. Owner | Name (As shown on registration certificate) | Address (As shown on registration certificate) |

3. For FAA Use Only

4. Unit Identification

5. Type

| Unit | Make | Model | Serial No. | Repair | Alteration |
|-------------------|--|-------|------------|--------------------------|-------------------------------------|
| AIRFRAME | ~~~~~(As described in item 1 above)~~~~~ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| POWERPLANT | | | | <input type="checkbox"/> | <input type="checkbox"/> |
| PROPELLER | | | | <input type="checkbox"/> | <input type="checkbox"/> |
| APPLIANCE | Type | | | <input type="checkbox"/> | <input type="checkbox"/> |
| | Manufacturer | | | <input type="checkbox"/> | <input type="checkbox"/> |

6. Conformity Statement

| | | |
|------------------------------|--|--------------------|
| A. Agency's Name and Address | B. Kind of Agency | C. Certificate No. |
| | <input type="checkbox"/> U.S. Certified Mechanic <input type="checkbox"/> Foreign Certified Mechanic <input checked="" type="checkbox"/> Certified Repair Station <input type="checkbox"/> Manufacturer | |

D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

| | |
|------|------------------------------------|
| Date | Signature of Authorized Individual |
|------|------------------------------------|

7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is APPROVED REJECTED

| | | | | |
|----|--|--|--|-----------------|
| BY | <input type="checkbox"/> FAA Fit Standards Inspector | <input type="checkbox"/> Manufacturer | <input type="checkbox"/> Inspection Authorization | Other (Specify) |
| | <input type="checkbox"/> FAA Designee | <input checked="" type="checkbox"/> Repair Station | <input type="checkbox"/> Person Approved by Transport Canada Airworthiness Group | |

| | | |
|-------------------------------|--------------------------------|------------------------------------|
| Date of Approval or Rejection | Certificate or Designation No. | Signature of Authorized Individual |
|-------------------------------|--------------------------------|------------------------------------|

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

- a) Performed alteration to [GPS 400, GNC 420/420A, or GNS 430/430A unit, as applicable] applying the instructions contained in FAA approved sections of Garmin Service Bulletin 0532, Revision B.
- b) Installed and performed Post Installation Check Out Procedure in the airplane, as described within the 400 Series Installation Manual (190-00140-02, Rev Q or later), as required to assure performance and airworthiness for returning the airplane to service.
- c) Inserted FAA approved Addendum, Garmin P/N 190-00140-14, dated April 10, 2006 into [previously FAA approved or FAA approved, as appropriate] [Airplane Flight Manual Supplement or Supplemental Airplane Flight Manual, as applicable] containing limitations for operational use of Terrain functionality.
- d) Inserted Pilot's Guide Addendum, Garmin International, P/N 190-00140-13, Rev. G [or later FAA approved revision] into the airplane. As described in the FAA approved Addendum, the pilot or flight crew must refer to this Addendum for operational procedures for use of the Terrain functionality.
- e) Entered into the airplane maintenance records in accordance with 14 CFR part 43, section 43.9, the incorporation of this modified [GPS 400, GNC 420/420A, or GNS 430/430A unit, as applicable], as referenced in the Garmin Service Bulletin 0532, Revision B, and provided copy to the owner/operator.
- f) Performed functional ground test and operational flight check shall be accomplished in accordance with 14 CFR part 91, section 91.407(b) of installed [GPS 400, GNC 420/420A, or GNS 430/430A unit, as applicable] to ensure that no degradation of performance of it or other equipment and systems to which the [GPS 400, GNC 420/420A, or GNS 430/430A unit, as applicable] is interfaced, is affected.
- g) Refer to the Instructions for Continued Airworthiness (ICA) included within Appendix A of the 400 Series Installation Manual (190-00140-02) applicable to model of [GPS 400, GNC 420/420A, or GNS 430/430A unit, as applicable].

-----END-----

Additional Sheets Are Attached

Garmin Ltd. or its subsidiaries
c/o Garmin International, Inc.
1200 E. 151st Street
Olathe, Kansas 66062 U.S.A.

**GPS 400, GNC 420/420A, GNS 430/430A AFMS / SAFM
(Airplane Flight Manual Supplement / Supplemental Airplane Flight Manual)
Terrain Addendum**

The GPS 400, GNC 420/420A, GNS 430/430A AFMS / SAFM (Airplane Flight Manual Supplement / Supplemental Airplane Flight Manual) Terrain Addendum contains the limitations for the GARMIN GPS 400, GNC 420/420A, or GNS 430/430A units when installed in accordance with STC SA00800WI (GPS 400), SA00801WI (GNC 420/420A), SA00705WI (GNS 430/430A), or follow-on field approved installations, modified in accordance with Garmin Service Bulletin No. 0532 to add the Terrain feature.

Insert this addendum into the Limitations section of the existing AFMS / SAFM for the Garmin GPS 400, GNC 420/420A, or GNS 430/430A. The combination of the existing document and the inserted addendum serves as the FAA Approved AFMS / SAFM for the Garmin GPS 400, GNC 420/420A, or GNS 430/430A with Terrain.

FAA APPROVED



Margaret Kiine
Manager, Aircraft Certification Office
Federal Aviation Administration
Wichita, Kansas 67209

DATE: APRIL 10, 2006

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GPS 400, GNC 420/420A, GNS 430/430A AFMS / SAFM
(Airplane Flight Manual Supplement / Supplemental Airplane Flight Manual)
Terrain Addendum

LIMITATIONS

1. The GPS 400, GNC 420/420A, or GNS 430/430A when upgraded to include Terrain must utilize Main Sub-System Version 5.01 or later FAA approved software version. The Main software version is displayed on the self-test page immediately after turn-on for 5 seconds.
2. Navigation must not be predicated upon the use of the TERRAIN display.

NOTE: The terrain display is intended to serve as a situational awareness tool only and does not provide TAWS capability. It does not provide either the accuracy or fidelity, or both, on which to solely base decisions and plan maneuvers to avoid terrain or obstacles.

3. To avoid giving unwanted alerts, TERRAIN should be inhibited when landing at an airport that is not included in the airport database.
4. Pilots are NOT authorized to deviate from their current ATC clearance to comply with terrain/obstacle alerts from a TERRAIN unit except as allowed by 14 CFR Part 91.3(b). TERRAIN unit alerts are advisory only and are not equivalent to warnings provided by a TAWS unit.
5. The TERRAIN databases have an area of coverage as detailed below:
 - (a) The Terrain Database has an area of coverage from North 75° Latitude to South 60° Latitude in all longitudes.
 - (b) The Airport Terrain Database has an area of coverage that includes the United States, Canada, Mexico, Latin America, and South America.
 - (c) The Obstacle Database has an area of coverage that includes the United States.

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